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EDITORIAL :

ADOLESCENCE

Physiological basis to research perspectives

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Introduction:

The adolescence is state or period of development between the onset of puberty to adulthood. It usually begins between 11 and 13 years of age with the appearance of secondary sex characteristics and spans the teenage years, terminating at 18 to 20 years of age with the completion of the development of mature adult form.

This is the period of physical and psychological development from the onset of puberty to complete growth and maturity.

Our life span usually divided into four phases: a] childhood, b] Adolescence c] Adulthood d] old age.

Major physical growth rate is in accelerated phase during intrauterine life and early childhood. Then during childhood at certain level is in steady state. During adolescence the physical mental and reproductive growth is accelerated. This is second growth spurt. The emotional and psychological changes are so drastic that Perfectly "normal" and seemingly well adjusted children often turn into parents' worst nightmares. The common word associated with this phase of life is teenage. Some scientists divide adolescence into three phases i.e. a] early b] intermediate and c] late adolescence.

Physiological basic of adolescence:

The adolescence is about this 25% of population whose problems are unique in medical and research point of view and requires lots thinking and discussion. Due to full of energy during this phase but lack of adequate wisdom, in the absence of mature supervision, adolescents are highly vulnerable to wide spectrum of medical and health problems. Truly speaking they are very few specialists in the field of adolescence. This it self suggest that the young people are at highly health risk.

The main reason for this sudden growth spurt and reproductive, emotional and psychological changes during adolescence is that, during this period the body is exposed to new surge of hormones. These hormone are hormone released by the part of the brain called hypothalamus i.e. GnRH..... pituitary hormones i.e. FSH, LH..., hormone released by gonads i.e. testosterone, oestrogens, progesterone, and androgens hormones from adrenal cortex. The body is full of energy but there is lack of adequate emotional and mental development and maturation. Certain changes in brain neurotransmitter system especially dopaminergic, serotonergic and nor-adrenergic system make the adolescent more vulnerable to emotional fluctuation, aggression and depression. These neuro endocrinal factors are responsible for temptation of experimenting and high taking behaviors among adolescent. The moods and behaviors often identified as typical adolescent (*e.g., mood lability, mood intensity, irritability, conflict with parents are the hall mark of adolescent.*) Researches using fMRI (functional magnetic resonance imaging) and PET (positron emission tomography), it has been found that adolescent' motor skills are very good but their skills at determining levels of a decision's importance, consequences, and interpretation aren't fully developed until well into the 20s. It has been shown that melatonin level, the natural hormone secreted by pineal gland, in children and adolescents rise much later in the evening than for adults. In other words the brain is conditioned to keep an adolescent up later, which promotes late sleeping habits. **Virtually all systems under go change. And the most important is central nervous system.** Adults use the frontal cortex to sort out feelings and their reactions to those feelings while adolescent due to still developing stage of prefrontal cortex, use the amygdala for sorting the emotion and thoughts. Amygdala is relied upon for memory while the frontal cortex grounds emotional decision upon future consequences of the decision making process. This may help to explain adolescent's suicide (as an extreme emotional expression) where the person does not realize the negative consequences this may have upon family and friends. The behavior of adolescent is very difficult to change, but experts may initiate new strategies to help adolescents. Understanding and love may defuse many volatile situations, but physiology of the teenage brain may never be an excuse for a teenager's irresponsible actions; it's just that for them.

Future research perspectives:

It is worth to note that Significant, percentage of people with HIV and AIDS and unwanted pregnancy are adolescent and unfortunately due unsafe sex and require safer sex practice and reproductive education. The big proportion of population using drugs including tobacco is adolescents. Illiteracy and ignorance both are still equally important require attention. There are limitation in methods in reproductive health research, lack of motivation and attention all aspects of reproductive health and physiology researches. Cultural and economic constrains especially community based research is further limitation. Another area of research is hormone and non biological factors that appear to be important in moderating the role of hormones in adolescent moods and behavior and CNS functions.

Interaction between endocrine and central nervous system require special attention in research. Pubertal increases in gonadal hormones are a hallmark of adolescence, although there is little evidence for a simple association of these hormones with behavioral change during adolescence. Prominent developmental transformations are seen in prefrontal cortex and limbic brain regions of adolescents across a variety of species, alterations that include an apparent shift in the balance between mesocortical and mesolimbic systems. Developmental changes in these stressor-sensitive regions, which are critical for attributing incentive salience to drugs and other stimuli, likely contribute to the unique characteristics of adolescence and require further research. Usually it is believed that adolescent and young people are enjoying their life. We hope it is true. But the fact is different. Learning life skills to survive in this era of competition make the life full of stress for adolescent.

WHO EXPERTS has given following recommendations: 1 Curriculum-based reproductive system health education; 2 provision of accessible, effective contraception and good counseling to prevent unintended pregnancies; 3 integration of family planning and other sexual and reproductive health services into primary health care; 4 availability of safe abortion services in countries where abortion is not against the law; 5 organized screening to reduce cervical cancer incidence and mortality by as much as 80%; and 6 good quality youth-friendly services to assist young people in the prevention and management of the Consequences of unsafe sex.

ORIGINAL ARTICLES:

1) STUDY OF SERUM MALONYLDIALDEHYDE LEVELS AS AN INDICATOR OF OXIDATIVE STRESS DURING SHORT TERM & LONG TERM YOGA PRACTICES.

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Abstract:

Background : In the last few decades the incidence of psychomotor and psychiatric illness has created an awareness regarding the mental and emotional well being as an important criterion of health. This led to a renewed interest in the ancient Indian system of "Yoga". The present study is designed to see the effect of "Yoga" on oxidative stress in young healthy individuals. In this study serum Malonyldialdehyde (MDA) levels are taken as an indicator of oxidative stress.. **Materials & Methods:** Thirty two healthy subject were given minimum duration for Yoga for 1 hour/day and 5 days/week for 3 months and six months. Their serum Malonyldialdehyde (MDA) levels were evaluated at the end of 3 months and 6 months. **Result :** In yoga oxidative stress decreased significantly after 3 months and in highly significant values after 6 months. **Conclusion:** Thus short term as well long term yoga training is beneficial. Slowly and steadily yoga movements which brings about physical and mental relaxation with minimum energy expenditure and less oxygen consumption. reduces oxidative stress.

Introduction

Health is defined as Physical, mental and social well being and not merely the absence of disease.(1)

In the last few decades the incidence of psychomotor and psychiatric illness has created an awareness regarding the mental and emotional well being as an important criterion of health. Scientific methods of modifying and improving the mental aspect of health were investigated and this led to a renewed interest in the ancient Indian system of "Yoga".(2)

Intense physical activity in the form of strenuous exercise causes more oxygen consumption and more free radical production termed as oxidative stress, while in Yoga movements are done slowly and steadily which brings about physical and mental relaxation with minimum energy expenditure and less oxygen consumption. Thus it causes less oxidative stress.

Oxidative stress is production of oxygen radicals in biological system. Antioxidants are compounds that block the production of these free radicals. Various types of exercises already have been done. It is observed that variable results are drawn from these studies.

According to some studies there was increase in indicators of oxidative stress in the form of increased byproducts of lipid peroxidation (increased MDA levels) as the intensity and duration of exercise was more. On the other hand in other study it was found that endurance training reduced MDA level which is a byproduct of lipid peroxidation. (3,4)

More study oriented research is required to give exact relationship between oxidative stress in Yoga. The present study is designed to see the effect of "Yoga" on oxidative stress in young healthy individuals. In this study serum Malonyldialdehyde (MDA) levels are taken as an indicator of oxidative stress.

Materials and Methods- The present study was undertaken in 32 male individuals aged between 20-35 yrs . A proforma was made by which the subjects were selected after clinical examination consisted of, body weight, pulse, blood pressure, respiratory rate, body temp. Dietary history of each subject was taken at the time of first meeting and was instructed to follow same dietary pattern throughout the study period & advised standard diet. No previous or current training in any type of exercise.

A study design was told to each subject and Informed written consent was taken from each individual Symptoms suggestive of disease of any body systems, Family h/o carcinoma ,Recent exposure to radiation ,Addictions such as tobacco, Gutkha, alcohol ,Cigarette smoking etc were excluded from the study . Subjects who were joining Yoga center for one year and who were fulfilling all the criteria for selection were selected. It was confirmed that the persons were not doing any sort of strenuous exercise and not doing any heavy physical works during routine job.

Minimum duration for Yoga for 1 hour/day and 5 days/week. The subjects were doing Yoga in morning hours. The sessions used to begin with meditation and Pranayama. It included prarthana, dhyana and pranayama. Various asanas were performed and session ended with shavasanas. Each session lasted for about 40-60 minutes on an average. Asanas included were-Padmasana, Vajrasana, Garudasana, Bhujangasana, Dhanurasana, Shavasana etc.

About 10 ml of blood was collected early morning hours without food, from anticubital vein with all aseptic precautions. Serum was prepared by centrifugation and it was used for estimation of Malonyldialdehyde (MDA) as an index of lipid peroxidation in before yoga, at the end of 3 months of Yoga & at the end of 6 months of yoga.

Serum MDA is estimated by Buege and Aust (1978) method. (5) Malonyldialdehyde (MDA) is a highly reactive three carbon dialdehyde, produced from lipid hydro peroxides. It can also be derived by the hydrolysis of pentose from amino acids and from DNA .MDA has most frequently been measured by thiobarbituric acid reaction. (6, 7)

Observation & Result:

Table no.1 Average serum MDA levels before and after Yogic training (nmoles/ml)

Before Yoga (A) Mean+-S.D.	3 months after yogic training (B) Mean+-S.D.	6 months after yogic training (C) Mean+-S.D.	Difference between A & B	Difference between A & C
2.88± 0.29	2.74 ± 0.46	2.71± 0.44	0.14*	0.17**

There is statistically significant difference in average serum MDA values between the before & after 3 months yogic training . Also statistically highly significant.($p < 0.001$) difference in average serum MDA values between before and after the 6 months yogic training .

DISCUSSION

A combination of scientifically based information and circumstantial evidence indicates that physical activity is beneficial to health in general with specific physiological gains in various systems and many biochemical variables. Physical activity is associated with beneficial changes in serum lipid but exhaustive exercise has been suggested to increase oxidative stress. Increased mental stress also increase oxidative stress. ^(8,9,10)

Cells continuously produce free radicals and reactive oxygen species (ROS) as a part of metabolic processes. Increased mental stress and exercise can produce an imbalance between ROS and antioxidants, which is referred to as oxidative stress. ⁽³⁾

The marker used to determine the oxidative stress in blood and muscles is Malonyldialdehyde (MDA). MDA is sensitive marker of lipid peroxidation. The MDA - TBA reaction for MDA estimation is reliable indicator of lipid peroxidation and thus of oxidative stress. ^(7,10)

It is well known that free radicals are generated deliberately by animal cells in certain special circumstances as these are beneficial as bactericidal agents. Also free radical chain reaction takes place in our body countless times a day. Cigarette smoking, alcohol consumption, pollutants, sunlight, radiations, emotional stress, mental stress, excess

physical activity, and fast food all these can cause free radical formation and free radical chain reactions.

Most other factors influencing free radical production were ruled out and the present study was planned to study the effect of yoga on the production of free radicals. Yogic form of exercise which is mostly static exercise consisting of slow movements.

In this study the serum MDA levels were estimated as an indicator of oxidative stress in individuals performing Yoga. The serum values were estimated before, 3 months after and 6 months after yoga training

Table no. 1 shows the serum MDA levels in Yoga group. The values were ranging from 2-4 n moles/ml. During Yogic training different serum MDA values were observed in the same individual after 3 months and 6 months of Yogic training. It was observed that the average serum MDA value decreased after 3 months of Yogic that the average Yogic training (2.74 ± 0.46 nmoles/ml) when compared with the average serum MDA value before Yoga (2.88 ± 0.29 nmoles/ml) [table no.5]. This decrease was statistically significant ($p < 0.05$). Also there was highly significant decrease in serum MDA levels (2.71 ± 0.44 nmoles/ml) after 6 months of Yogic training when compared with the level before Yoga. ($p < 0.001$)

These study results were matched with the previous studies^(11,12,13,14) The decreased serum MDA levels indicating decreased oxidative stress was also observed previously even with 8 wks. of Yogic training,^(II)

These results could be the manifestations of body and mind relaxation by Yoga. It is proven fact that Yoga is science of holistic living and not merely a set of Asanas and pranayama. It is psychophysical and spiritual science, which aims at the harmonious development of human body, mind and soul. In Yoga physical postures and breathing exercises improve muscle strength, flexibility, blood circulation and oxygen uptake. The relaxation induced by meditation help to stabilize the autonomic nervous system with a tendency towards parasympathetic dominance i.e. decreased heart rate, decreased blood pressure and hence decreased tissue demand of oxygen.^(2,15,16)

In Yoga oxygen consumption decreased as person is adjusted to all meditation techniques, as the person relaxed by yogic training the mental or emotional stress is reduced. Thus as a stress relaxation technique it must have contributed in decreased free radical generation. Also as the individual performing Yoga is accustomed to all Yogic techniques, the oxygen consumption is decreased. Less the oxygen consumption, less is the free radicals production and hence less is the oxidative stress.^(17,18,19)

Thus, Yoga contributes to physical relaxation as well as mental relaxation. In Yoga movements are done slowly and steadily. It strengthens many systems of body like cardiovascular system and respiratory system to provide tissue demands at lower energy expenditure as improvement in the oxygen supply occurs. All these factors must have contributed in reducing oxidative stress.^(20,21)

Thus, Yogic training found to be beneficial in increasing body's antioxidant status due to its relaxation techniques. The modern living lifestyle is known to produce various physical and psychological stresses and subject the individual to produce oxidative stress. Yoga is a

psychophysical and spiritual science which causes physical and mental relaxation. Thus it causes relief from oxidative stress.^(20,22,23)

It was found that there was significant decrease in serum MDA levels indicating decreased oxidative stress (Table 1) thus probably Antioxidants must be utilized to combat oxidative stress.

After 6 months in Yoga group there was highly significant decrease in oxidative stress in the decrease in the serum MDA levels. (**figure 1**). Benefits of Yoga in cardiovascular strengthening, respiratory strengthening, mental relaxation as well as parasympathetic dominance caused reduction in oxidative stress.

Conclusions: Oxidative stress is decreased significantly in 3 months yoga practices highly significant decrease in 6 months yoga practices. Yoga practices should be encouraged to decrease oxidative stress as well as to decrease cardiovascular diseases due to oxidative stress.

Limitation : We have not studied the difference in sex i.e in female. So these finding will be confirmed in large number of individuals in male and females in future

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2) STUDY OF SER. FOLLICULAR STIMULATING, LUTENISING & PROLACTIN HORMONAL LEVELS IN PRIMARY INFERTILITY.

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ABSTRACT

Objectives:The aim of the study was to estimate the levels of follicle stimulating hormone, luteinizing hormone and prolactin hormone in Primary infertile women in Mumbai, Maharashtra, India. **Methodes:**The present investigation was carried out at Biochemistry Department, functioning at Grant Medical College & Sir J.J. Group of Hospitals, Byculia, Mumbai, from May 2011 to August 2011. Sample size was 30 Primary infertility Female. The inclusion criteria for the selection of cases were diagnosis of primary infertility, age between 20-40 years and duration of marriage more than one year. The exclusion criteria that were adopted during case selection were male factor infertility and amongst the female factors were tubal factor, any congenital anomaly of the urogenital tract, or any obvious organic lesion. The protocol for infertility work up in the women included: a detailed medical history, a gynecological examination, a hormonal profile (prolactin, FSH and LH). Five milliliters of

fasting venous sample obtained in the morning of day second of menstrual cycle for serum biochemical analysis. Serum was separated and stored for further analysis. . All the hormones, serum prolactin, LH and FSH were estimated using chemiluminiscence kits.

Conclusion:The serum FSH hormonal levels of the infertile women were lower level when compared to control groups & it was found to be statistically **highly significant**. The serum FSH mean & SD is 6.340 ± 1.497 ($P < 0.0001$) in the infertile group and 9.98 ± 2.99 in control group. The serum LH concentration was lower level in the infertile group than in the control group. & it was found to be statistically **highly significant** .The LH mean & SD is 4.077 ± 2.91 ($P < 0.0001$) in the infertile group & 7.85 ± 1.24 in control group.. The serum Prolactin concentration was increased in infertile group compared with control group. & it was found to be statistically **highly significant** .The serum Prolactin mean & SD is 25.22 ± 5.744 ($P < 0.0001$) in the infertile group & 17.89 ± 1.82 in control group.

INTRODUCTION

Infertility is a medical problem that affects a vast proportion of the world's young population (10-15%). A Large proportion of the world's population has no access to medical treatment for infertility and even in developed and emerging economies there are great inequalities in access to proper diagnosis and treatment. Infertility in this study is defined as inability to conceive after one year of unprotected adequately time intercourse. It has two types, primary infertility; it is a term used for a couple who have never achieved a pregnancy. Secondary infertility referred to a couple who have previously succeeded in achieving at least one pregnancy even if this ended in abortion (1).

Generally infertility is a multifunctional condition with more than one factor contributes to have the disease (1). Many parameters are outlined for the cause of infertility like age, lifestyle and physical problems etc. Greater focus on education and careers among women has triggered other trend in modern society, less frequent, early and late marriages and more frequent divorce are among the most striking cases of delayed childbirth. Expanding contraceptive options and access to family planning and legalized abortion services have markedly contributed to the declined birth rate. An ongoing epidemic of sexually transmitted infection, associated with increased risk of subsequent infertility of Chlamydia infection. The major causes of infertility include ovulatory dysfunction (15%), tubal and peritoneal pathology (30-40%), and male fact (30-40%) and uterine pathology (2).

1. FSH (follicle stimulating hormone):

Human Follicle Stimulating Hormone (FSH) is a glycoprotein (M.W. approximately 30000d).. FSH is secreted by the basophilic cells of the anterior pituitary.FSH is responsible for the proliferation of the follicular cell, for the development of the graafian follicle and for ovum maturation. (3)

2. LH (luteinizing hormone)

Luteinizing hormone (LH, also known as lutropin) is a hormone produced by the anterior pituitary gland. In Females, an acute rise of LH called the LH surge triggers ovulation and development of the corpus luteum. (3)

3. Prolactin

Prolactin is one of several hormones that is produced by the pituitary gland.. The most important role of prolactin is to stimulate milk production in women after the delivery of a baby. (4)

AIMS & OBJECTIVES

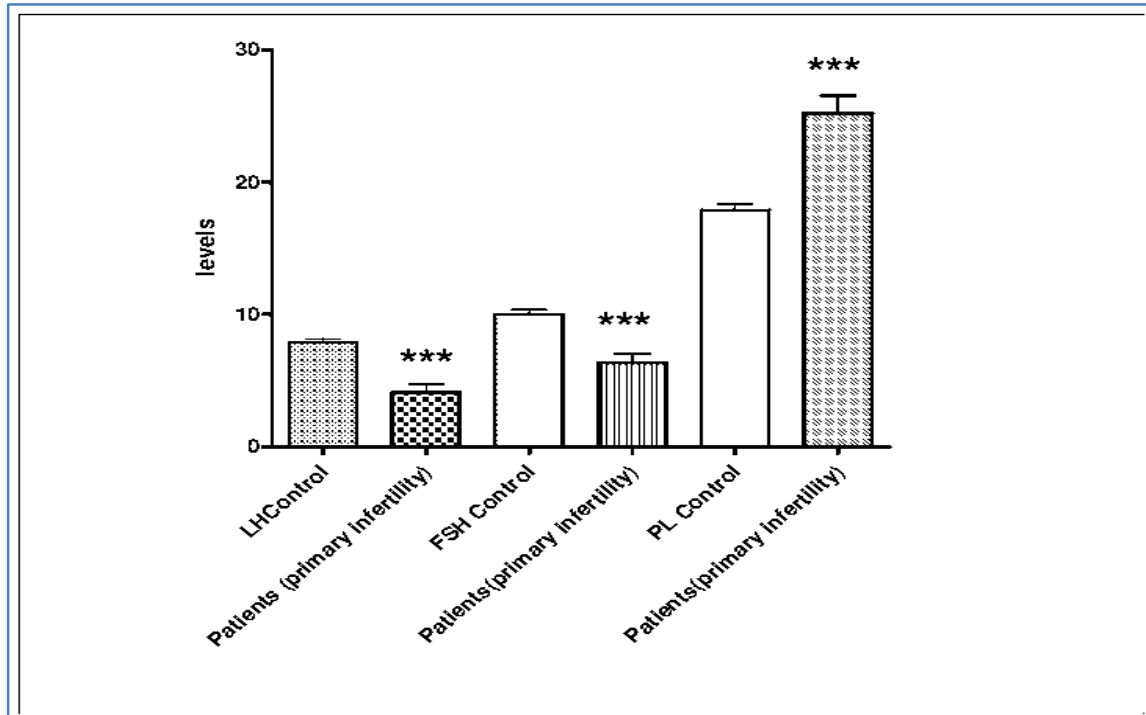
- The aim of the study was to estimate the levels of serum follicle stimulating hormone, luteinizing hormone and prolactin levels in Primary infertile women by IMMULITE 1000 chemiluminescent immunoassays.
- To study the comparison between concentration of serum FSH, LH and Prolactin in Primary infertile women.

Materials and methods

- It was observational study. Patient attending chemiluminescent lab in Biochemistry department taken as cases & control. The study was conducted at Biochemistry Department , functioning at Grant Medical College & Sir J.J. Group of Hospitals, Byculla, Mumbai , from May 2011 to August 2011. Sample size was 30 Primary infertility Female. The inclusion criteria for the selection of cases were diagnosis of primary infertility, age between 20-40 years and duration of marriage more than one year. The exclusion criteria that were adopted during case selection were male factor infertility and amongst the female factors were tubal factor, any congenital anomaly of the urogenital tract, or any obvious organic lesion.(1)
- Five milliliters of fasting venous sample obtained in the morning of day second of menstrual cycle for serum biochemical analysis. Serum was separated and stored for further analysis. All the hormones were estimated using chemiluminiscence kits of serum prolactin,.(2)

Statistical Analysis

Unpaired t test was applied for the comparison of hormonal levels in control and infertile women. Significance level was taken as $P < 0.0001$.



RESULT

The serum FSH hormonal levels of the infertile women was lower level when compared to control groups & it was found to be statistically highly significant.. The serum FSH mean & SD is 6.340 ± 1.497 (**$P < 0.0001$**) in the infertile group and 9.98 ± 2.99 in control group.

The serum LH concentration was lower level in the infertile group than in the control group. & it was found to be statistically highly significant . The LH mean & SD is 4.077 ± 2.91 (**$P < 0.0001$**) in the infertile group & 7.85 ± 1.24 in control group.

The serum Prolactin concentration was increased in infertile group compared with control group. & it was found to be statistically highly significant. The serum Prolactin mean & SD is 25.22 ± 5.744 (**$P < 0.0001$**) in the infertile group & 17.89 ± 1.82 in control group.

DISCUSSION

We found statistically significant decreased in serum FSH&LH with increased in serum prolactin levels in primary infertile women than in the control group. Our study coincide with study of Kyungza Ryu *et al.* (1991), states that 65.5% of infertile women with proper two phase menstrual cycles suffered from luteal phase defects but in 28.7% of cases lower values of FSH and LH were noticed.(5). According to Emo kpae M . A. et, there may be failure at the hypothalamus or pituitary (hypogonadotropic-hypogonadism) which result in decreased in serum FSH&LH with increased in serum prolactin levels and leads to infertility(4). Our study coincide with study of Emo kpae M . A. et, suggest that increased in

serum prolactin result in amenorrhea because of defect in the positive feedback of estrogen on LH, an lead to decreased in serum LH & FSH values.(6)

Our study coincide with study of K. Mohan & Mazher Sultana & suggest that decrease level of LH in the midcycle clearly indicates that there is a possibility of anovulation. Low levels of FSH and LH which may further explain the abnormal or delay ovum maturation. .(2)

According to A. Z. Mohammed increased prolactin may be the cause of low estrogen and progesterone concentration in the infertile subjects results in decrease in serum LH & FSH in infertile women (7).

CONCLUSION

We found statistically significant decreased in serum FSH&LH with increased in serum prolactin levels in primary infertile women than in the control group. There was a significant association between abnormal menstrual patterns & anovulatory cycles as observed in infertile groups with raised serum prolactin level. There is also a higher prevalence hyperprolactinemia in Infertile groups.

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5) CANDIDA SPECIES IDENTIFICATION FROM CLINICAL SPECIMENS AND ITS CHANGING PATTERN IN A TERTIARY CARE HOSPITAL

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ABSTRACT

The object of the Study was to isolate & identify Candida species from various routine culture specimens and prevalence of fluconazole resistance among them which will guide the clinician towards appropriate management. During the three months of duration total 62 (1.73%) yeast like cells were isolated from total 3580 routine culture specimens. All were processed by using Gram stain, germ tube, carbohydrate assimilation, chromogenic agar medium, SDA broth, microscopic morphology on cornmeal agar (By Dalmau culture). Susceptibility to fluconazole disc (25 µg/disc) was done. Out of 62 isolates 27(43.54%) were *C. tropicalis*, 19(30.64%) *C. albicans*, 7(11.29%) *C. guilliermondii*, 5(8.06%) *C. parapsilosis*, 3(4.84 %) *C. kefyr*, 1(1.62%) *C. glabrata*. Thus non albicans were the major isolates. Neonates were at higher risk of developing candidemia. Surprisingly all the isolated *C. guilliermondii* were from blood culture of neonates. Fluconazole resistance was more among albicans (58%).

KEYWORDS: Candida spp., Sabouraud Dextrose Agar, Fluconazole resistance

INTRODUCTION

Candida is common fungal pathogen isolated from clinical specimens. They are component of normal flora of human beings.^[1,3]

Candidemia is found mainly in individuals with some immunocompromised condition.^[1,3]

Candida can cause simple mucocutaneous lesion to even life-threatening systemic infections. Management of life-threatening candidiasis remains hampered by delays in diagnosis and the lack of reliable diagnostic methods.

Predisposing factors for candida infection are: Prolonged use of antimicrobial agents, immunocompromised status, chemotherapy, catheterization.^[3,4,5,8]

There is surge in the frequency of non-albicans Candida isolated and antifungal resistance.^[1,10] It requires Candida species identification and perform their antifungal sensitivity for correct diagnosis and proper treatment.

MATERIALS AND METHODS

Duration of the study was from 16th MAY to 13th AUG-2011. During this period all the clinical samples received for routine culture and sensitivity were screened for budding yeast like cells with the help of gram stain, 10 % KOH, and colonies on routine culture media.

1st DAY FOLLOW UP

- a. Gram stain^[1]
- b. Streaking on Sabouraud Dextrose Agar^[1]
- c. Incubated for 24 hours at 25⁰ C. ^[1,2]
- d. Candida stain Gram positive ^[1,2].

2nd DAY FOLLOW UP

- a. Germ tube test was performed.^[1,2]
- b. Streaking on chrome agar.^[1,2]
- c. Sugar assimilation (glucose, lactose, sucrose, maltose, trehalose, raffinose, xylose) test was also done on Yeast Nitrogen Base agar. ^[1]
- d. Sabouraud Dextrose Broth(SDB) inoculation & incubation at 37⁰ C was done^[1]
- e. Culture on cornmeal agar by dalmat technique & Incubated upto 48 hours at 25⁰ C.
- f. Susceptibility to fluconazole disc(25 µg/disc) was done.(By Disc diffusion method)

3rd DAY FOLLOW UP

- a. Colour on chrome agar was noted.^[12]
- b. Result of SDB for surface pellicle, surface growth, bubbling etc was looked for.
- c. Result of sugar assimilation was observed^[1,2]
- d. Results of microscopic morphology on cornmeal agar were noted.^[2]
- e. Susceptibility to fluconazole was noted.

KEY IDENTIFICATION FEATURES

Candida		
SDA Broth	Chrome Agar	Carbohydrate assimilation
Surface pellicle & Bubbling	Light green - C. albicans	Lactose (+) - C. kefyr

IJABMS
In *C. tropicalis*
No change (clear) in
C. albicans

JANUARY
Metalic Bluish green - *C. tropicalis*
Bluish pink - *C. guilliermondii*
Creamish to pink- *C. parapsilosis*
Creamish – *C. kefyr*

2013
Raffinose (+)&Lactose(-)
-*C. guilliermondii*

RESULT

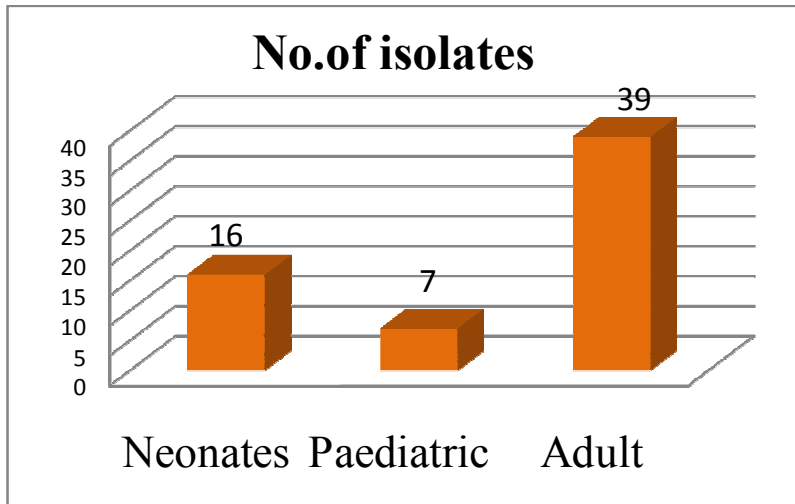
Total 3580 routine culture specimens were received during 16th May to 13th Aug-2011 at our department, of which 62(1.73%) isolates showed yeast like cells.

Table 1: - Distribution of different Species in total specimens:

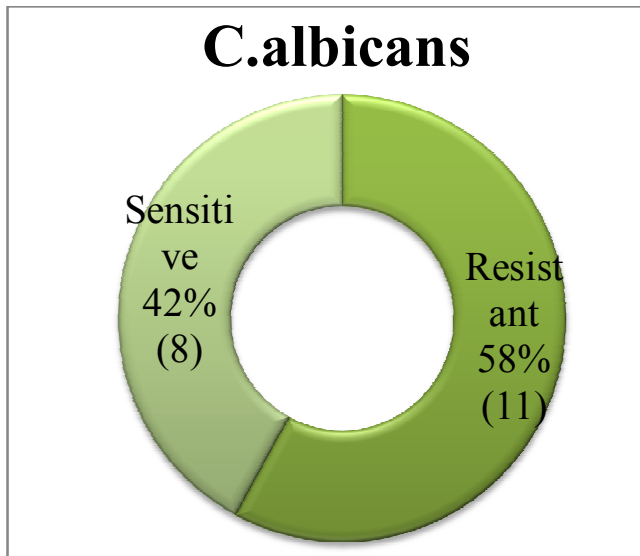
Candida species	No. of Candida positive specimen (total 62)	Percentage
<i>Candida albicans</i>	19	31 %
<i>Candida tropicalis</i>	27	43 %
<i>Candida guilliermondi</i>	7	11 %
<i>Candida parapsilosis</i>	5	8 %
<i>Candia kefyr</i>	3	5 %
<i>Candida glabrata</i>	1	2 %

Table 2: - Distribution of species among various types of specimens.

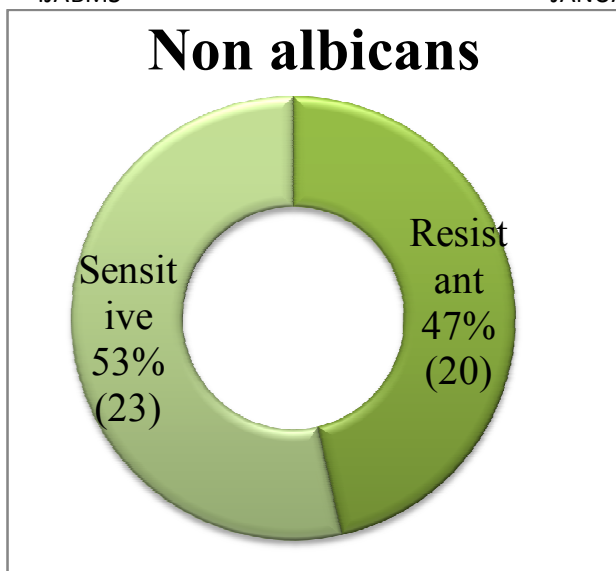
	C.tropicalis	C.albicans	C.parapsilosis	C.guilliermondii	C.kefyr	C.glabrata
Blood	4	3	4	7	-	1
Urine	13	5	-	-	1	-
Sputum	5	6	-	-	1	-
Swab	3	3	-	-	-	-
Pus	-	-	-	-	1	-
Ascitic fluid	-	-	1	-	-	-
Other	2	2	-	-	-	-



➤ Figure 1. **Distribution within age groups.**



➤ Figure 2. **Fluconazole resistance**



DISCUSSION

Patients admitted at tertiary care hospitals have access to very intensive management modalities. This along with increasing number of immunocompromised patients have led to rise in infections caused by candida especially by non albicans candida.^[1,3,6] Due to variable clinical presentation of candida infections, it becomes very important to identify this pathogens from all the routine culture specimens received at laboratory irrespective of clinician's suspicion. Candida species differ in their antifungal susceptibility and virulence factors.^[1,6] Thus identification of candida upto species level along with antifungal susceptibility becomes very essential.

In present study, results show that *C. tropicalis* (43.54%) was the major isolate in contrast to previous studies^[13,14]. Out of 19 blood culture that showed presence of candida, 13 (68.42%) were from NICU. Thus the neonates were at higher risk of developing candidemia^[8]. Results of Chrome agar were consistent with *C. albicans* and *C. tropicalis*. While in *C. parapsilosis* & *C. guilliermondii* colour development was variable in total 3 isolates. Sugar assimilation and dalmau techniques were very helpful in species identification when other methods showed variable findings.

The striking feature of the present study was the isolation of all the *C. guilliermondii* from blood culture specimens of neonates, which has not been mentioned in any of the referred studies and requires further detail investigation.^[4,5,6,7,8] Also, all the *C. parapsilosis* were isolated from neonates, which was unusual.^[8]

CONCLUSION

This Study highlights the emergence of non-albicans candida as major isolates and alarming fluconazole resistance in *C. albicans*. So it is indispensable to identify all yeast isolates up to species level and their antifungal susceptibility. It will expedite specific therapy, reduces morbidity and mortality in patients infected with candida.

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6) FACTORS AFFECTING PROGRESSION OF NEPHROPATHY IN TYPE 2 DIABETES MELLITUS

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ABSTRACT:-

Background: Hyperglycemia and hypertension are known to be risk factors for the development of proteinuria in patients with diabetes, which leads to progression of end stage renal disease.

Objective: To study the effect of various factors on progression of diabetic nephropathy in type 2 diabetic patients.

Material and Methods: We investigated factors affecting progression of nephropathy by measuring serum creatinine (s-Cr), glomerular filtration rate (GFR) level in 70 (45 men and 25 women) type 2 diabetes mellitus patients on antihypertensive treatment.

Results: The survey was done for 6 months during which 40 (Group 1) - uncontrolled type 2 diabetes mellitus having S. Creatinine <1.2 mg/dl compared with 30 (Group 2) - uncontrolled type 2 diabetes mellitus having S. Creatinine $\geq$ 1.2 mg/dl. Mean S. Creatinine 2.1mg/dl, mean SBP 141.37mmHg, mean duration of diabetes mellitus 9.26years, mean HbA1c 9.0%, mean Serum cholesterol 215.63 mg/dl and mean GFR 36.75 ml/min was seen in group 2 patients. In group 2 mean SBP, Duration of DM, HbA1c and serum creatinine were significantly higher and GFR significantly lower than group1 ($P < 0.05$).

Conclusion: hyperglycemia (HbA1c), duration of DM and hypertension are the risk factors that lead to progression of diabetic nephropathy with decline in GFR.

KEY WORDS: - Type2 diabetes mellitus (DM), Diabetic nephropathy (DN), serum creatinine, GFR, hypertension.

INTRODUCTION:-

The Prevalence of diabetes has reached epidemic proportions. WHO predicts that developing countries will bear the brunt of this epidemic in the 21st Century. While the global prevalence of diabetes is 6.4% with an estimated 50.8 million people living with DM, India has world's largest diabetes population, followed by China with 43.2 million. Diabetic nephropathy is a clinical syndrome characterized by persistent albuminuria, arterial blood pressure elevation, progressive decline in glomerular filtration rate (GFR), and a high risk of cardiovascular morbidity and mortality¹. Approximately 40% of people with diabetes will develop nephropathy. Diabetic nephropathy (DN) is a leading cause of end-stage renal disease. However, the decline in GFR is highly variable, ranging from 2 to 20 ml/min/year²⁻⁵. Chronic kidney disease (CKD) can be quantitatively defined as a GFR <60 ml/min/1.73m² and the rate of rise in serum creatinine, a well-accepted marker for the progression of DN, (creatinine value 1.4 to 3.0 mg/dl) is the indicator for impaired renal function^{6,7}.

Recently, interest has focused on the role of the metabolic syndrome (insulin resistance), defined by the presence of abdominal obesity, dyslipidemia, hypertension, and fasting hyperglycemia, in the development of CKD.⁸ The Diabetes Control and Complications Trial (DCCT) showed a significant relationship between reduction in glycosylated hemoglobin (HbA1c) levels and the risk of microvascular complications including CKD.⁹ In patients with diabetes, poor glycemic control is a risk factor for the development of nephropathy. Similarly, the incidence of a decline in renal function over 5 years was greater among older patients with hypertension.¹⁰ Hypertension has long been recognized as a consequence of renal impairment and an important factor in the progression of CKD, elevated systemic blood pressure transmitted to the glomerulus would contribute to glomerular hypertension and thus accelerate glomerular damage.⁸ Raised systolic blood pressure was an independent risk

factor for development of albuminuria or renal impairment among patients with type II diabetes.¹¹ Recent evidence also suggests a role for dyslipidemia in the development and progression of renal disease. Experimental studies have demonstrated that lipids may induce glomerular and tubulointerstitial injury and damage glomerular capillary endothelial and mesangial cells as well as podocytes.¹² The identification of promoters of progression of renal damage in diabetics is important for the creation of new powerful treatment modalities impeding the development of end-stage renal disease. This study was designed to assess the effect of various factors like obesity, hyperglycemia, hypertension, duration of diabetes mellitus, dyslipidemia on progression of diabetic nephropathy.

MATERIALS AND METHODS:-

An observational cross sectional study was conducted in 2011 with 70 uncontrolled diabetes mellitus type 2 patients under antidiabetic and antihypertensive treatment, in which 45 were males and 25 were females, age group of 40- 70 years in G.G. hospital, Jamnagar district.

Individuals who had already been treated for diabetes and hypertension were included in the study. The research protocol was approved by Institutional ethical committee and informed consent obtained from each subject prior to inclusion in the study. Personal history and medical history was collected in pre-designed proforma.

After taking consent, Blood Pressure (BP) was measured with an appropriately sized cuff in the sitting position after resting for 10 min. Three measurements on different days were recorded, and the average was used for the analysis. Fasting blood sample was collected and following investigation done. HbA1c was measured by liquid chromatography. Fasting Serum Cholesterol was estimated by Colorimetry, enzymatic method using cholesterol esterase, cholesterol oxidase and peroxidase. It was performed by end point accucare. Non-fasting blood samples were obtained for measurements of serum concentrations of creatinine. Serum creatinine was estimated by modified Jaffe's kinetic reaction with Initial Rate Colorimetric and single reagent density by using picric acid¹³⁻¹⁵.

Glomerular Filtration Rate (GFR) was calculated by Cockcroft-Gault equation, Estimated creatinine Clearance (ml/min) = $(140 - \text{age}) \times \text{weight}(\text{kg}) / 72 \times \text{s. creatinine}(\text{mg/dl})$. Values for female were estimated after multiplying 0.85 to above formula¹⁶. Patients were grouped according level of serum creatinine as:

Group 1: uncontrolled type 2 diabetes mellitus patients having S. Creatinine <1.2 mg/dl (N=40)

Group 2: uncontrolled type 2 diabetes mellitus patients having S. Creatinine ≥ 1.2 mg/dl (N=30)

RESULTS:

In present study, mean S. Creatinine levels in group 1 patients was 0.72 mg/dl which was significantly lower than group 2 patients who had S creatinine level of 2.1mg/dl.

Table 1. Mean $\pm$ SD and P Value of Various Factors in two Groups.

Factors	Group	Value (Mean $\pm$ SD)	P value
Age (years)	1 (N=40)	53.39 $\pm$ 5.27	> 0.05
	2 (N=30)	58.63 $\pm$ 10.77	
BMI (kg/m ²)	1 (N=40)	24.52 $\pm$ 2.15	> 0.05
	2 (N=30)	24.94 $\pm$ 2.96	
SBP (mmHg)	1 (N=40)	126.45 $\pm$ 10.33	< 0.05
	2 (N=30)	141.37 $\pm$ 10.56	
Duration of DM (years)	1 (N=40)	5.65 $\pm$ 3.32	< 0.05
	2 (N=30)	9.26 $\pm$ 3.16	

HbA1c (%)	1 (N=40)	7.97 ± 1.00	< 0.05
	2 (N=30)	9.00 ± 0.98	
S. cholesterol (mg/dl)	1 (N=40)	214.52 ± 22.09	> 0.05
	2 (N=30)	215.63 ± 31.59	
GFR (ml/min)	1 (N=40)	122.73 ± 37.18	< 0.05
	2 (N=30)	36.75 ± 9.26	

Table 1 shows mean age of two groups was not statistically different. In group 1 patient mean age was 53.39 years and group 2 patients was 58.63 years. Also Mean BMI of group 1 patients was 24.52 kg/m² and group 2 patients was 24.94 kg/m² which was similar.

There was significantly higher Mean SBP in group 2 (141.37mmHg) compared to group 1 patients (126.45 mmHg). Mean duration of Diabetes of group 1 patients was 5.65 years which was significantly less than group 2 patients where it was 9.26 years. Mean HbA1c of group 1 patients was 7.97 % that was significantly lower than group 2 patients HbA1c of 9.0 %. Mean S. Cholesterol of group 1 patients was 214.52 mg/dl and group 2 patients was 215.63 mg/dl (not statistically different). Mean GFR of group 1 patients was 122.73 ml/min and group 2 patients was 36.75 ml/min which indicated significantly poor renal function in group 2. In our study mean SBP, duration diabetes mellitus type 2, HbA1c are significant different on comparing the two groups and mean S. Cholesterol of both group was found above normal level though not statistically different in the two groups.

DISCUSSION:-

In present study we found that GFR was significantly lower in group 2 compared to group 1 patients suggesting the group 2 diabetic patients were having more severe renal affection than group 1 diabetics. The factors like systolic blood pressure, Duration of Diabetes Mellitus and HbA1c were significantly higher in group 2 patients suggesting that above mentioned factors are associated with progression of diabetic nephropathy.

In our study, mean SBP was 141.37 mmHg, mean duration of DM was 9.26 years and mean HbA1c level was 9.0% while mean GFR was 36.75 ml/min in group 2 patients. A similar finding were observed by Grover, et al who studied patients with S. creatinine ≥ 1.4 mg/dl and found that mean SBP was 142.8214 mmHg, mean duration DM was 14.09 years, Fasting Blood Glucose was 142.035 mg/dl and mean S. Creatinine 1.6686 mg/dl¹⁷.

Kasper Rossing, et al in a follow up study of type 2 DM patients with nephropathy, evaluated renal functions. In this study it was found that rate of decline in mean GFR was 5.2 ml/min/year, mean SBP was 154 mmHg, mean albuminuria was 581mg/24hrs, mean HbA1c was 8.9 %. He suggests that elevated mean albuminuria, SBP, HbA1c, were significantly associated with increased decline in GFR during follow-up¹⁸.

Amita Dasmahapatra et al, showed that in overt nephropathy patients, mean duration of diabetes(NIIDM) was 15.4 years, mean SBP was 159.2 mmHg, mean HbA1c was 9.2% ,mean AER (albumin excretion rate) was 981.8 microgram/min, and total: HDL Cholesterol was high suggesting that a significant correlation exist between albuminuria and hypertension, duration of DM, HbA1c and S. cholesterol¹⁹.

Jamal S. Alwakeel et al, in a follow up study of NIIDM Saudi patients showed that mean age of patients was 66.9 years, mean duration of DM was 15.4 years and found that GFR deteriorated from baseline value of 78.3 ml/min/1.73 m² to 45.1 ml/min/1.73 m² at last visit²⁰. Progression of nephropathy was observed in 40.3 % patients, had doubling S. Creatinine in their first hospital visit where SBP, Duration of DM, Persistent proteinuria and HbA1c were significant markers associated with progression of nephropathy.

M.A. Wijesuriya et al in a retrospective analytic study, conducted by reviewing the clinical records of the patients with type 2 diabetes who attended the National Diabetes Centre of Sri Lanka from January 2005 to December 2010 observed that nephropathy was significantly associated with poor glycemic control, high HbA1c, high Fasting blood glucose, high systolic blood pressure²¹.

The present study tune with all above studies suggest that persistent hyperglycemia as assessed by HbA1c, longer duration of uncontrolled diabetes mellitus and hypertension

are the independent factors that affect renal function outcome in type 2 diabetes mellitus patients.

CONCLUSION: In our study, it was found that persistent higher hyperglycemia, longer duration of DM and higher SBP (systolic blood pressure) with lower GFR in Group 2 patients as compare to group1. Glycemic control (HbA1c), duration of DM and hypertension are the risk factors leading to progression of diabetic nephropathy with decline in GFR earlier. This study may allow one to gain deeper insight into the various differences that may exist between the treatments suggested by previous studies and hence further guide the management of type 2 diabetic nephropathy.

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CONFLICT OF INTEREST: - None declared.

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7) AN OSSEOUS STUDY OF SUPRASCAPULAR NOTCH AND VARIOUS DIMENSIONS OF SAFE ZONE TO PREVENT SUPRASCAPULAR NERVE INJURY.

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ABSTRACT

INTRODUCTION : Suprascapular nerve injuries have become commonly recognized as a cause of shoulder pain and dysfunction. The entrapment of suprascapular nerve is

commonly considered at the level of the suprascapular notch (SSN). It may be injured during arthroscopic shoulder procedures.

OBJECTIVES : In the present study, the morphology of suprascapular notch in nerve lesions has been assessed to understand the suprascapular nerve lesion and a safe zone has been measured to avoid injury to the nerve during operative procedures.

METHODS : Three hundred scapulae were examined. Three measurements were defined and collected for every SSN: maximum depth (MD), superior transverse diameter (STD) and middle transverse diameters (MTD). The safe zone from the supraglenoid tubercle to the base of SSN (AB) and the distance between the posterior glenoid rim and the base of scapular spine (CD) have also been measured.

RESULTS : The SSNs were classified into six types according to Michael Polguj. Type III was the most common type found in 128(42.66%) scapulae. Complete ossification (bony foramen) found in 11 (3.67%) scapulae. Out of these 11 scapulae one scapula had a unique double suprascapular foramen. There was a smaller foramen above the larger one. Four scapulae with a bony canal in the course of the Suprascapular nerve have been found which strongly suggests a possibility of nerve entrapment. We also measured the safe zone from the supraglenoid tubercle to the base of SSN which was 27.77 ± 2.45 mm with a range of 20.94-34.48mm and the distance between the posterior glenoid rim and the base of scapular spine which was 15.77 ± 1.51 mm with a range of 12.17-19.72mm.

CONCLUSIONS : The present study provides precise data to clinicians in diagnosis of the suprascapular nerve entrapment and to make a decision about safe advancement in operative procedure to avoid nerve injury.

KEY WORDS: suprascapular notch, foramen, bony canal, safe zone.

INTRODUCTION

A precise knowledge of the shoulder-girdle region is of great importance, in order to avoid neurological complications. Such knowledge is of prime importance when procedures are performed via open, arthroscopic, or arthroscopically assisted methods. Nerve injury involving suprascapular nerve following shoulder surgery is common due to proximity of the nerve to the operative field. Mansat et al. reported a nerve injury rate of 1.1% for rotator-cuff repair (19). Zanotti et al identified that one patient out of ten patients who underwent mobilization and repair of a massive tear had iatrogenic suprascapular nerve palsy (18). McIlveen et al. had not noted any case of complete improvement in the iatrogenically-injured cases, for which they had followed nerve lesions around the shoulder (20). Apart from this the suprascapular nerve can also be injured or compressed in the suprascapular notch due to trauma, anterior dislocations of shoulder joint, presence of ganglion cysts(9) , tumors, anomalous passage of the suprascapular artery through the suprascapular notch (10). Suprascapular nerve neuropathy is also common in athletes who overuse the shoulder region. The frequency of suprascapular neuropathy in international level high-performance

volley ball players was 33% (25). The anatomical variations of SSN are considered to be a risk factor for suprascapular neuropathy entrapment. Complete ossification with formation of bony foramina is the most recognized predisposing factor for the compression at the SSN (5). The ossified STSL can be a risky factor at surgical explorations during a suprascapular nerve decompression. (9).

To avoid such injury during operative procedures and to study the pathology of nerve compression, multiple studies have been carried out with particular reference to suprascapular notch, partial or complete ossification of superior transverse scapular ligament and a bony canal. Studies have also been carried out to find the safe zone for the operative procedures to prevent injury to the nerve. Rengachary et al. (1979) classified the ssns into six types based on the shape of the notch and ossification of STSL (7, 8). Ticker et al. (1998) and Bayramoglu et al. (2003) modified the classification of Rengachary et al. and included only the U- shaped notch and V -shaped notch, and the notch with ossification of the STSL.(9,5). The morphology of SSN is considered to be a risk factor for suprascapular nerve entrapment either in combination with an anomalous STSL. (9, 5) or as a narrow notch (7). Natsis et al had established a new method of classifying SSN morphology by using specific geometrical parameters (14). Hua-Jun Wang et al had also classified SSN according to Natsis' method and also studied the bony canal (15). In India, Garg Soni et al (2012) classified the SSN according to Natsis (16). Fabrice Duparc (2010) studied 30 shoulders and found that the SSN appeared compressed in 15(50%) cases in the suprascapular notch (1). In 9 shoulders out of those 15, a SSN stenosis was present but without any muscular atrophy. Michael Polguy (2011) classified almost all variations of SSN based on specific geometrical parameters (2).

Several authors have tried to obtain a safe zone for operative procedures so as to avoid iatrogenic nerve lesions by measuring the distance between the supraglenoid tubercle and the deepest point of SSN.

The present study is based on the specific geometrical parameters of the SSN and classifies almost all variations of these structures according to Michael polguy. Measurements to find the safe zone to avoid injury to the nerve during operative procedures have also been studied.

AIMS AND OBJECTIVES :

The aim of the present study is to obtain a safe zone which would be useful to avoid iatrogenic nerve lesion; and to verify the reliability of the existing data for the management of entrapment neuropathy.

MATERIAL AND METHODS

All three hundred dried scapulae from the Department of Anatomy of medical colleges of south Gujarat (Govt. medical college, Vadodara, S.B.K.S.M.I.R.C, Pipariya, Govt. medical college, Surat and SMIMER medical college, Surat) were examined. The age and sex of the bones were not known. The type of suprascapular notch was determined by using the classification system used by Michael Polguy et al. (2011) (2). Measurements of the SSN were taken using classical osteometry with the help of digital vernier caliper. Three SSN dimensions were defined as follows.

- (1) The Maximum Depth (MD):- the maximum value of the longitudinal measurements taken in the vertical plane from an imaginary line between the superior corners of the notch to the deepest point of the suprascapular notch.

(2) The superior transverse diameter (STD):- the maximum value of the horizontal measurements taken in the horizontal plane between the corners of the SSN on the superior border of the scapula.

(3) The middle transverse diameter (MTD):- the value of the horizontal measurements taken in the horizontal plane between the opposite walls of the SSN in half dimension of MD perpendicular to it.

The distance between bony landmarks were also measured, these parameters were as follows.

(4) Distance between the supraglenoid tubercle and the deepest point of the SSN. (AB)

(5) Distance between the posterior rim of the glenoid cavity and base of scapular spine. (CD)

Five basic types of SSN were noted. In type I, MD was longer than STD. This type was divided into three subtypes: IA, IB and IC. Subtype IA had longer MTD than STD. In IC it was the inverse ($STD > MTD$) and in IB these diameters were equal ($STD = MTD$). Type II had equal MD and STD. Type III had longer STD than MD. This type was also divided into three subtypes: IIIA, IIIB, and IIIC. In IIIA, MTD was longer than STD. In IIIC, it was the inverse ($STD > MTD$) and in IIIB these diameters were equal ($STD = MTD$). In type IV, there was a bony foramen. Type V had a discrete notch.

DATA ANALYSIS

The data so obtained was checked for its completeness, quality and internal consistency. The data were then entered and analysed using the Microsoft excel 2007

OBSERVATION AND RESULTS:

Three hundred (141 right and 159 left) scapulae were analysed. The distribution of the various types of SSN is illustrated in table 1. Type III was the most common type with 128 (42.66%) scapulae, whereas type II was the least observed type with just 8(2.67%) of scapulae.

Table 1 : Distribution of the suprascapular notch

Type	Right	Left	Total
Type I A	9 (3%)	9 (3%)	18(6%)
Type I B	9 (3%)	6(2%)	15(5%)
Type I C	15(5%)	13(4.33%)	28(9.33%)
Type II	6(2%)	2(0.67%)	8(2.67%)
Type III A	2(0.67%)	5(1.67%)	7(2.33%)
Type III B	6(2%)	2(0.67%)	8(2.67%)
Type III C	44(14.67%)	69(23%)	113(37.67%)
Type IV	8(2.67%)	3(1%)	11(3.67%)

Type V	42(14%)	50(16.67%)	92(30.67%)
Total	141	159	300(100%)

Table 2 : Measurements of the suprascapular notch

Type	Maximum depth of SSN Mean $\pm$ SD (mm)		Superior transverse diameter of SSN Mean $\pm$ SD (mm)		Middle transverse diameter of SSN Mean $\pm$ SD (mm)	
	Right	left	right	Left	right	left
Type I	9.42+1.72	9.57+1.46	7.73+1.40	7.70+1.41	7.81+1.45	7.88+1.16
Type II	8.26+0.98	8.73+0.83	8.26+0.98	8.73+0.83	8.26+0.99	8.73+0.83
Type III	7.66+2.07	7.67+2.32	10.51+2.03	10.00+2.80	9.00+2.04	8.99+2.23

Table 3 : Measurements of distance from suprascapular notch.

Type	Distance between suprascapular notch and supraglenoid tubercle. (AB)		Distance between posterior rim of glenoid cavity and base of scapular spine.(CD)	
	Mean $\pm$ SD(mm)	range	Mean $\pm$ SD(mm)	range
Type I	27.52+2.17	22.63-32.19	15.61+1.34	12.56-19.06
Type II	27.10+1.57	23.78-28.82	15.56+0.41	15.12-16.44
Type III	27.44+2.70	20.94-34.48	15.61+1.71	12.17-19.71
Type IV	28.75+3.46	22.32-32.53	16.99+1.80	14.44-19.72
Type V	28.33+2.05	22.07-31.89	15.96+1.26	12.28-19.03

The distance between the suprascapular notch and the supraglenoid tubercle (AB) and the distance between the posterior rim of glenoid cavity and the base of the scapular spine (CD) were varied in between the types. Both AB and CD were the largest in type IV

followed by type V, type I, type III and type II. Mean distance of AB for all types was 27.77 ± 2.45 mm with A range of 20.94-34.48mm and for CD, mean was 15.77 ± 1.51 mm with a range of 12.17-19.72mm. Among the 11 scapulae with bony foramina(type IV), we found one with double foramen, out of which upper one was smaller and the lower one was larger. Apart from the bony foramen (type IV), we found a groove in 1(0.33%) scapula and a bony canal in 4(1.33%) scapulae.

Table 4 : Measurements of bony canal

No.	Right(mm)	Left(mm)
1	14.03	12.28
2	12.68	11.83

DISCUSSION :

Variation in the morphology of SSN has been identified as one of the causes of suprascapular nerve entrapment. Several classifications of variation of SSN have been reported. Rengachary et al (1979) conducted a study of SSN in 211 cadaveric scapulae and classified them into six types focused on shape of SSN and ossification of STSL. Type I was without a discrete notch, type II was a wide V- shaped notch with its maximum width along the superior border of the scapula. Type III was a symmetrical U- shaped notch with nearly parallel lateral margins. Type IV had a very small and V- shaped notch. Type V had a U shaped notch and partial ossification of the medial part of the STSL, and type VI had a bony foramen with a completely ossified the STSL, identical to type IV notch in the present study. The most common type was the U-shaped in 48% scapulae and a small V- shaped notch was found in only 3% scapulae (7, 8). Ticker et al (1998) divided the notch into U –shaped (77%) and V –shaped (33%) and divided the STSL into 3 parts non-ossified, partially ossified and completely ossified (bony foramen). He considered separately the SSN and the degree of the ossification of the STSL (9). Natsis et al (2007) studied 423 dry scapulae and established a new classification based on specific geometrical parameters. He classified the SSN into 5 types. Type I no notch 35(8.3%) , type II notch with greater transverse diameter 177(41.85%), type III notch with greater vertical diameter 177(41.85%), type IV bony foramen 31 (7.3%), type V notch and bony foramen 3 (0.7%)(14).

Hua-Jun Wang et al in 2011 also classified SSN into five types according to Natsis and found that the most prevalent group were type II and type III, accounting for 58.11 and

28.23%, respectively(15). In India, Garg Soni et al (2012) conducted the study on 100 scapulae and classified the SSN into five types as per classification of Natsis and also found that the most prevalent group were type II 72% and type III 20%. Type I were 5% and type IV were 3% (16). Type V was not found by Garg Soni and Hua-jun wang.

Michael Polguj's (2011) classification of the SSN into six types is simple and based on specific geometrical parameters that clearly distinguish each type (2). The present study followed the same classification based on the specific geometric parameters and a comparison was made. In the present study, subtype IA, IIIA and Type IV 6, 2.33 and 3.67% respectively were much lower than the findings of Michael Polguj et al who found them to be 15.1, 8.2 and 7% respectively (2). Finding of Type V 30.6% in the present study was quite higher than theirs (11.6%).

Table 5 : Comparison of distribution of the suprascapular notch with other study.

Type	Michael Polguj et al (%) (2011)	Present study (%) (2012)
Type I A	15.1%	6%
B	3.5%	5%
C	5.8%	9.33%
Type II	2.3%	2.67%
Type III A	8.2%	2.33%
B	2.3%	2.67%
C	44.2%	37.67%
Type IV	7%	3.67%
Type V	11.6%	30.67%
Total	100%	100%

Variation in the morphology of the STSL which include their partial or complete ossification have been identified to be one of the predisposing factor in case of SSN entrapment in various case-reports. In the present study, complete ossification (bony foramen) is found in 3.67% (11 out of 300) scapulae. These findings are similar with findings of 4% by Rengachary et al(1979), 3.7% by Tubbs et al, 3.7% by Edelson, 5% by Ticker et al and 3% by Garg Soni in India(7,10,6,9,16). Bayramoglu et al detected a bony foramen in 12.5 %. Vallois found them to be 6.1% in Italy (5, 12). Natsis detected them in 7.3% scapulae, Gray found a foramen in 73 of 1,151 scapulae (6.34%) but no suprascapular foramina were found

in 87 Indian scapulae (14,3). These values are higher than the values of present study. In India Mohd. Azim Khan reported one case of complete ossification of STSL (13).

In the present study, we found foramina in 11 out 300 scapulae (3.67%). Out of them one scapula had a double foramen, the smaller one situated above the bigger one. Hua-Jun Wang (2011) found a unique case with a double suprascapular foramen in 295 scapulae that were examined (15). Polguj M. et al also found a double suprascapular foramen in their study of 610 scapula analysed by the three-dimentional CT- reconstruction (15).

Suprascapular nerve running through the inferior suprascapular foramen was discovered and suprascapular vessels passed through the superior suprascapular foramen. We found a single case in which a groove ran between SSN and spinoglenoid notch. 8 such cases were collected by Hua-Jun Wang et al (2011)(15).

In the present study, 4 cases were found with bony canals formed by complete ossification of wide and flat STSL. Two were on the right side and two on the left. Upper openings were towards SSN and lower openings were towards spinoglenoid notch. Direction of the canal was similar with the direction of the suprascapular nerve. The anterior wall was formed by the base of the coracoid process and the posterior wall was formed by the STSL. This narrow and long bony canal may reduced the area for the suprascapular nerve and predispose to the nerve entrapment. The range of a length of these bony canals was between 11.83-14.03mm. Hua-Jun Wang et al(2011) also got 4 cases with bony canals (one on the left side and three on the right side) with a range of 5.89-17.86mm(15).

In the present study, the distance between the deepest point of the suprascapular notch and the supraglenoid tubercle (AB) as well as the distance between the posterior rim of glenoid cavity and the base of the scapular spine(CD) has been measured.

Table 6 : Comparison between the results of distance AB and CD in previous studies

	Distance AB		Distance CD	
	Average value(mm)	Range(mm)	Average value(mm)	Range(mm)
Bigliani et al (1990)	30	25-39	18	14-25
Ekin et al (1995)	33	21-38	20	13-24
Shishido et al (2001)	29	23-35	18	14-24
S. R. Sinkeet et al (2010)	28.74+3.8	16-36	15.86+2.2	14-20

Stefano Gumina et al (2011)	31	21-41	17	11-25
Mustafa Urguden et al (2003)	24.9	21-33.3	—	—
Present study	27.77+2.45	20.94-34.48	15.77+1.51	12.17-19.72

The mean distance of AB was 27.77+2.45mm with a range of 20.94-34.48mm. This suggests that a distance of 21mm from the supraglenoid tubercle to the suprascapular notch is a safe zone to operate without injuring the suprascapular nerve. These findings correlate with the findings of the previous authors like Ekin et al(1995), Stefano Gumina et al (2011), Mustafa Urguden et al (2003)and Shishido et al (2001)(22,17,11,23). S. R. Sinkeet et al (2010) had found a minimum range of 16mm which is lower than that in the present study (4). The mean distance of CD was found to be 15.77+1.51mm with a range of 12.17-19.72mm. Findings in the present study are similar with those of Bigliani et al who have determined the safe zone of the nail on the posterior glenoid notch to be 2 cm at the supraglenoid level and 1cm at the scapular spine level in arthroscopic bankart repair operation(21). Karas et al. has also reported that dissection of more than 2 cm medial to the superior aspect of the glenoid rim might result in iatrogenic injury to the suprascapular nerve (24).

CONCLUSION

The present study of the safe zone is helpful in the preoperative evaluation of patients, where the surgeon has to make a decision about the safe advancement of the operative field and the study of variation of SSN, complete ossification of STSL with bony foramina and bony canal provides a precise and well sorted data to clinicians in the diagnosis and treatment of suprascapular neuropathies. Since the present study was performed with a limited number of scapulae, more radiological, clinical and cadaveric studies need to be done.

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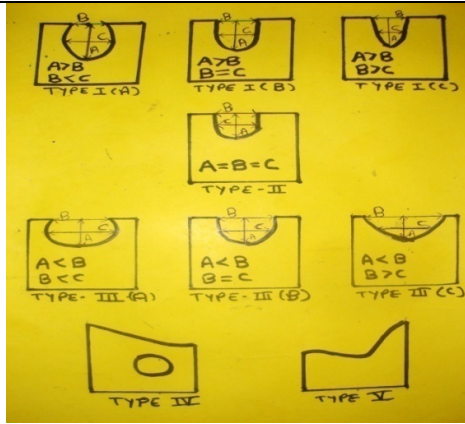


FIGURE-1 TYPES OF SUPRASCAPULAR NOTCH

A= Maximum Depth (MD)

B= Superior Transverse Diameter (STD)

C= Middle Transverse Diameter (MTD)

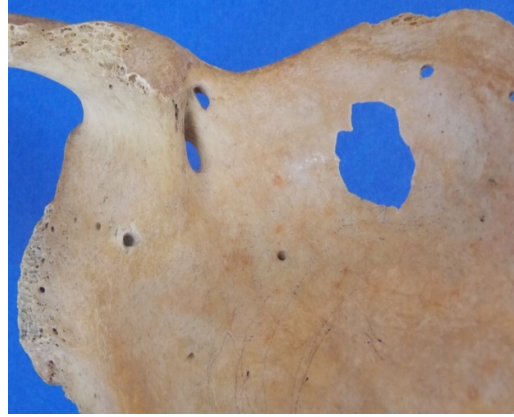


IMAGE-1 SCAPULA WITH DOUBLE SUPRASCAPULAR FORAMEN.



IMAGE-2 BONY CANAL



IMAGE-3 DISTANCE BETWEEN SUPRAGLENOID TUBERCLE AND BASE OF SUPRASCAPULAR NOTCH



IMAGE-4 DISTANCE BETWEEN POSTERIOR GLENOID RIM AND BASE

8) BLOOD PRESSURE AND PULSE RATE RESPONSES TO SUSTAINED HANDGRIP DYNAMOMETER TEST IN RHEUMATOID ARTHRITIS PATENTS

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ABSTRACT:

Objectives: To measure the blood pressure and pulse rate responses in rheumatoid arthritis patients to the sustained isometric exercise by hand grip dynamometry and comparing the results with control group.

Materials and methods: Patients: - 35 Rheumatoid Arthritis patients diagnosed on the basis of Modified American Rheumatology Criteria 1987 were selected for this study. Controls: - 35 healthy age and sex matched control. Age group 20 to 70 years, including both male and female. Instrument used: Hand Grip Dynamometer, Electronic Blood Pressure and pulse rate monitor, Stop watch etc.

Method: 1. The subject pressed the hand grip dynamometer for 3 minute at 30% of the maximal voluntary effort and blood pressure & pulse rate were recorded before and after the test. 2. Data obtained from the patients is compared to the control group.

Results: For cases rise in DBP i.e. >15 mm Hg were significantly lower (34.3%) as compared to controls (50%). For cases rise in DBP i.e. < 15 mm Hg were significantly higher (15.7%) as compared to controls (0%)., therefore, it suggests there was autonomic dysfunction in 15.7 % of RA patients.

Conclusion: This study suggests there was autonomic dysfunction in 15.7 % of Rheumatoid arthritis Patients.

Key words: Rheumatoid Arthritis, hand grip dynamometer, autonomic response, Maximum voluntary contraction.

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic systemic disease affecting joints as well as extra-particular structures and is the most common type of inflammatory arthritis

worldwide. RA most commonly involves the small joints of hands and feet, often in a symmetrical distribution resulting in pain, stiffness and loss of function. RA has a wide clinical spectrum ranging from mild joint symptoms to severe inflammation and damage to joints. RA is diagnosed on clinical, serological and radiological grounds. The American Rheumatology Association (ARA) first proposed classification criteria for RA in 1956 and then revised them in 1987.

Sympathetic Nervous System and Arthritis

In general, RA patients have an autonomic imbalance with an overly active SNS and reduced PNS activity. Determining the pulse rate and blood pressure responses to sustained hand grip test is an established technique to evaluate this autonomic balance. A low variability in heart rate reflects an increase in SNS activity and reduced PNS activity. In RA, it has been suggested that stress may aggravate disease activity. Minor stress (lasting from minutes to a few days with small intensity), that is, *daily hassles*, may lead to a short rise of neurotransmitters and hormones, and could increase disease activity in RA patients.

Previous studies to evaluate sympathetic nervous system involvement used only a single test like

Sweating response, orthostatic test. The sweating tests are very difficult to reproduce and to quantify. Bennett et al studied the sweating response after an injection of acetylcholine in areas of anhidrosis. The abnormal responses were found in most cases of RA with neuropathy, thus indicating a relation between autonomic neuropathy and peripheral neuropathy (7). Edmonds et al studied 27 patients with RA with these cardiovascular tests (6). P J Barendregt, G L van der Heijde, F C Breedveld, H M Markusse state that Parasympathetic dysfunction may play a role in ocular dryness in patients with rheumatoid arthritis(8). Leden et al reported abnormal responses in 7 patients with severe RA (7). Klocke R, Cockcroft JR et al investigated the augmentation index as a measure of arterial stiffness. They concluded that, chronic inflammation in the form of vasculitis leads to an increased arterial stiffness and blood pressure in RA patients (6). Louthrenoo W, Ruttanaupawan P et al performed the handgrip test in 34 RA patients with clinical dysautonomic symptoms (9).

Ahmed Kamal, PhD, SMIEEE state that increasing the sympathetic activity (higher low frequency) and reducing the parasympathetic tone (reduced frequency gain response), which can lead to sudden death in patients with RA (1). Kawser Jahan¹, Noorzahan Begum², Sultana Ferdousi- study may conclude that sympathetic activity was higher with lower parasympathetic activity along with shifting of sympathovagal balance towards sympathetic predominance in patients with rheumatoid arthritis (5). In the present study sustained hand grip dynamometer tests has been used to measure the blood pressure and pulse rate responses in rheumatoid arthritis patients and comparing the results with control group.

MATERIAL AND METHOD

Patients - 35 Rheumatoid Arthritis patients diagnosed on the basis of Modified American Rheumatology Criteria 1987 were selected for this study.

Control - 35 healthy age and sex matched control.

Age group of subjects was 20 to 70 years, including both male and female. Detailed clinical history was noted. Procedure in detail explained to the patients and an informed consent was obtained. The procedures were in accordance with the ethical standards of the committee of the institute.

Patients were excluded from the study if they,

- Had <10 g/dl hemoglobin;
- Were pregnant;
- Had diseases interfering with the autonomic nervous system, including diabetes mellitus,
Renal and liver diseases, Parkinson's disease, porphyria and amyloidosis;
- Had cardiovascular diseases including hypertension, ischaemic heart disease, congestive heart failure, valvular heart disease, cardio-myopathy and cardiac arrhythmia;
- neurological diseases including multiple sclerosis, polyneuropathy or Guillain-Barre' Syndrome.
- Drugs that interfered with the ANS including antihypertensive, diuretic, adrenergic inhibitor, anti-arrhythmic, sedative, hypnotic, epileptic drugs were also excluded from the study.

Sustained handgrip test:

The subject was asked to sit comfortably in chair. Initially the subject was asked to exert maximal hand grip strength on hand grip dynamometer with dominant hand. First the maximum voluntary contraction (MVC) (Maximal isometric tension i.e. T_{max}) is determined and then the subject was asked to exert 30 % of MVC for 3 minutes with dominant hand. The Blood pressure and Pulse rate was measured in the non dominant hand at rest and just before the release of hand grip pressure. Maximum rise in blood pressure and pulse rate during 30 % of MVC over the resting blood pressure and pulse rate was noted. The blood pressure rises by peripheral vasoconstriction mediated by the α – adrenergic receptors of ANS. Therefore any damage to the neurological pathways involved could lead to a diminished or absent cardiovascular response to sustained hand grip test. Blood pressure response to sustained hand grip test above 15 mmHg considered normal, 11 – 15 mmHg is borderline and less than 10 mmHg is abnormal (Ewing and Clarke grading).

Instrument used: Hand Grip Dynamometer (0 – 100 kg. by Anand Agencies Pune), Electronic

Blood Pressure and pulse rate monitor (Omron model HEM – 7111), Stop watch etc.

All statistical analysis were performed by SPSS Software version 17 using the paired, unpaired 't' test and chi-square test.

RESULTS AND DISCUSSION:

Thirty five RA patients and Thirty five controls in the age group of 20 – 70 years were studied. Table 1 show the data of age distribution and Table 2 show the data of gender distribution. Total participation of female subjects was 71.4 % and male subject was 28.6 %.

Table 1. Age Distribution

Group	Mean	N	Std. Deviation
Cases	46.23	35	8.627
Controls	40.11	35	9.99

Table 2. Gender Distribution:

			GROUP		Total
			CASES	CONTROLS	
SEX	F	Count	27	23	50
		% of Total	38.6%	32.9%	71.4%
	M	Count	8	12	20
		% of Total	11.4%	17.1%	28.6%
Total		Count	35	35	70
		% of Total	50.0%	50.0%	100.0%

The symptoms of autonomic dysfunction like syncope, feeling faint, vertigo, excessive fatigue, excessive sweating, visual distortion, tremor, numbness, cold hand & feet, muscle weakness etc. were present in 37.1 % in RA.

Table 3. Cases: Symptoms.

	Frequency	Percent
No	22	62.9
Yes	13	37.1
Total	35	100.0

The comparative study between Cases and control group using Unpaired 't' Test showed that

There were no any significant deference in basal pulse rate and basal diastolic blood pressure in both RA Patients as well as controls group. The basal systolic blood pressure was significantly higher in RA Patients than control group. The rise in diastolic blood pressure was very highly significance in RA Patients than control group.

Table 4. Unpaired't' Test:

	GROUP	Mean	Std. Deviation	T VALUE	P VALUE	SIGNIFICANCE
Basal PR	Cases	81.54	11.147	1.541	0.128	NS
	Controls	77.60	10.245			
Basle SBP	Cases	122.51	8.223	2.514	0.014	S
	Controls	117.89	7.145			
Basle DBP	Cases	79.83	8.777	1.879	0.065	NS
	Controls	76.11	7.730			

Rise in PR	Cases	89.29	7.854	0.906	0.368	NS
	Controls	87.46	8.998			
Rise in DBP	Cases	15.31	4.776	-3.701	0.000	VHS
	Controls	18.63	2.263			

NS: Non-significance, S: Significance, VHS: Very high significance.

Paired 't' test for cases as well as control group showed there was very high significance

Table 5. Paired 't' test for cases:
difference in rise in pulse rate and rise in diastolic blood pressure to isometric

	Mean	N	Std. Deviation	T	DF	SIGNI.
Basal PR	81.54	35	11.147	-5.55	34	0.000(VHS)
Rise in PR	89.29	35	7.854			
Basal DBP	79.83	35	8.777	-18.97	34	0.000(VHS)
Rise in DBP	95.14	35	9.309			

exercise.

Table 6. Paired 't' test for control:

	Mean	N	Std. Deviation	T	DF	SIGNI.
Basal PR	77.60	35	10.245	-6.047	34	0.000(VHS)
Rise in PR	87.46	35	8.998			
Basal DBP	76.11	35	7.730	-48.69	34	0.000(VHS)
Rise in DBP	94.74	35	7.671			

For cases rise in DBP i.e. >15 mm Hg were significantly lower (34.3%) as compared to controls (50%). For cases rise in DBP i.e. <15 mm Hg were significantly higher (15.7%) as compared to controls (0%). , therefore, it suggests that, there was autonomic dysfunction in 15.7 % of RA patients.

Table 7. Group VS Rise in DBP:

			GROUP		Total
			CASES	CONTROLS	
RISE IN DBP	>15	Count	24	35	59
		% of Total	34.3%	50.0%	84.3%
	<15	Count	11	0	11
		% of Total	15.7%	0.0%	15.7%
Total		Count	35	35	70
		% of Total	50.0%	50.0%	100.0%
CHI2=13.01		DF=1	P VALUE=0.000		

Sustained hand grip is a type of isometric exercise with the start of an isometric muscle contraction, pulse rate is increased. This is largely due to a reduction in vagal tone, although increase discharge in cardiac sympathetic fibers also plays a role. Thereafter, the systolic and diastolic blood pressure also rises sharply. This is because of increased peripheral resistance due to vasoconstriction in the muscles produced by sympathetic outflow. The rise in diastolic blood pressure will be abnormally small if there is extensive peripheral sympathetic abnormality. ANS involvement is not uncommon in RA, however the actual mechanism is not clear. The association of autonomic dysfunction with RA and systemic diseases could be an immunological mechanism. Consequently, we believe that further large-scale studies investigating cardiovascular autonomic neuropathy in rheumatoid arthritis diseases should be carried out to verify our findings and manifest clinical consequences beyond these results.

CONCLUSION:

This study suggests there was autonomic dysfunction in 15.7 % of Rheumatoid arthritis Patients.

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9) LEUCOCYTE AND PLATELET COUNTS IN ANAEMIC AND NON ANAEMIC YOUNG FEMALE

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INTRODUCTION : Anaemia is most commonly occur in Indian female. This is mostly due to nutritional deficiency of iron, folic acid, zinc, and cooper. There is some relation between elevated leucocyte count and coronary heart disease, vascular disease. Recently neutrophil to lymphocyte ratio (N/L ratio) emerge as an inflammatory index in ischaemic heart disease (IHD), myocardial infarction (MI) and certain colon cancer. Decrease in platelet count increase bleeding tendency. It increase mortality and morbidity in population.

OBJECTIVE : the goal of our study is to estimate leucocyte and platelet count in anaemic patients and estimate N/L ratio.

METHOD : 20 anaemic female (Hemoglobin (Hb) level less than 6gm% since 3 months) as a study group and 20 healthy female (Hb level more than 12gm%) as a control group. Age of both groups was between 20-30 years. All the female were instructed about study and written consent taken. History and clinical examination was done.

By using automated cell counter leucocyte and platelet count was done. Both total and differential leucocyte count (TLC and DLC) was done. Also N/L ratio was estimated. Statistical analysis was done by unpaired t test. P value less than 0.05 considered as a significant.

RESULT : Hb concentration in patients of anaemia was 4.59 ± 1.88 gm% compare to 13.62 ± 1.10 gm% in control subjects which is statistically significant. TLC was insignificantly more

in anaemic patients vs healthy subjects. On DLC in % , there was increment in neutrophil ($P<0.01$) and basophils ($P<0.001$), decrement in monocytes and eosinophils ($P<0.001$) without much alteration in lymphocytes count. Platelets was decreased in anaemic group ($P<0.05$). N/L ratio was significantly higher in anaemia vs controls.

CONCLUSION : Anaemia not significantly increase leucocyte count but significantly increase neutrophil count thus N/L ratio highly significantly increase and platelet count was significantly increase.

KEY WORDS : anaemia, haemoglobin, leucocyte, Platelet, IHD, HF

MAIN ARTICLE

INTRODUCTION :

Leucocyte count is regarded to be an independent risk factor for coronary heart disease, stroke (CHD), vascular disease (1, 2). Leucocyte count has prognostic importance for both short term and long term survival. It is well established fact that many factors are associated with CHD and their measurement may allow the estimation of risk of ischaemic events (3). One such risk factor may be the role played by leucocyte (4), particularly the neutrophils (2) assessed most simply by leucocyte count in peripheral blood (3). Recently neutrophil to lymphocyte ratio (NLR) has emerged as a useful inflammatory index in critically ill patients and ischaemic heart diseases (IHDs) (5).

Anaemia is most common nutritional disorder (6). Deficiency of iron, zinc, folic acid, copper and vitamins are documented to impair the immune responses and bactericidal activity of macrophages, monocytes and neutrophils (7). Anaemia is associated with hypoxia and ischaemia that leads to increase morbidity and mortality. It may be possible that ischaemia associated with anaemia may alter the leucocyte count. So the current study was planned to estimate total and differential leucocyte count (TLC and DLC), Neutrophil to lymphocyte ratio (N/L ratio), platelet count in cases of anaemia.

MATERIALS AND METHODS :

Present study was carried out in 20 female of nutritional anaemia (haemoglobin (Hb) level was less than 6 gm% with at least 3 month duration) in age group 20-30 years and were compared with 20 young healthy female (Hb level more than 12gm%)

Experimental protocol was explained and consent was taken.

History was taken and clinical examination (general and systemic) done for inclusion and exclusion criteria.

@ Inclusion criteria:

- 1) Female with age group of 20-30 years.
- 2) Healthy individual without any known disease.
- 3) No history of drug, blood transfusion or any condition that affect blood cell count.

@ Exclusion criteria:

- 1) Individual with any known general or systemic disease.
- 2) Any history of drug or medication that affect blood cell count.
- 3) Female with pregnancy and menstrual period.
- 4) Any un co-operative individual.

@ Experimental protocol:

- 1) All the subjects filled the consent form that they are willing to participate in the study.
- 2) History and clinical examination was done for inclusion and exclusion criteria.
- 3) Subject's Hb, TLC, DLC and platelet count was estimated by electronic cell counter and then N/L ratio was estimated.
- 4) Then mean value and standard deviation was estimated by statistical method.

STATISTICAL ANALYSIS :

Unpaired t test is used for analysis and P value less than 0.05 consider as a significant.

RESULTS :

Hb concentration in patients of anaemia was 4.59 ± 1.88 gm% compare to 13.62 ± 1.10 gm% in control subjects which is statistically significant. TLC was insignificantly more in anaemic patients vs healthy subjects. On DLC in % , there was increment in neutrophil ($P < 0.01$) and basophils ($P < 0.001$), decrement in monocytes and eosinophils ($P < 0.001$) without much alteration in lymphocytes count. Platelets was decreased in anaemic group ($P < 0.05$). N/L ratio was significantly higher in anaemia vs controls.

TABLE 1 : Comparison of basic parameters in anaemia and control.

Parameters	Anaemia	Control	Significance
Age (years)	25.3 ± 4.2	23.6 ± 3.8	NS
Hb (gm%)	4.59 ± 1.76	13.34 ± 1.10	HS
TLC (cu mm of blood)	7628 ± 3201	6874 ± 1876	NS
Platelet count (lakhs / cu mm of blood)	1.57 ± 0.91	3.28 ± 1.46	S

TABLE 2 : Comparison of DLC % of anaemia and control.

Parameters	Anaemia	Control	Significance
Neutrophils	62.78 ± 9.33	56.78 ± 5.65	S
Lymphocytes	33.61 ± 10.25	31.15 ± 3.96	NS
Eosinohils	2.62 ± 1.04	5.42 ± 3.05	HS
Basophils	3.0 ± 1.0	1.89 ± 0.83	HS
Monocytes	2.36 ± 1.81	7.14 ± 3.23	HS

N/L ratio	1.93 $\pm$ 0.08	1.74 $\pm$ 0.03	HS
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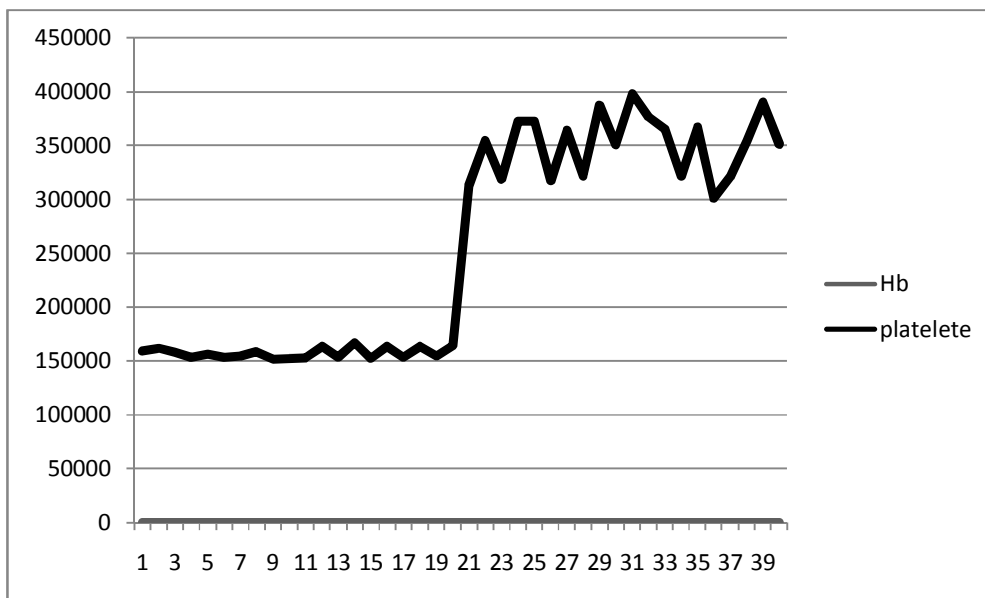
Data presented are Mean $\pm$ SD (standard deviation)

NS : not significant ($P > 0.05$)

S : significant ($P < 0.05$)

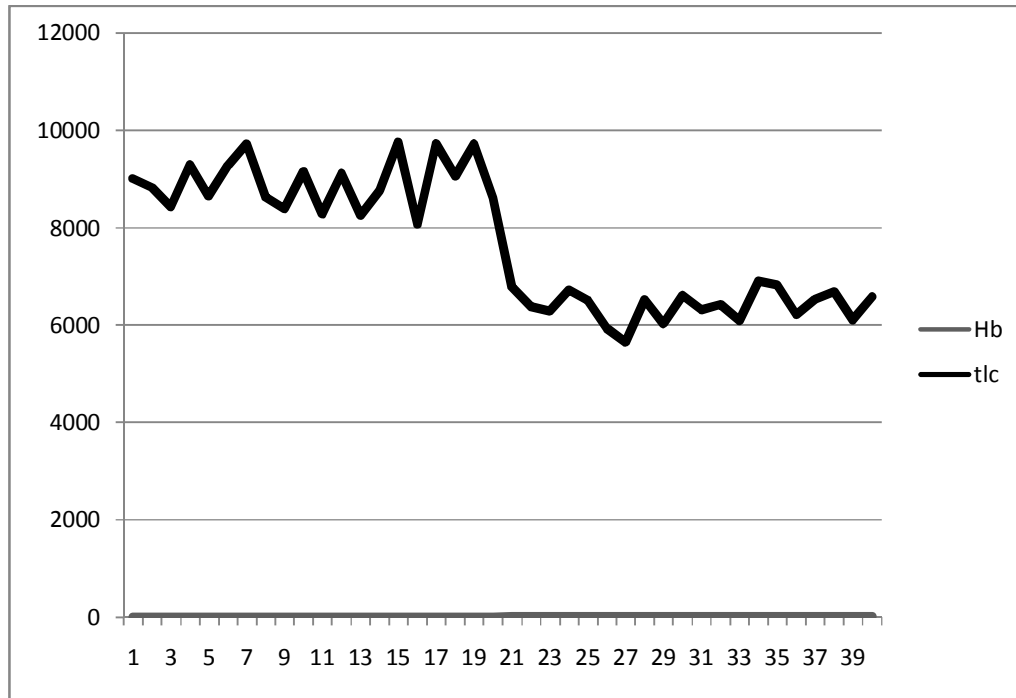
HS : highly significant ($P < 0.001$)

Graph 1 : relation of Hb with platelet

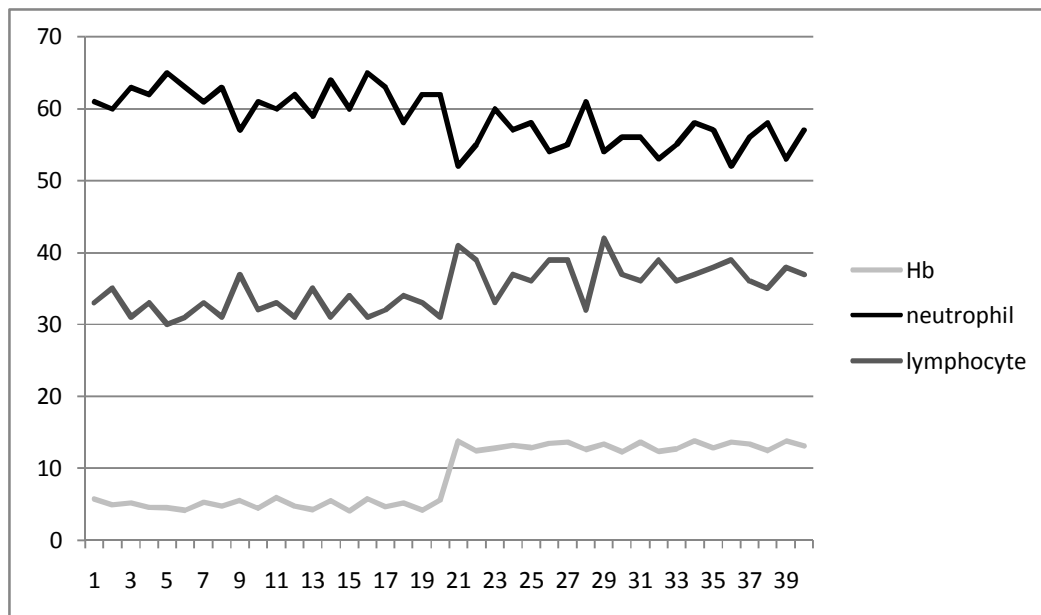


SUBJECT NO. 1-20 : ANAEMIC AND 21-40 : CONTROL IN ALL GRAPHS.

Graph 2 : relation of Hb with TLC



Graph 3 : relation of Hb with neutrophil and lymphocyte



DISCUSSION

Anaemia is said to be involved in pathogenesis of heart failure (HF), chronic angina and acute coronary syndrome (8). There is insignificant increment in leucocyte count in anaemia

in present study. This is elevated leucocyte count (even with normal range) is associated with cardiovascular risk (3). Hypoxia induced by anaemia is a kind of stress, which increases vascular reactivity to catecholamine through glucocorticoids, thus helping in raising leucocyte count. So high leucocyte count might be seen as a manifestation of a haematological stress syndrome (3). Activated leucocyte particularly neutrophils release substances, i.e. cytotoxic material, protease, hydrolytic enzymes that could lead to vascular and ischaemic injury (3, 5).

Neutrophil count is found significantly higher ($P<0.01$) in present study in anaemic patients. It is reported that neutropenia rarely suffer from myocardial infarction (MI) (3). Along with neutrophil, basophil count is also found to be more in anaemia. Role of basophil in vascular events is unknown. Monocyte, eosinophil and platelet count are found to be reduced significantly in patients of anaemia. Exact reason for decrease count is not known. Lymphocyte count is not more affected in both groups.

Recently neutrophil to lymphocyte ratio (N/L ratio) has been described as significant inflammatory index in IHD, MI and in colorectal cancer (3,9). In current study N/L ratio is significantly more ($P<0.001$) in anaemic patients compare to control subjects.

CONCLUSION

Anaemia not significantly increase leucocyte count but significantly increase neutrophil count thus N/L ratio highly significantly increase and platelet count was significantly increase.

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10) A COMPARATIVE STUDY OF EFFECTS OF MEDITATION AND RELAXATION ON BIOPHYSICAL PARAMETERS.

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Abstract

Introduction: Considering today's stressful and modern day hectic schedules Humanity is increasingly turning towards various lifestyle modifications. Unable to locate stability and serenity in the outside world people have directed their gaze towards meditation in a bid to attain peace of mind.

Objective: The background leading to the present study was that meditation is known to produce specific physiological response patterns that involve various biological systems. The present study was done with an intention to find out the effect of meditation on Biophysical parameters like Serum lipid profile and Blood pressure and then compare them with non-meditators undergoing relaxation.

Method: The study was conducted on 30 Meditators and 30 Non-meditators who were used as controls, but were made to relax in the lying position. Blood pressure measurements were taken in three phases, that is 1) before 2) during and 3) after meditation or relaxation as per the respective group. Serum Lipid profile of all the subjects were also done in the fasting state in the morning.

Results: On analysis it was revealed that lipid profile of meditators showed lower values in triglycerides, total cholesterol and LDL ($p < 0.05$) as compared to that of non-meditators. As regards Blood pressure, significant reduction ($p < 0.05$) in the systolic and diastolic Blood pressures were found during the 2nd and 3rd phase of meditation, whereas, none of the three phases of relaxation showed any such effect.

Conclusion: Meditation has a Blood pressure lowering effect as well as lowering effect on Serum lipid profile parameters.

Key words:

Lipid profile, systolic, diastolic, Meditation, relaxation

Introduction

In today's demanding routine we are being exposed to increasing levels of stress which has turned endemic and just can't be shrugged off. The only viable solution seems to be lifestyle modifications and altering one's attitude towards stress. Meditation which is turning out to be

universally accepted looks out to be the only feasible answer to this condition. Meditation seems to have varied positive physiological, psychological and spiritual benefits. Meditation since generations has helped most people feel less anxious and the awareness that meditation brings can also be a source of personal insight and self-understanding.

Some of the more established methods of meditation are Transcendental meditation, Sahajayoga, Vipassana and Mindfulness meditation (1).

Generally the entire process of meditation entails the following stages: concentration (dharana), absorption (jhana) and one pointedness (samadhi) often followed by the stage of knowledge (nana) (2).

Meditation involves energizing the subtle system of chakras which correspond to the seven nerve plexuses. These chakras comprises of 1) Mooladhara Chakra(pelvic autonomic plexus) 2) Swadhistana Chakra(aortic plexus) 3) Nabhi Chakra (coeliac plexus) 4) Hriday Chakra(cardiac plexus) 5) Vishuddhi Chakra(cervical plexus) 6) Agnya Chakra(optic chiasma) and 7) Sahasrara chakra(seven nuclei in the limbic system) which is actually the final integration of all the six chakras(3,4)

A fine balance and coordination in terms of energy is said to exist between these different chakras. Meditation is known to have a cleansing and soothing effect on the different chakras and help in balancing the energies between them.(5,6)

Sahaja Yoga is even shown to increase plasma Beta-Endorphin levels. These Beta-Endorphins are known to have a role in strengthening the immune system and thereby contribute in the maintenance of homeostasis(3).Meditation is considered to be a wakeful state accompanied by a decreased metabolism which in turn manifests with a decrease in heart rate and Blood pressure(7,8,9,10,11).It is also shown to have a therapeutic effect on metabolic syndrome and thereby being curative on various risk factors like high Blood pressure, abdominal obesity, high cholesterol and insulin resistance(12).Taking into account the above benefits the present study was thus conducted to find out the effect of meditation on biophysical parameters like Serum lipid profile and Blood pressure.

Materials and Methods

The study was conducted at Grant Govt. Medical College and J. J. Hospital, Mumbai after obtaining approval from the institutional ethical committee. The subjects for the study included 30 meditators and 30 non-meditators who were used as control. The subjects were in the age group of 27 to 65 years and their selection criteria were as follows.

- 1) Strict vegetarian diet.
- 2) No smoking habit.
- 3) No history of alcohol intake.
- 4) No past history of hypertension.
- 5) Systolic Blood pressure not more than 130 mm Hg and diastolic Blood pressure not more than 90 mm Hg.
- 6) Not a known case of hyperglycemia or hyperlipidemia.

The meditators (group I) consisted of 'sadhaks' from Mumbai based Prajapati Brahmakumari Ashram who were practicing regular meditation for a minimum period of 6 months prior to the conduction of study.

The non-meditators (group II) consisted of volunteers randomly chosen from the normal healthy population fulfilling the above criteria but who never practiced any kind of meditation.

The study was conducted in the morning hours with the subjects in a fasting state. The procedure was carried out in the following manner.

Group I comprising of meditators were asked to perform 30 minutes of concentrative meditation wherein they would focus on their breathing.

Group II comprising of non-meditators were asked to just relax by lying supine for 30 minutes.

Blood pressure measurements were taken in both the groups in three different phases, that is 1) prior to 2) during and 3)after their respective procedures. A standard ISI marked

sphygmomanometer of “diamond” brand along with “Microtone” stethoscope was used for the recording of Blood pressure. The observations thus obtained were noted down.

Soon after the procedure, Blood samples from both the groups were collected in plain bulbs and sent for serum lipid profile analysis. Prior written consent had been taken from all the subjects after explaining all the requisite procedures.

Serum lipid analysis was done using standard enzymatic kits and derivative formulas as listed below.

Tests	Method used
1) Serum Triglycerides	GPO-PAP enzymatic method
2) Serum Total Cholesterol	CECO-PAP enzymatic method
3) Serum HDL	Phosphotungstate/ Mg^{2+} precipitation method
4) Serum LDL	} Derivation by Friedwald Formula*(14)
5) Serum VLDL	

*Friedwald formula: $VLDL = \text{Triglycerides} / 5$

$LDL = \text{Total cholesterol} - (VLDL + HDL)$

All the results obtained by laboratory analysis for group I and group II were noted down and used for subsequent statistical analysis.

Statistical analysis

The statistical analysis of the data obtained for the meditator and non meditator groups were done using paired t test and p value of less than 0.05 was considered significant and those less than 0.001 was considered highly significant. The results obtained on analysis were presented as Mean $\pm$ Standard Deviation for each of the parameters.

Observation and Results

The meditator group showed significant difference ($p < 0.05$) in serum levels of triglycerides (TRI), total cholesterol (TCH) and Low density lipoproteins (LDL) as compared to the non meditator group (Table I)

But no significant difference ($p > 0.05$) were obtained between the meditator group and the non meditator group in serum high density lipoproteins (HDL) and serum very low density lipoproteins (VLDL)

Table I showing the serum lipid profiles in meditators and non-meditators

	TRI (mg%)	TCH (mg%)	HDL (mg%)	VLDL (mg%)	LDL (mg%)
Meditators Group I	83.80 $\pm$ 31.30	189.90 $\pm$ 26.27	52.60 $\pm$ 4.65	21.40 $\pm$ 6.87	123.80 $\pm$ 14.94
Non- Meditators Group II	107.20 $\pm$ 26.81	209.90 $\pm$ 25.70	51.30 $\pm$ 5.03	22.10 $\pm$ 6.81	133.00 $\pm$ 16.90
p value	0.0048	0.0034	0.1	0.35	0.01
Significance	Significant	Significant	Non significant	Non significant	Significant

When Blood pressure observations were compared in different phases in the meditators significant difference in systolic as well as diastolic components were observed by comparing phase 1 with phase 2 (i.e before meditation values with during meditation values). Comparison of phase 1 with phase 3 (i.e before meditation values with after meditation values) too revealed significant alterations in both diastolic and systolic components of Blood pressure.

But in group II subjects who were asked to relax no significant difference in either of the components of Blood pressure were observed on comparison of phase 1 with phase 2 as well as phase 1 with phase 3 of relaxation.

Table II showing Blood pressure response in phase 1, 2 and 3 in meditators and non-meditators

	Group I Meditators (undergoing Meditation)		Group II Non-meditators (undergoing Relaxation)	
	Systolic BP	Diastolic BP	Systolic BP	Diastolic BP
Phase 1 Before meditation/Relaxation	121.20 ± 4.02	81.90 ± 2.25	119.70 ± 2.73	80.40 ± 1.52
Phase 2 during meditation/Relaxation	117.80 ± 4.85	80.80 ± 2.07	118.90 ± 3.63	80.60 ± 1.83
Phase 3 after meditation/Relaxation	117.90 ± 4.90	80.80 ± 2.07	118.90 ± 3.63	80.60 ± 1.83
p value	p* < 0.0001 (HS)	p* < 0.01 (S)	p* > 0.05 (NS)	p* > 0.05 (NS)
Significance	p** < 0.0001 (HS)	p** < 0.0001 (HS)	p** > 0.05 (NS)	p** > 0.05 (NS)

NS-not significant, S-significant, HS-Highly significant.

*comparison of before with during the respective procedure.

**comparison of before with after the respective procedure.

Discussion

Meditation shows to have a strong evidence to modify various biophysical parameters inclusive of those in the present study i.e. Blood pressure and lipid profile apart from various other parameters that don't fall in the purview of the present study. (15)

Blood pressure is one of the most studied parameters amongst meditators. Findings showing the beneficial effect of meditation by reducing deranged values of BP or normalizing it have been replicated in many studies. Murphy M et al (16) showed that meditation helps relax the large muscle groups pressing on the circulatory system in various parts of the body as well as cause relaxation of the small muscles controlling the Blood vessels whose elasticity help reduce the pressure inside them.

Studies done by Eckberg DL et al in 1977 (17) showed that meditation can also induce a respiratory mediated reflex modulation of sympathetic activity and peripheral resistance by modifications of breathing rate. Reduction in breathing rate as seen in meditation involves an increase in tidal volume, leading to greater cardiopulmonary stretch receptor stimulation which in turn leads to a reduction of sympathetic efferent discharge and vasodilatation.

Studies done by Solpure et al in 2004 (18) showed significant decrease in systolic and diastolic Blood pressures in meditators undergoing vipassana meditation. The study was

conducted by measuring Blood pressure of the subjects prior to and after 10 days session of vipassana meditation.

Khare et al (19) in their study conducted in 2000 which was quite similar to our study showed a significant fall in systolic Blood pressure in meditators but a similar effect was not observed in the group undergoing relaxation. Diastolic Blood pressure in either group was not significantly altered.

Statistically significant decrease in mean Blood pressure was also noted by S. Terathongkum in their 2006 study (20) of autonomic influences on cardiac parameters due to meditation.

Contradictory to these results a study done by Solberg et al in 2004(21) found no significant change in systolic and diastolic Blood pressure either by meditation or by rest.

In the present study systolic as well as diastolic Blood pressure showed a significant lowering during and after meditation in group I subjects .Whereas in group II subjects no significant changes in either systolic or diastolic Blood pressures were observed in any of the phases of relaxation. The above observation in our study could be attributed to the fact that meditation has aforementioned effects on the autonomic nervous system as well as those effected upon by the procedure followed during meditation which include a change in respiratory rate and depth causing a more effective maintenance of Blood pressure. Relaxation on the other hand does not seem to affect the autonomic system nor does it seem to have any effect on the respiratory component as no standard procedure is followed during plain relaxation.

Meditation and its effect on lipid profile has also been the subject of interest amongst many researchers. Favourable metabolic effects have been cited by many of them. Metabolic syndrome which is notoriously linked to dyslipidemia, high Blood sugar, obesity is often caused due to a deficient insulin secretion and /or insulin resistance. Kurhade G.A et al in their 2000 study (22) has stated that insulin has important effects on key steps in the metabolism of lipids and lipoproteins. Increased Blood glucose levels caused due to inadequate utilization of Insulin leads to an increase in triglycerides and other Blood fats. Robert Schneider through his 2006(12) study has stated that meditation modulates physiological response to stress via a neurohumoral activation mechanism and also decreases sympathoadrenal system activation which alters Blood pressure and insulin resistance. Blood pressure and insulin resistance being important components of metabolic syndrome, improving insulin resistance would thereby cause an improvement in the lipid profile of the subject.

Vyas and Dixit having compared the lipid levels between meditators and non-meditators have shown a significant lowering of serum cholesterol in meditators in their 2002 study (13).

Significant reduction in serum cholesterol, LDL, VLDL, total triglycerides and significant increase in HDL cholesterol were also shown in the 2005 study by Bijlani R L et al (23) as a result of introducing a brief lifestyle intervention i.e. meditation in a heterogeneous study group. More significant changes were observed in subjects having Hyperglycemia/Hypercholesterolemia.

In our study we found significant lower values for all lipid profile parameters in the meditator group except for serum VLDL and HDL levels, where no significant difference existed between the two groups. Effect on VLDL and HDL levels could probably have been elicited on more intensive and scientific regimen of meditation accompanied with yoga and other lifestyle and dietary modifications. As lifestyle modifications and dietary alterations apart from introduction of yoga schedule fall beyond the ambit of our study need for such fuller research wherein promotion of other lifestyle modifications apart from mere introduction of meditation has to be done and evaluated in the near future.

Conclusion

Thus, we conclude that meditation causes favorable effects on both systolic as well as diastolic Blood pressure and also had a significant beneficial effect on various lipid profile parameters. This thereby explains that meditation is more than mere relaxation and an

introduction of meditation in our day to day schedule should definitely be advocated to cope up with varied modern day stresses.

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11) EFFECT OF PHYSICAL AND MENTAL STRESS ON HEART RATE VARIABILITY IN TYPE-A AND TYPE-B PERSONALITIES.

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OBJECTIVE: The goal of our study was to evaluate the changes in heart rate variability due to physical and mental stress in different type of personalities (Type A and Type B) and to investigate a possible link between psychological traits and autonomic imbalance.

METHOD: In laboratory set up, 25 subjects (9 males, 11 females; 5 rejected) of mean age 20.30 ± 1.53 years were taken. After taking written consent, subjects were instructed to fill in personality questionnaire. In each of the subject, baseline ECG was recorded for 5 minutes and they were subjected to mental (reverse calculations) and physical stress (45 degree shoulder abduction) with 15 minutes interval period in between. Spectral analysis of HRV for our

study, characterized by High frequency (HF) component, Low frequency (LF) component and LF/HF ratio. All the subjects were divided into Type A (Scores > 207), Type B (Scores <187) and AB (Scores in 188 to 207). Correlation was found between type of personalities and the frequency domain of HRV.

RESULTS: All the components of HRV (LF, HF, LF/HF) were sensitive to physical and mental demands. Type A personality were more prone to stress, despite similar baseline values and stress tests to Type B personality. Statistically significant change in heart rate and thus RR interval was observed during the physical and mental stress as compared to resting condition in Type A individuals. Although personality scores gave positive correlation with HR, LF and LF/HF while negative correlation was seen with HF domain, but the correlation was not significant. Due to mental stress, significant increase in heart rate, LF domain and LF/HF ratio was seen as compared to physical stress. HF domain, although increased with physical stress, but it was not statistically significant. **CONCLUSIONS:** Both physical and mental stress influence risk factors that may increase risk for cardiovascular diseases especially in type A personality.

KEY WORDS: *Stress, Personality, cardiovascular risk, Heart Rate Variability, Autonomic Function*

INTRODUCTION

Cardiovascular diseases are the highest cause of death in the industrialized world, and many of these deaths may be work related. Epidemiological studies have implicated stress as one of the risk factors for cardiovascular disease (CVD) but little is known about the mechanisms that underlie this connection³.

However, the physiological mechanisms accounting for these associations between personality traits on one hand, and cardiovascular morbidity and mortality on the other are not completely understood. Candidate mechanisms have included: limbic and hypothalamic–pituitary–adrenal deregulations, dysfunctions of the autonomic control of the heart (e.g., defective neuronal reuptake of noradrenalin), altered blood platelet function, and non-compliance to medical treatments^{5,6}. Experimental evidence for an association between a propensity for lethal arrhythmias and signs of either increased sympathetic or reduced vagal activity has encouraged the development of quantitative markers of autonomic activity⁷.

Heart rate variability is generally measured using automated computer software wherein, ECG is generated, which is digitized using analog to digital converter (ADC) and several methods can be used to analyze the data (time domain, spectral or frequency domain, geometric, and nonlinear)¹². This study utilized frequency domain analysis of heart rate variability. Spectral analysis of R-R intervals was done using Fourier transformations, which decomposes a complex function into various frequencies of oscillatory functions, like the sine and cosine functions. Spectral analysis takes the Fourier transform and splits the graph into different levels of frequency power:

- High Frequency (HF)
- Low Frequency (LF)
- Very Low Frequency (VLF)
- Low Frequency (LF)/ High Frequency (HF)

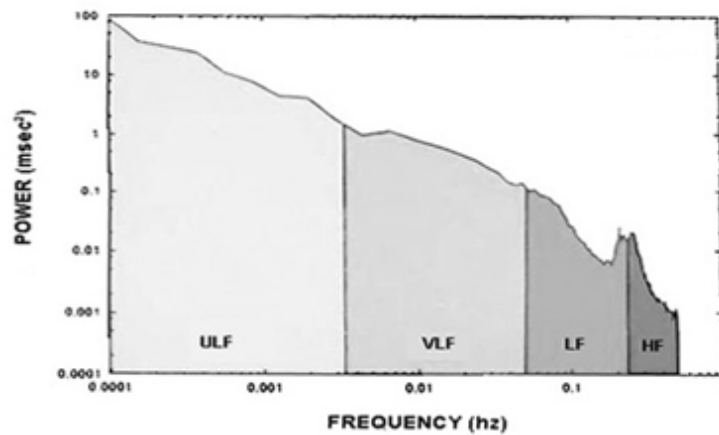


Figure 1 : SPECTRAL FREQUENCY ANALYSIS (Modified) ¹³

Our study was inspired by the fact that very few studies were done in Indian subcontinent to demonstrate how different types of personalities react to physical as well as mental stress and document its effect on HRV. Since, recent studies have documented that 6-10% of myocardial infarction takes place in younger age group, thus, we targeted this age group for our study¹⁴.

MATERIALS AND METHODS:

The present study comprises of 25 subjects of mean age 20.30 ± 1.53 , selected randomly from the apparently healthy MBBS students of Maulana Azad Medical College and Lok Nayak Hospital, New Delhi. After taking Institutional ethical clearance, experiment protocol was explained and consent was taken. These subjects would be of either sex, and will be given Personality questionnaire according to which they will be divided into Type A and Type B personality. Those students who will have borderline scores will be rejected from our study.

STUDY DESIGN

This was a self control type of study. The subjects in the study were selected on randomized basis and that they extended their cooperation for the same.

- Study duration: 8 Weeks
- Selection Criteria

[1] Inclusion Criteria

- a) Individuals of either sex and of adult age group(18-35 years)
- b) Apparently healthy individuals without any known disease which may directly or indirectly affect Autonomic nervous system.
- c) No history of any medication or drug affecting the ANS.

[2] Exclusion Criteria

- a) Individuals with any known disease or drug which may directly or indirectly affect ANS.

- b) Borderline personality scores (Type AB)
 - c) Any orthopedic abnormality
 - d) Unable to cooperate to undergo the study design.
- **Experiment Protocol:** In laboratory set up, the following protocol will be followed:
1. All the subjects filled a consent form that they are willing to participate in study.
 2. Relevant history was taken and the subjects were instructed to fill in the given Personality questionnaire¹⁵.
 3. Anthropometric measurements: height, weight and body mass index was calculated using formula individual body mass in kg divided by square of his/her height.
 4. Subject's Blood pressure was measured using automated apparatus
 5. In each of the subject, baseline ECG was recorded for 5 minutes after 15 minutes of rest at comfortable room temperature¹⁰. The acquired ECG signal is digitized and stored. The analysis was done by frequency domain methods as described below.
 6. After which each of them were subjected to mental (reverse calculations of subtracting 13 starting with 3000)¹⁶ and physical stress (45 degree shoulder abduction, one arm unsupported with maximum extension)¹⁷ with 15 minutes rest period in between.
- **Spectral analysis of HRV¹⁰** will be characterized by the following three frequency domain components:
1. High frequency (HF) component(0.15Hz - 0.40 Hz): Predominantly parasympathetic,
 2. Low frequency (LF) component (0.04Hz – 0.15 Hz): Predominantly sympathetic.
 3. LF/HF ratio: Sympathovagal balance

STATISTICAL ANALYSIS

Student's t-test was used for the analysis and a p value of < 0.05 was considered as significant. The correlation between the different parameters was studied by using Pearson's correlation coefficient.

RESULTS

For analyzing the data, acquisition was done by computed software in RMS polyrite. Each data file was filtered in order to remove low-frequency composite oscillating waves. Since

the QRS waves were high frequency waves, this filter made the QRS peaks in the electrocardiograph stand out more and facilitated selection in later parts of the program. The program then found the peaks of each graph, and other outliers caused by irregularities were eliminated through the use of a threshold.

The mean age of the subjects was 20.30 ± 1.53 years and various anthropometric parameters are given in the Table-1 below.

Table-1: Anthropometric Parameters for Subjects

#	PARAMETER	VALUE
1	Age (years)	20.30 ± 1.53
2	Male : Female	9 : 11*
3	Height(cm)	166.29 ± 11.36
4	Weight(kg)	63.60 ± 16.21
5	Body Mass Index(kg/m ²)	23.00 ± 4.08

*5 subjects excluded from the study due to borderline personality scores (Type AB)
Most of the components of HRV were sensitive to physical and mental demands. Due to physical stress statistically significant increase in heart rate, low frequency and low/high frequency was seen, whereas high frequency and RR interval decreased significantly (see Table-2).

Table-2: Impact of Physical Stress on HRV Components

#	DOMAIN	BASELINE	PHYSICAL STRESS
1	Heart rate	80.80 ± 11.55	$90.45 \pm 9.48^*$
2	RR interval	0.76 ± 0.11	$0.67 \pm 0.07^*$
3	LF	180.10 ± 113.54	$280.95 \pm 118.36^*$
4	HF	159.50 ± 41.57	134.80 ± 41.85
5	LF/HF	1.19 ± 0.71	$2.21 \pm 0.89^{**}$

*Significant ($p < 0.05$); **Highly significant ($p < 0.001$)

When the group was subjected to mental stress, highly significant increase in LF domain and LF/HF ratio was seen whereas, HF domain decreased significantly (See Table-3)

Table-3: Impact of Mental Stress on HRV Components

#	DOMAIN	BASELINE	MENTAL STRESS
1	Heart rate	80.80 ± 11.55	$97.90 \pm 9.88^{**}$
2	RR interval	0.76 ± 0.11	$0.62 \pm 0.07^{**}$

3	LF	180.10 ± 113.54	396.70 ± 231.37**
4	HF	159.50 ± 41.57	119.75 ± 50.87
5	LF/HF	1.19 ± 0.71	3.32 ± 1.31**

*Significant ($p < 0.05$); **Highly significant ($p < 0.001$)

Mental Stress resulted in significantly higher variation in HRV parameters vis-à-vis Physical Stress, except HF domain where difference was not significant.

Amongst 20 subjects, 6 subjects were of Type A personality (Score >207), 14 Type B personality (Score <187) and 5 Type AB (Score in 187-207); which were excluded from the study. When the baseline characteristics were compared between Type A and Type B personalities, no significant difference was seen between them (details in Table-4)

Table-4: Comparison of baseline HRV characteristics for Type-A and Type-B subjects

#	PARAMETER	TYPE-A SUBJECTS	TYPE-B SUBJECTS	SIGNIFICANCE
1	Heart rate	74.50 ± 10.15	83.5 ± 11.37	NS
2	RR interval	0.82 ± 0.12	0.73 ± 0.10	NS
3	LF	191.67 ± 119.1	175.14 ± 115.32	NS
4	HF	185.33 ± 43.93	148.43 ± 36.65	NS
5	LF/HF	1.09 ± 0.69	1.23 ± 0.74	NS

*NS: Not-Significant ($p > 0.05$); S: Significant ($p < 0.05$); HS: Highly significant ($p < 0.001$)

Both Type A and Type B personalities when exposed to mental stress demonstrated significant changes as shown Table-5 and Table-6 below:

Table – 5: Impact of Mental Stress on Type A Personality

#	PARAMETER	BASELINE	MENTAL STRESS	SIGNIFICANCE
1	Heart rate	74.50 ± 10.15	103.67 ± 7.28	HS
2	RR interval	0.82 ± 0.12	0.58 ± 0.04	HS
3	LF	191.67 ± 119.1	471 ± 275.18	S
4	HF	185.33 ± 43.93	121.17 ± 14.50	HS
5	LF/HF	1.09 ± 0.69	3.76 ± 1.86	HS

*NS: Not-Significant ($p > 0.05$); S: Significant ($p < 0.05$); HS: Highly significant ($p < 0.001$)

Table-6: Impact of Mental Stress on Type-B Personality

#	PARAMETER	BASELINE	MENTAL STRESS	SIGNIFICANCE
1	Heart rate	83.5 ± 11.37	95.43 ± 10.02	HS
2	RR interval	0.73 ± 0.10	0.64 ± 0.07	HS
3	LF	175.14 ± 115.32	364.86 ± 213.24	S
4	HF	148.43 ± 36.65	119.14 ± 60.83	NS
5	LF/HF	1.23 ± 0.74	3.14 ± 1.03	HS

*NS: Not-Significant ($p > 0.05$); S: Significant ($p < 0.05$); HS: Highly significant ($p < 0.001$)

When Type A personality was subjected to physical stress, highly significant changes was seen with Heart rate, RR interval, HF and LF/HF ratio, whereas, in Type B personality LF/HF ratio was increased significantly whereas, non-significant difference was seen in other parameters (Table-7, Table-8)

Table-7: Impact of Physical Stress on Type A Personality

#	PARAMETER	BASELINE	PHYSICAL STRESS	SIGNIFICANCE
1	Heart rate	74.50 ± 10.15	89.83 ± 7.17	HS
2	RR interval	0.82 ± 0.12	0.67 ± 0.05	HS
3	LF	191.67 ± 119.1	311.67 ± 123.76	NS
4	HF	185.33 ± 43.93	125.33 ± 21.36	HS
5	LF/HF	1.09 ± 0.69	2.59 ± 1.17	HS

*NS: Not-Significant ($p > 0.05$); S: Significant ($p < 0.05$); HS: Highly significant ($p < 0.001$)

Table-8: Impact of Physical Stress on Type B Personality

#	PARAMETER	BASELINE	PHYSICAL STRESS	SIGNIFICANCE
1	Heart rate	83.5 ± 11.37	90.71 ± 10.55	NS
2	RR interval	0.73 ± 0.10	0.67 ± 0.08	NS
3	LF	175.14 ± 15.32	267.79 ± 118.17	NS
4	HF	148.43 ± 36.65	138.86 ± 48.21	NS
5	LF/HF	1.23 ± 0.74	2.05 ± 0.73	HS

*NS: Not-Significant ($p > 0.05$); S: Significant ($p < 0.05$); HS: Highly significant ($p < 0.001$)

Correlation amongst the personality scores and HRV parameters were done using Pearson's Coefficient. Although positive correlation was seen with LF domain and LF/HF ratio, it was

non-significant. A significant positive correlation was seen with BMI in type B personality group.

DISCUSSION

HRV analysis has gained much importance in recent years as a technique employed to explore the activity of ANS, and as an important early marker for identifying both physiological and pathological conditions. An attempt was made to examine the influence of stress on Heart Rate Variability in Type A and Type B personalities. We explored this relation recording data for three conditions: at rest, with physical stress followed by mental task. The experimental tasks were intended to induce mental and physical stress. For almost all described measures (Mean RR, LF, HF, LF/HF), the active conditions can be distinguished from the rest condition, meaning that heart rate variability is sensitive to any change in mental or physical state.

Mean values $\pm$ SD for heart rate at rest was 80.80 ± 11.55 bpm, which increased highly significantly to 90.45 ± 9.48 bpm during physical stress and 97.90 ± 9.88 bpm with mental stress. Thus, as expected there was significant decrease in RR interval both during physical and mental stress.

Due to stress, there was statistically significant increase in LF and LF/HF ratio and decrease in HF domain. Moriguchi et al¹⁸ and Lucini D et al¹⁹ also documented the same. Contrary to these findings, Tharion et al in 2009 stated that there was no significant change in frequency domains due to stress²⁰.

Although more sympathetic activation was observed in mental stress vis-à-vis physical stress; the difference was not significant in our study. Whereas, Garde et al reported that physical demands have major influence on autonomic modulation and role of mental stress is insignificant²¹.

Personality may favor emotional stress, which in turn may alter autonomic drive, reduce coronary blood flow, and induce ischemia²². Effect of stress (physical and mental) on heart rate variability in Type A and Type B personality was also ascertained. While some earlier studies suggested that type A personality doubled your risk of heart disease and made you five times more likely to have a recurrent heart attack,²³ other studies have found no association between type A personality and heart disease risk^{24, 25}. Increased sympathetic activity at baseline and during stress is an attractive potential mechanism that may link personality characteristics to cardiovascular disease²⁶. We found although the baseline stress levels were same in both the personality types, but when type A individuals were exposed to mental stress, highly significant increase in LF and LF/HF ratio was seen. Psychological characteristics have been proposed as possible mechanisms that contribute to sympathetic activation. Behavioral responses are frequently accompanied by sympathetic activation. These behavioral responses are regulated by central control mechanisms, which are linked closely to brain stem centers that modulate autonomic outflow²⁷. Several prior studies have examined the association between type A personality (with its related hostility and anger) and cardiovascular disease. Some have shown a direct relationship between the two^{28,29} and others have shown no interaction^{30,31}.

On comparing both the sexes, females had higher HR, LF domain, LF/HF with respect to males, although the difference was not significant. K. Umetani in 1998 documented that in young females (< 50 years), Heart rate was significantly more than males, whereas after 50 years, this effect disappeared³². However, D. Ramekers stated that there is no influence of gender on heart rate variability³³.

Important and unique strengths of the present study include:

- Data analysis was completed with the investigator blinded to personality type
- Effect of both physical and mental stress on heart rate variability was seen
- Stressors used in this study replicated real life stressors
- Non-invasive technique was used to assess sympathovagal balance.
- We studied normal subjects over a narrow range of age and body mass index, which minimized the influence of these variables on the responses we report. Young individuals were chosen due to increase in rate of myocardial infarction in this age group.

CONCLUSION

Thus, we conclude both physical and mental stress influence risk factors that may increase risk for cardiovascular diseases especially in type A personality.

SCOPE FOR FURTHER STUDY

Scope and reliability of the study can be enhanced by:

- Increasing number of subjects
- Including subjects from different professions
- Testing efficacy of other physical and mental stress inducers, to identify the optimal inducer to be used for the study.
- Assessing biochemical parameters like cortisol and catecholamines during the study.

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12) STUDY OF BACTERIAL PROFILE OF PUS CULTURE IN DHIRAJ GENERAL HOSPITAL

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ABSTRACT:

AIM: To study the profile of aerobic bacterial infection in pus culture in a hospital attached to a teaching institute.

Material and methods: Total 259 pus samples received from various wards of the institute were processed aerobically, using standard culture methods. Internal quality control methods were observed to ensure correctness of the results.

Observations: Though *S. aureus* was reported to be the commonest pathogen, the role of GNB, guided by *Pseudomonas* and *E. coli* spp. cannot be undermined.

Discussion: The study supports the previous observations made at other locations in India, and thus finds it relevant also to expect GNB infections as predominant cause of bacterial infections in pus cultures.

Conclusion: The study concludes that incidence of pus infection is expected to be highest in wards housing post-surgical patients. When empirical treatment is intended, GNB may also be expected as the most probable causative agent.

Key words: pus culture, aerobic, bacterial profile

INTRODUCTION

The overall incidence of wound sepsis in India is from 10 to 33%. Western studies indicate this range to be between 3 to 10%, with an average of 5%. Urinary tract infection is reported to be highest (42%), followed by wound infection (23.8%) and respiratory tract infection (10.5%).

Relative resistance to antibiotics, hence difficult to treat; relatively more virulent strains and capacity to adapt quickly to changing environment make the pathogens acquired in the hospital a matter of concern.

Various studies across the globe have been consistent enough to show a predictable bacterial profile in the wound infections. This makes an important observation for a clinician who intends to start empirical treatment to his patients, while laboratory culture reports are awaited.

Tiwari P, Kaur S reported that the most common bacteria isolated in 35% of positive blood and pus samples were vancomycin-sensitive *Staphylococcus aureus*¹.

In a study done in ICU patients in Kolkata, Ghosh A et al reported that Gram-negative infection was more common overall, but incidence of Gram-positive infection was also very high. Gram-negative infections were responsible for more severe infections and case fatality. Multidrug resistant Gram-positive infections are rising.²

In six years surveillance at a pediatric ICU in Taiwan, Lee CY et al observed that *Staphylococcus aureus* was the most common isolate among the Gram-positive organisms, while *Pseudomonas aeruginosa*, *Escherichia coli*, and *Klebsiella pneumoniae* were the 3 leading Gram-negative isolates.³

Zubair M et al from north India collected. Pus samples for bacterial culture from 102 patients admitted with diabetic foot infections. They found that Gram negative aerobes were most frequently isolated (63.8%), followed by gram positive aerobes (36.1%) and anaerobes (31.4%).⁴

In a prospective study conducted by Basu S et al on 52 wounds, it was reported that in chronic wound infections, the most common organisms were *Pseudomonas* (21 wounds) and *Escherichia coli* (eight wounds). They recommended that because the prevalence of monomicrobial flora in chronic wounds is high, if a wound infection is suspected, empiric therapy should target the most prevalent flora. The high rate of drug-resistant *Pseudomonas* and MRSA strains should discourage antibiotic use in chronic ulcers before obtaining culture results.⁵

In a five year study of bacterial profile in burn wound infections, Agnihotri N et al documented that *Pseudomonas aeruginosa* was found to be most common isolate (59%) followed by *Staphylococcus aureus* (17.9%), *Acinetobacter* spp. (7.2%), *Klebsiella* spp. (3.9%), *Enterobacter* spp. (3.9%), *Proteus* spp. (3.3%) and others (4.8%).⁶

This study was undertaken in order to establish the current aerobic bacterial profile in pus cultures, from samples obtained from various wards of the 1200 bedded Dhiraj General Hospital.

MATERIAL AND METHODS

The study was done over a period of one year. A total of randomly selected 259 pus samples received by the bacteriology section of microbiology department, from various wards of Dhiraj General Hospital, were processed. Standard diagnostic procedures were followed, using media and stains approved in the laboratory for aerobic culture. Relevant baseline information of the patient was noted. Internal quality control methods were observed to ensure correctness of the results. The data thus created was documented and analyzed.

OBSERVATIONS

A total of 259 samples received by the laboratory were randomly selected for the study. Of them, orthopedics and surgery wards (84+70/ 259) constituted 59.45 % of all samples. Males outnumbered Females, with the sampling percentage ratio of 69.49:30.50. (Table 1)

Of the 259 samples studied, 119 samples showed no growth, whereas 140 samples showed growth. Of the 140 samples, 134 samples showed growth of a single organism, and six samples showed mixed growth. Thus, a total of 146 isolates were processed for identification.

S. aureus (39), *Pseudomonas* spp. (26), *E. coli* (20), *Klebsiella* (19) & CONS (18) = total 122/146 isolates constituted 83.56% growth of all isolates. (Table 2)

Of 146, 13 (8.90%) isolates were resistant to all the antibiotics tested against. 93 (63.69%) isolates were resistant to more than one drug, whereas 40 (27.39%) isolates were sensitive to all the drugs. (Table 3)

16 isolates were sensitive to only one drug. *E. coli* and *Klebsiella* spp. constituted 50% of this group, followed by other GNB. (Table 4) Cephalexin was the drug with 50% isolates sensitivity in this group, followed by Co-trimoxazole and Novobiocin. (Table 5)

13 isolates were resistant to all drugs. *E. coli* proved to be the front runner in this group (46.15%), followed by *Pseudomonas* and *Klebsiella* spp. Interestingly, *S. aureus* and CONS were not part of these findings. (Table 6)

DISCUSSION

The observations of this study very well coincide with the works reported by various authors across the country.

The predominance of mono-microbial infections observed in this study has been substantiated by a prospective study done by Basu S et al⁵, stating that chronic wounds do tend to show mono-microbial infections.

S. aureus was found to be the most commonly occurring pathogen in the study group. Tiwari P, Kaur S¹ and Lee CY et al³ quoted to have demonstrated similar findings. However, Agnihotri N et al⁶ found it to be second most common pathogen after *Pseudomonas* spp.

Pseudomonas and *E. coli* spp. were the most common Gram Negative Bacilli (GNB) obtained from the pus samples. Such GNB dominance in the aerobic growth in pus culture

has been highly seconded by studies reported by Ghosh A et al², Zubair M et al⁴. Basu S et al⁵ too reported *Pseudomonas* and *E. coli* spp. to be the most commonly occurring pathogens in wound infections, in that order.

72.59 % of all isolates were resistant to more than one drug. 8.90 % organisms showed resistance to all drugs they were tested against., Agnihotri N et al⁶ and Basu S et al⁵ also reported on the multi drug resistance capacity of the pathogens isolated from pus samples.

16 isolates were sensitive to only one drug. *E. coli* contributed maximum number to this group. Cephalexin was the drug with 50% isolates sensitivity in this group, followed by Co-trimoxazole and Novobiocin. However, additional tests like identifying MRSA or ESBL production were not performed, thus leaving further scope of evaluation. Basu S et al⁵ has reported on high incidence of up to 18.18% of ESBL producing GNB and MRSA as a probable contributors to drug resistance.

CONCLUSION

The study concludes that incidence of pus infection is expected to be highest in wards housing post-surgical patients. It is concluded from this study that, majority of the pus samples showed mono-microbial infection. Though *S. aureus* was reported to be the commonest pathogen, the role of GNB, guided by *Pseudomonas*, *E. coli* and *Klebsiella* spp. cannot be undermined. Any empirical treatment if intended by the clinician may be instituted with this bacterial profile as baseline data. However, this study does not comment on the probability of MRSA or ESBL producers, thus discouraging antibiotic use in chronic ulcers before obtaining culture results.

Table 1: Ward wise Distribution of samples.

Ward	Male	Female	Total
Orthopedics	68(37.78%)	16(20.25%)	84(32.43%)
Surgery	57(31.67%)	13(16.46%)	70(27.03%)
Pediatrics	8(4.44%)	0(0%)	8(3.088%)
Medicine	0(0%)	1(1.27%)	1(0.386%)
Ophthalmology	1(0.56%)	0(0%)	1(0.386%)
ENT	3(1.67%)	1(1.27%)	4(1.544%)
Gynecology	0(0%)	7(8.86%)	7(2.703%)
ICU	17(9.44%)	1(1.27%)	18(6.95%)
OT recovery	7(3.89%)	6(7.59%)	13(5.02%)
Casualty	3(1.67%)	0(0%)	3(1.158%)
Special	3(1.67%)	4(5.06%)	7(2.70%)
OPD	3(1.67%)	2(2.53%)	5(1.93%)
TB	2(1.11%)	1(1.27%)	3(1.158%)
Osw	3(1.67%)	0(0%)	3(1.158%)
Obstetrics	0(0%)	23(29.11%)	23(8.89%)

IJABMS	JANUARY		2013
Other	5(2.78%)	4(5.06%)	9(3.47%)
Total	180(69.49%)	79(30.50%)	259(100%)

Table 2: Bacterial profile of pus culture

Organism isolated	Total 146	%
CONS	18	12.32
Proteus spp.	10	6.84
Staphylococcus aureus	39	26.71
Klebsiella	19	13.01
Acinetobacter	4	2.73
Pseudomonas spp.	26	17.80
Enterococcus	2	1.36
Escherichia coli	20	13.69
Citrobacter	1	0.68
Alkaligenes	1	0.68
Yeast like budding cells	2	1.36
Streptococcus	3	2.05
GPC	1	0.68

Table 3: Resistance to more than one drug

Growth	146 (100%)
Resistant to all	93 (63.69%)
CONS	8(5.47%)
Proteus	8(5.47%)
S. aureus	17(11.64%)

Klebsiella	16(10.95%)
Acinobacter	4(2.73%)
Enterococcus	2(1.36%)
E. coli	14(9.58%)
Citrobacter	1(0.68%)
Pseudomonas	21(14.38%)
Alkaligenes	1(0.68%)
Streptococcus	1(0.68%)

Table 4: Isolates sensitive to only one drug

Organism	Sensitive to one antibiotic
Acinobacter	2(12.5%)
Klebsiella	4 (25%)
Pseudomonas	2(12.5%)
Proteus	2(12.5%)
E. coli	4(25%)
Enterococcus	1(6.25%)
S. aureus	1(6.25%)
Total	16(100%)

Table 5: Drug sensitivity in single drug sensitive isolates

Drug	Number of isolates	%
Cephotaxime	8	50
Tetracycline	1	6.25
Tobramycin	1	6.25
Novobiocin	2	12.5
Gentamicin	1	6.25
Erythromycin	1	6.25
Co-trimoxazole	2	12.5
Total	16	100

Table 6: Isolates showing resistance to all drugs

Organism	Resistant to all	%
Enterococcus	1	7.69
E.coli	6	46.15
Pseudomonas	3	23.07
Klebsiella	2	15.38
Proteus	1	7.69
Total(resistant to all)	13	99.98

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13) A COMPARATIVE STUDY OF VISUAL REACTION TIME IN BADMINTON PLAYERS AND HEALTHY CONTROLS

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ABSTRACT:

Introduction: Reaction time is duration between application of a stimulus to onset of response. Visual reaction time is time required to response to visual stimuli. The present study was conducted to measure visual reaction time in 100 subjects (50 Badminton players and 50 healthy controls). **Material & Method:** The visual reaction time was measured by the direct RT computerized software in healthy controls and Badminton players. Simple visual reaction time is measured. During the reaction time testing, visual stimuli were given for eighteen times and average reaction time was taken as the final reaction time. **Result:** The study shows that Badminton players had faster reaction time than healthy controls. **Conclusion:** Our study concluded that persons involved in sports are having good reaction time as compared to controls. These results support the view that playing of Badminton is beneficial to eye-hand reaction time, improve the concentration and alertness.

Key Words: Reaction Time, Badminton players, Visual Reaction Time, Alertness

INTRODUCTION:-

At the present time children are more involved in videogames, watching TV, movies and exploring internet. Sports like badminton, table tennis, volleyball, , cricket, football, etc. are preferred less with modernization. These sports not only make them physically healthy but would also improve their alertness, concentration.

Reaction time is duration between application of a stimulus to onset of response. Visual reaction time is time required to response to visual stimuli. Reaction time acts as a reliable indicator of rate of processing of sensory stimuli by central nervous system and its execution in the form of motor response.¹ Reaction time can be divided into three parts. The first is perception time, which is time for the application and perception of the stimulus and giving the necessary reaction to it. The second is decision time, which signifies the time for giving an appropriate response to the stimulus. The third is motor time, which is the time for compliance to the order received^{2,3}. Reaction time can be described into three types, (1) Simple reaction time:- here there is one stimulus and one response. (2) Recognition reaction time:- here there are some stimulus that should be responded to and other that should not get response. (3) Choice reaction time:- here there are multiple stimulus and multiple responses^{4,5}. Sports such as badminton ,table tennis, , tennis and squash have been classified as reaction sports⁶. In badminton specifically, the incredible speed of the shuttle which allows a very minimal amount of time to react and execute shots , so badminton player has to give proper and quick response during the game. A study done by Hascelik et al.⁷ found decrease in the visual reaction time of male volleyball players. Another study done by Nougier et al.⁸ suggest that athletes has better reaction time as compared to control subjects.

Thus we devised the present study to see the effect of badminton playing, which involves decision making during game, on speed of cognitive processes (reaction time) and to compare with control group which is not involved in regular sports activity.

MATERIAL AND METHOD:-

The present study was conducted in 50 healthy controls and 50 Badminton players of age group of 14 to 40 years of male in Jamnagar district. The research protocol was approved by Institutional ethical committee and informed consent obtained from each subject prior to inclusion

in the study. Personal history and medical history of both groups was collected in pre-designed proforma. Medical history was taken to rule out any medical or surgical disease which would affect reaction time of individual. After taking consent, Reaction time was measured with Direct RT computerized software.⁹ It was carried out with adequate light and in silent atmosphere. Visual reaction time was measured where subject has to respond to different colour stimulus appearing on computer screen by pressing spacebar key on keyboard. In present study only simple visual reaction time was measured. Subjects were given practice session before measuring the actual reaction time. Data was collected and was statistically analyzed. Reaction time was reported as mean $\pm$ Standard Deviation (SD). The level of significance between Badminton players and controls was tested by T-test (Unpaired) by SPSS version 20 software. The difference was taken as significant if p value was less than 0.05.

RESULTS:-

Table 1 show General characteristics of healthy controls and Badminton players. (value are Mean $\pm$ SD)

	Number	Age (Year)	Height(cm)	Weight(kg)	BMI
Healthy control	50	20.14 $\pm$ 4.015	167.18 $\pm$ 6.252	54.72 $\pm$ 9.996	19.5 $\pm$ 3.264
Badminton players	50	23.50 $\pm$ 8.767*	166.62 $\pm$ 7.478	61.52 $\pm$ 12.339*	22.11 $\pm$ 3.808

*P<0.05

Table 1 shows the mean age of healthy controls was 20.14 years and of Badminton players was 23.50 years. Mean height of healthy controls 167.18 cm and Badminton players 166.62 cm.

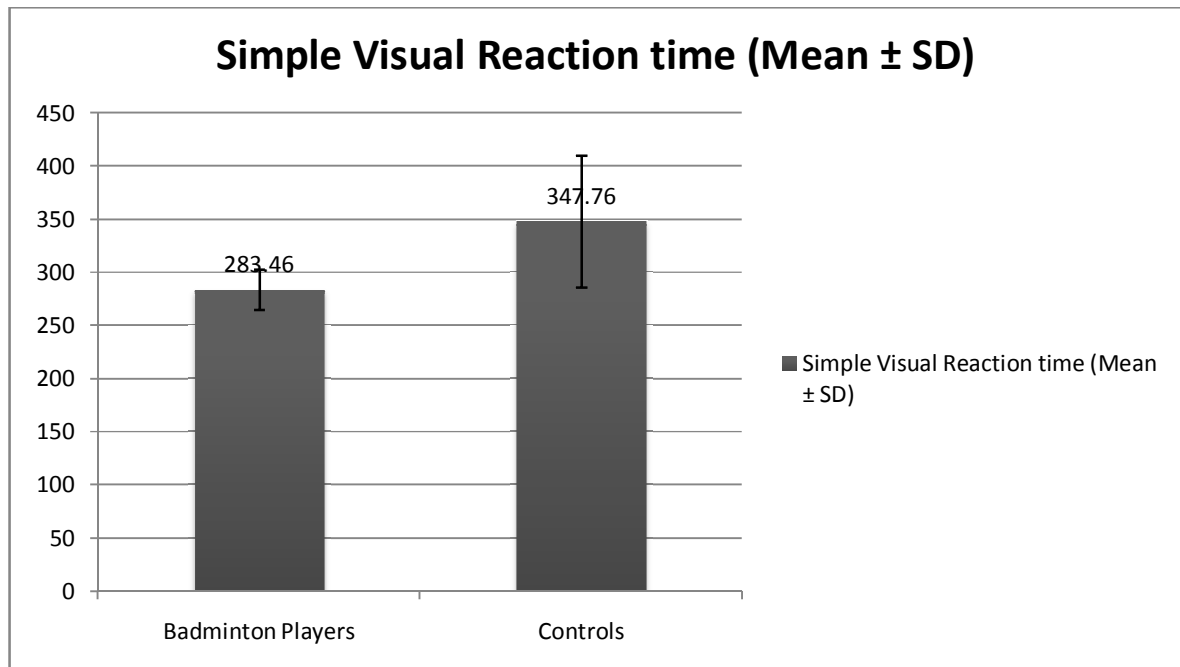
Mean weight of healthy controls 54.72 Kg and Badminton players 61.52 Kg. Mean BMI of healthy controls 19.58 Kg/m² and Badminton players 22.11 Kg/m². Among these age and weight are statistically significant.

Table 2 shows Comparison of simple visual reaction time in healthy controls and Badminton players

	Number	Simple Visual Reaction time (Mean $\pm$ SD) in ms	P value
Badminton Players	50	283.46 $\pm$ 18.867	<0.05
Healthy Controls	50	347.76 $\pm$ 61.827	

Table 2 shows simple visual reaction time in healthy controls (347.76 $\pm$ 61.827 ms) and Badminton players (283.46 $\pm$ 18.867 ms). Visual reaction time was significant faster in Badminton players.

Graph 1 showing simple visual reaction time (mean $\pm$ SD) in ms in Badminton players and healthy controls.



DISCUSSION:

In present study there are difference of visual reaction time between Badminton players and healthy controls. Visual reaction time is shorter in Badminton players than healthy controls, which is statistically highly significant. Reaction time is an important component of motor movements. It is one of the important methods to study a person's central information processing speed and fast coordinated peripheral movement response. Reaction time is an accurate indicator of speed and effectiveness of decision making. Reaction times vary depending on what portion of the eye picks up the stimulus. Reaction times are shortest if the stimulus is picked up by the cones of the eye directly in front of the line of vision¹⁰. This is called central vision. As the stimulus moves more peripherally reaction times increase with the angle of the stimulus from central vision. Visual reaction time is the time taken by an individual to react to an visual stimulus. It can be of crucial value in activities like driving and is an important quality of a sportspersons. It has been well documented that exercise and sports beneficial to mental health¹¹⁻¹². Patrick J. Smith, et al.¹⁶ found in his study that participants who completed a six month aerobic exercise program exhibited improvements in reaction time. Researchers have also established that exercise and sports results in a mild enhancement of cognitive function¹³⁻¹⁷. Result from present study are tune with finding of study by Hascelik et al⁷ who found decreases in the visual reaction time of male volleyball players from 214.55 ms to 200 ms. Ghuntla T et al¹⁸ found the visual reaction

time of basket ball players is faster than controls, which was significant. Some study like Mamog˘lu et al¹⁹ found the visual reaction times of professional

subjects. Badminton is a sport that depends on finely crafted movements that occur very quickly and a precise execution of shots. Badminton players have to give a good attention to the stimuli and have to be alert to give a proper motor response. Motor response execution is a physical task, so it is logical that people trained in physically reactive sports like Badminton may have superior ability to select a correct motor response. Although the mechanism behind exercise and human information processing have not been exactly identified. There are several possible mechanism which provide primary support for different hypothesis. Different direct and indirect mechanisms could explain relationship between exercise and mental processing. Perhaps the most popular mechanism is the idea that those individuals who exercise at moderate to intense levels have higher rates of cerebral blood flow. This increased amount of blood flow in the brain results in improvements in cognitive functioning due to increased supply of necessary nutrients, such as oxygen and glucose^{14,15}. The quicker reaction time in Badminton players compared to controls is due to improved concentration, alertness, better muscular co-ordination and improved performance in speed and accuracy task.

CONCLUSION:

To conclude persons involved in sports like Badminton are having good visual reaction time as compared to controls. These results support the view that playing of Badminton is beneficial to eye-hand reaction time and coordination. It can be stated that Badminton is beneficial for the enhancement of cognitive function, concentration and alertness.

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CONFLICT OF INTEREST:- None declared.

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14) A MODIFIED ANAESTHESIA PROTOCOL FOR PATIENTS UNDERGOING MINIMAL INVASIVE CARDIAC SURGERY BY RIGHT THORACOTOMY- A SINGLE CENTER EXPERIENCE.

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Abstract:

Objectives : Median sternotomy is a well accepted incision for most cardiac surgical procedures. However due to some obvious advantages, now right thoracotomy incision is preferred for some cardiac surgical procedures. The patient position for right thoracotomy necessitates some modifications in anesthesia protocols. In this study we evaluated the feasibility of this approach in selected procedures.

Methods : Between February 2009 and October 2012, 41 patients underwent Cardiac surgery via right thoracotomy. The patients selected for this approach were in ASA Grade-II to III without diabetes or hypertension. The surgeries conducted were Atrial septal defect closure (28 cases), valve replacements (12 cases) and one case of thoracic mass excision. A standardized protocol of anaesthesia induction and maintenance was administered with injection propofol, fentanyl and vecuronium bromide dosed according to the patient's body weight. Tracheal intubation was carried out with Left sided DLT (double lumen tube) followed by single lumen tube after the surgery for post operative ventilation. A cardiac surgery was performed through right thoracotomy in fourth inter costal space with incision of 4 to 6 cm in size. There was no mortality or significant morbidity in any of these patients and there was decreased bleeding and shortened duration of ICU stay.

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Results- Feasibility of undergoing complex cardiac surgery by lateral thoractomy is shown by our experience and we also observed less bleeding and early post operative recovery and ambulation. The approach was highly accepted for cosmetic reasons also.

Keywords: General anaesthesia, Double lumen tube, TEE.

Introduction:

In the past 150 years Cardiac surgery has seen rapid growth and significant advances. The first heart surgery was performed by Larrey in 1810 when a stab wound to the heart was operated^[13]. Milton from Cairo developed a technique for median sternotomy in cadavers and subsequently excised a tuberculous sternum from young patient^[12]. Since then, the approach for all major cardiac surgeries has been a median sternotomy. This incision is well accepted to carry out most of the cardiac surgeries and the anaesthesia management is standardised in most of the centers. This incision is predominantly used in cardiac surgery, but it is a useful incision for many other operations^[3]. The incision also allows excellent access to the mediastinum and both pleural spaces; hence it can be used for thoracic operations such as retrosternal goiter excision and **esophagectomy**. Modifications of median sternotomy such as hemisternotomy have been used for minimally invasive aortic and mitral valve surgery. Median sternotomy is a long incision which begins above the sternal notch and extends 1-2 cm below the xiphoid^[4]. The incision may associate with significant bleeding and cosmetic issues.

In the past 25 years minimally invasive Cardiac surgery has been catching up with a quest for better cosmetic results with minimal invasion. Lateral thoractomy is a less invasive approach with advantages such as lesser bleeding, early ambulation, lower infection rates and minimal trauma and better cosmetic appearance with a less noticable scar. This approach is advantageous in younger patients especially in females. Vernick et al have also observed that minimally invasive mitral valve surgery may also reduce Atrial fibrillation incidence^[2]. Another advantage of this approach may be in the patient who undergoes repeat cardiac surgery after a prior midline sternotomy. Re-sternotomy in this situation may be hazardous leading to bleeding and damage to adjacent structures. It is also noted that a sternotomy after a prior thoractomy does not increase bleeding risks. So a thoractomy may be advantageous in either ways when a repeat cardiac surgery is contemplated^[10].

The change in positioning of the patient necessitates changes in anesthesia protocols, in this article we describe our experience in administering anesthesia for 41 patients who underwent Cardiothoracic surgery by thoractomy. The problems inherent with lateral thoractomy include: limited exposure of the heart during surgery which poses

challenges with management of arrhythmia, problems in achieving haemostasis, myocardial protection and de-airing at the end of surgery. Patient selection for this approach is of paramount importance to avoid complications. Prolonged single-lung ventilation and limited access for rapid intervention pose a great challenge for the anesthesiologist. Occasionally, conversion to median sternotomy may be required and the vigilant anesthesiologist should be ready to manage these situations.

Material and Method:

From February 2009 to October 2012, we carried out MICS in 41 patients out of which 27 were female and 14 were male. Mean age was 32.16 years. Patients were in ASA Grade II and III. None of the patients had diabetes or hypertension. There were 28 cases of ASD, 11 cases of valve replacement (9- Mitral Valve Replacements, 2- Aortic Valve Replacements) and one case for double valve replacement surgery and one patient with right thoracic mass excision. Intra operative TEE was used to monitor card activity and complications during surgery.

All patients were anesthetized by a standard protocol of induction by - Inj. Propofol 0.5 to 1mg/kg, Inj. Midazolam 0.05 to 0.1 mg/kg, injection, Fentanyl 3-5 µg/kg and Inj. Vecuronium bromide 0.1 to 0.15mg/kg intravenously. They were intubated endo bronchially by appropriate size of left sided double lumen tube for Right side lung isolation. The Right lateral decubitus position was set by patient lying down in supine position with 15 degree tilt on the right. A sand bag is placed behind the right scapula and one behind the buttock for support. The right arm is placed over the patients head with forearm flexed at the elbow, to facilitate exposure of the 4th inter costal space. A neck was maintained in neutral position with a pillow. The pelvis was half rotated towards the back to allow access to femoral vessels. The ipsilateral arm was suspended by well padded and held so as to expose the axilla. The surgical repair was done through Right thoracotomy in the 4th intercostal space with the incision of 4-6cm in size and anaesthesia was maintained by continuous infusion of Inj. Protocol 1mg/kg/hr, Inj. Fentanyl 1-2 mg/kg/hr and Inj. Vecuronium by 0.05mg/kg/hr with the help of 50% concentration air with oxygen and trace of volatile inhaled anaesthetic agent savoflurane. The cardio pulmonary bypass was performed under standard protocol of heparinisation 300 units/kg and ACT maintained between above 400. The systemic venous returns were done by two stage femoral venous cannula on right side and

systemic arterial perfusion carried out by femoral arterial cannulation on the same side.

All patients were given thoracic intercostal block by Inj. Bupivacaine in dose of 1mg/kg with the dilution of 0.25%. The endo bronchial intubation was switched to endo tracheal intubation on table after the operation was over by proper size single lumen endo tracheal tube. All patients who were extubated successfully on fast track protocol with 3-4hrs in post operative recovery room after assessing the basic vital parameters, drain and satisfactory criteria of extubation.

Proposed advantages of Median Sternotomy vs Thoracotomy

	Median Sternotomy	Thoracotomy
Mortality	More	Less
Bleeding	More	Less
Duration of ventilation	Longer	Shorter
Wound infection	More	Less
Duration of ICU stay	Longer	Shorter
Atrial fibrillation	More	Less ?
Cosmetic appearance	Less	Good cosmetic results.

Results:

In our experience we found less bleeding (average 114 to 290ml in 48hrs), early post operative recovery (average hospital stay 3.5 to 4.5 days) and early ambulation with excellent pain relief. There was no operative or postoperative mortality. In the post operative phase there was no significant morbidity and the Electrocardiogram was normal. We did not encounter any pneumothorax during the post operative period. The patients were happy with the post operative results.

Discussion : The Median sternotomy has been a standard approach since many years for all cardiac operations but the disadvantages of this approach are a obvious scar and its cosmetic implications. Lateral thoracotomy has been used to circumvent this problem by many centers especially with young ladies undergoing Atrial septal defect closure. Molavipour et al^[6] showed that Atrial septal defect repair can be safely undertaken by this approach and they also showed better cosmetic appearance with this approach. Van Son et al.^[8] in their experience of 15 patients showed the feasibility of minimally invasive repair of ASD with good cosmetic results. Aybek et al.^[7] recently in their experience of 241 patients who underwent mitral valve operations through right minithoracotomy showed a mortality of 3.3% and acceptable cosmetic results. These results along with ours currently show that in selected patients this approach can be safely used to carry out surgeries such as Atrial septal defect closure and mitral valve operations. Wang et al^[11] have also shown the feasibility of operating on ventricular septal defects and Tetralogy of Fallot by right thoracotomy. Lamelas e.t. al.^[9] have shown that mitral valve surgery through thoracotomy has distinct advantages over sternotomy in an elderly population. Thus it appears from these studies that minimally invasive cardiac surgery through a thoracotomy is feasible in many subgroups of patients with overwhelming advantages. With advances in surgical technique, the anesthesia protocol also needs to be amended to facilitate the procedure. In our experience of 41 patients we never encountered any significant complication or mortality showing that a modification of anesthesia protocols and surgical technique can result in a successful outcome in most of these patients.

Important aspects of Anesthetic management-

1. Due to a left decubitus position it is very essential and important to place a large bore venous cannula of 16G and intra arterial (radial) cannula of 20 G in left hand to prevent the compression effect in right hand. The groin should be spared for the surgeon for femoral vascular cannulation. The central venous catheter (triple lumen or pulmonary arterial line) should be inserted through the left neck for easy access due to left decubitus position. The right neck should be spared because SVC cannulation may be required from neck through Internal Jugular Vein. So

both forms of cannulation require more skill and perfection due to limitations in sites for cannulation.

2. An application of chest lead with aseptic precautions is important to avoid interference in surgical field
3. An application of external defibrillator is a must to treat any arrhythmias throughout the surgery, due to small incision and limitation of excess. This is an important consideration because during lateral thoracotomy treating arrhythmias may be an issue because complete access to the chest is not available.^[1]
4. Special care should be taken for pressure points like bony prominences to prevent nerve compressions. Brachial plexus injury is prevented by using cotton pad or roll in axilla.
5. This approach requires special skill and an experience for endo bronchial intubation.^[1,2]
6. The use of intra operative TEE plays a major role in proper placement of systemic venous cannula for cardio pulmonary bypass(CPB), de airing, to detect embolisation and heart pumping(EF) while coming off CPB. Several authors have shown the value of TEE in assessing repair and to detect air in the circulation^[5]

Conclusions

Anaesthesia technique for cardiac surgery by midline sternotomy technique is standardised in most institutes. However, the modifications required for the minimally invasive heart surgery are still developing in many centers. Since it is a relatively new method, there are several aspects worth emphasizing like, endo bronchial intubation v/s endo tracheal intubation, use of intra op TEE, de airing of cardiac chambers, defibrillation when required and post op analgesia. We conclude from our initial experience, that MICS is a cosmetically superior method with less pain and early recovery. It requires special skill on the part of the anaesthetist for endo bronchial intubation, intra op TEE and early recovery anaesthesia. Hence with this approach from the anaesthesia and surgical team, it is possible to reduce hospital stay, post op pain, blood loss and surgery cosmetically more acceptable. Furthermore, studies are needed to compare sternotomy with lateral thoracotomy to establish the superiority of this approach.

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15) PENCIL PUSH-UP “THE ECONOMICAL AND EASY ANSWER TO SYMPTOMATIC CONVERGENCE INSUFFICIENCY”

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ABSTRACT

Aim: To determine the effect of home based pencil push-up exercise for patients having symptomatic convergence insufficiency.

Methodology: In this prospective interventional study 62 patients between the ages of 6 to 23 yrs diagnosed of having convergence-insufficiency were enrolled. Patients' pre exercise duration of symptoms, refractive errors, distant & near deviation angles & near point of convergence noted at baseline & at each subsequent visit. Follow up of 16 weeks was done (0, 4, 8, 12, and 16). Patients were given a strict exercise protocol (10 mins 3 times a day) under the observation.

Results: Mean age of patients ranged from 16 ± 7.7 yrs with a male: female ratio 1.3:1. At baseline Mean deviation of angle at distance was 3.1 ± 1.6 PD & at near 10.5 ± 2.4 PD. The near point of accommodation was within normal limit for the age. After 16 weeks of exercise mean angle of deviation became orthophoric at distant and reduced to 3.8 ± 1.4 PD at near. At study endpoint (16 wks) Near point of convergence became 13.8 ± 5.1 cm from 26.1 ± 7.2 cm at baseline. This improvement was statistically significant ($p=0.0001$).

Conclusion: Home based pencil push-up exercise proved to be a cost free & easy therapy for patients with symptomatic convergence insufficiency during the study period.

Introduction:

Convergence insufficiency^{7, 12}, is one of the most common causes of ocular discomfort and the most common cause of muscular asthenopia. Symptoms of convergence insufficiency⁷ include eyestrain, headaches, blurred vision, diplopia, difficulty concentrating on performing close-up activities. In the evaluation of patients with ocular asthenopia, convergence insufficiency should

be a part of the differential diagnosis. This condition is characterized by a patient's inability to converge the eyes smoothly and effectively as the object of visual interest moves from distance to near and/or the inability to maintain the convergent near point¹². This ineffective muscular action can cause loss of proper binocular alignment with a resultant exophoria or intermittent exotropia at near⁸. Associated with convergence insufficiency is a wide range of symptoms that can vary from mild to severe. Patients can be particularly distressed when they experience binocular diplopia at near.

The current reports sight a frequency of convergence insufficiency between 2.25 and 8.3% but these numbers originate from clinical studies on school age children^{2,3}

Clinical findings:

The diagnosis of convergence insufficiency is based on the symptomatology^{7,8} as well as the physical findings.

- **Remote near point of convergence:**

A remote near point of convergence is the most consistent finding in convergence insufficiency. Normal young children have an excellent ability to converge and can maintain convergence easily 1–2 cm from their nasal bridge. Adults have slightly more difficulty but normally can maintain convergence in the 3–4 cm range.

Many authors use a remote near point of 10 cm to define patients with convergence insufficiency

However, according to The Convergence Insufficiency Treatment Trial⁴ (CITT) at least 6 cm is considered as the remote NPC.

- **Decreased fusional convergence:**

The stimulus for fusional convergence at near is disparate retinal imagery. Fusional convergence amplitudes or positive fusional vergence is the amount of convergence available to overcome temporal disparity in order to maintain binocular fusion at near.

Base-out prisms are used to measure fusional convergence^{11,13}.

In convergence insufficiency it is common to see low fusional convergence amplitudes and thus an inability to maintain near fixation.

- **Phoria or tropia**

Most patients with convergence insufficiency will demonstrate varying degrees of exophoria or even an intermittent exotropia at near. The presence of orthophoria at near does not rule out convergence insufficiency.

Multiple treatments options are available for convergence insufficiency^{2,5,6,10}. Which include Passive treatment like base-in prism reading glasses that helps in relieving the symptoms and Active treatments like Pencil push-ups⁹/accommodative target. Home-based pencil push-ups (HBPP)¹ therapy in many studies have shown to improve the symptoms as well as the clinical signs. Recent studies^{1,2,3} have suggested that HBPP therapy is the most commonly prescribed

treatment by both ophthalmologists and optometrists for symptomatic convergence insufficiency.

Aim and objective:

This study was done to determine the effect of home based pencil push-up exercise for patients having symptomatic convergence insufficiency in patients attending our strabismus clinic.

Materials and Methods:

In this prospective interventional study conducted at strabismus clinic of C .H. Nagri Eye Hospital during the time period of November 2010 to April 2011. We enrolled 62 patients between the ages of 6 to 23 years having symptomatic convergence insufficiency.

Inclusion and exclusion criteria are listed below.

Inclusion criteria:

- exodeviation at near at least 4Δ greater than at far,
- a receded near point of convergence($>10\text{cm}$)
- Insufficient positive fusional vergence at near (PFV) (i.e. convergence amplitudes failing Sheard's criterion PFV less than twice the near phoria or minimum PFV of $\leq 15\Delta$ base-out blur or break¹³)

Exclusion criteria:

- Patients with abnormal NPA,
- Amblyopia
- Anisometropia
- Previously treatment with prism glasses,
- History of strabismus surgery,
- Presence of any other ocular abnormalities,
- Systemic diseases

All the patients attending the strabismus clinic of C.H Nagri Eye Hospital were examined by a strabismologist and patients considering the mentioned inclusion and exclusion criteria were included in our study. Comprehensive ophthalmic examination which included Best-corrected visual acuity (BCVA) and refraction, Patients' pre exercise duration of symptoms, refractive errors, best corrected visual acuity, distant & near deviation angles & near point of convergence noted at baseline & at each subsequent visit.

Patients were followed up for a period of 16 weeks (0, 4, 8, 12, and 16). The patients were instructed on the use of HBPP therapy prior to starting treatment. Patients and their parents were demonstrated how to correctly perform HBPP therapy before leaving the clinic.

HBPP exercise method:

Patient was taught to hold a pencil at arm's length positioned approximately midway between the eyes. Patient was then instructed to look at and attempt to maintain a single image of the pencil while it is being moved toward the nose. The patient is told to continue moving the pencil toward the nose until it is no longer possible to view the pencil as a single image. At this point,

the pencil should be positioned at the most closest point at which a single image is achieved. If the patient is not able to regain a single image, the entire procedure must be repeated. Patient was instructed to perform the pencil push-ups procedure 10 mins 3 times a day with their refractive correction in place under the observation of their parents or guardian.

RESULTS

Table shows Baseline variables for the 62 patients in the study. The mean age of the patients was 16 years (range, 6 to 23 years). The mean refractive error (spherical equivalent) was -2.3 ± 1.2 D in the right eyes and -1.9 ± 0.9 D in the left eyes. There was no difference in mean refractive error between the two eyes ($p > 0.05$).

• **Baseline variables:**

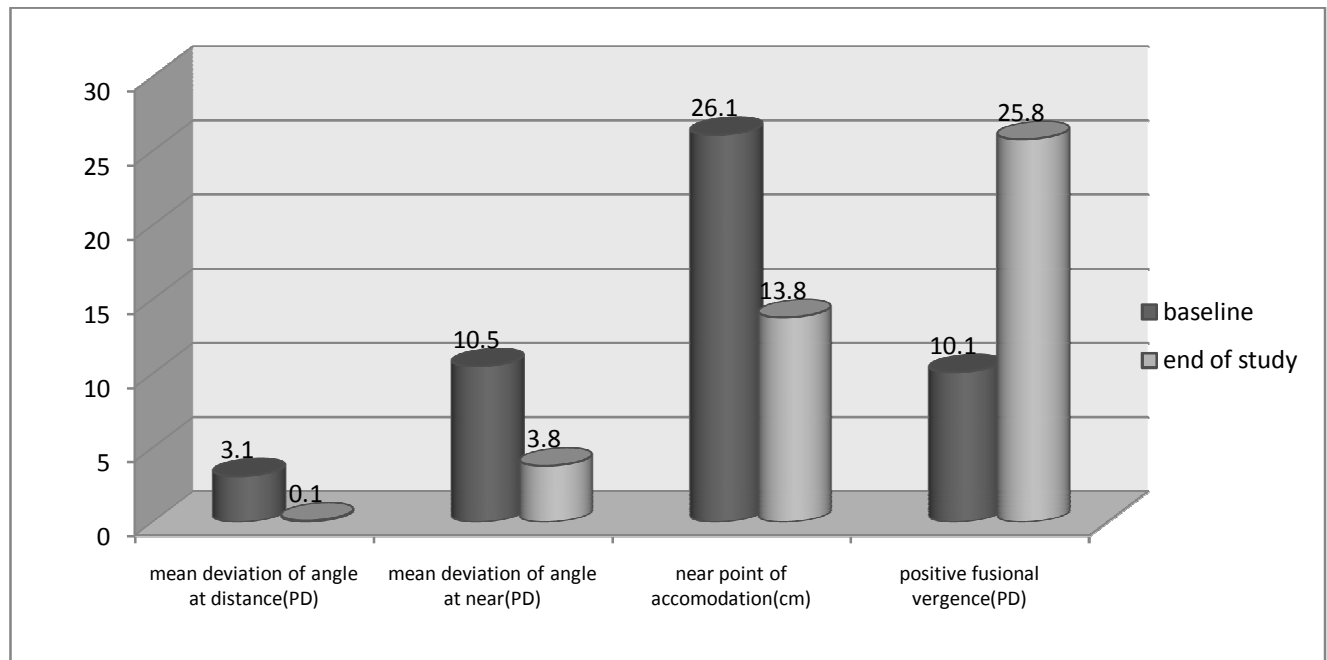
Mean age	16 $\pm$ 7.7 yrs
Male : female ratio	1.3:1
Mean deviation of angle at distance	3.1 $\pm$ 1.6 PD
Mean deviation of angle at near	10.5 $\pm$ 2.4 PD
Near point of convergence	26.1 $\pm$ 7.2 cm
Near point of accommodation	Normal for all ages
positive fusional vergence at near	10.1 Delta

• **End of study variables:**

Mean deviation of angle at distance	orthophoria
Mean deviation of angle at near	3.8 $\pm$ 1.4 PD ($p=0.0001$)
Near point of convergence	13.8 $\pm$ 5.1 cm ($p=0.0001$)
Near point of accommodation	normal
positive fusional vergence at near	25.3 Delta ($p=0.0001$)

1. Successful outcome was defined as achievement of both normal near point of convergence (NPC) (<6 cm) and normal positive fusional vergence (PFV) (>15 PD);
2. Improved outcome:
at least one of the followings, 1) a normal NPC, 2) an improvement of greater than 4 cm in NPC, 3) a normal PFV, 4) an increase of greater than 10 PD in PFV
3. those who did not meet the criteria were defined as Non-responders.

Successful outcome	32	51.61%
Improvement	12	19.35%
non responders	14	22.58%



Discussion

HBPP therapy is a simple, cost-free and easy to learn. In this study the effectiveness of 16 weeks of HBPP therapy was evaluated. The results from the present study indicated that 77.41% of the patients showed either successful or improved outcomes after 16 weeks of HBPP therapy.

In multiple studies^{1,5,9} office based therapy has shown to be more effective than home based therapy, but in our study even home based pencil push up showed very encouraging results.

Kyung et al¹ showed similar results as our study; with mean deviation angle decreased to orthophoria at the end of study period for distance as in our study and 4 PD for near as it became 3.8 ± 1.4 PD for near in our study.

Convergence Insufficiency Treatment Investigator Group (CITI group)^{4,5} in their randomized Trial suggested statistically significant improvement in NPC and PFV and improvement in mean deviation angle of at distant and at near which were similar to our results.

limitation of our study:

One of the major limitation was that we excluded patients with abnormal NPA in order to rule out convergence insufficiency associated with accommodative insufficiency. This may be a possible explanation for the relatively higher success rate observed in the present study because symptomatic convergence insufficiency with normal NPA have shown to respond very well to orthoptic treatment but patients with abnormal NPA do not respond well to any type of orthoptic training.

Other important limitations were a small sample size and lack of symptom level measurement using the questionnaire. In addition to it, the patients were not divided into children and young adult groups as they were in other studies.

However, randomized control trial with larger sample size is needed to confirm these findings.

Conclusion:

Home based pencil push-up exercise proved to be a cost free & easy therapy for patients with symptomatic convergence insufficiency during the study period. Therefore in country like ours where resources are limited, home based pencil push up therapy is cheap, economical, easy and highly effective mode to tackle symptomatic convergence insufficiency.

Foot note:

No financial conflicts to declare.

This paper was read in 40th all Gujarat ophthalmological society annual conference 2012 held at surat, Sep 2012.

This paper is also accepted to be broadcast as E poster at the Asia pacific Academy of ophthalmology annual conference to be held in Hyderabad Jan 2013.

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16) A COMPARISON OF THE EFFECTIVENESS OF DEXMEDETOMIDINE INFUSION AND MIDAZOLAM FOR SEDATING CARDIAC PATIENTS UNDERGOING AWAKE FIBREOPTIC NASAL INTUBATION.

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Keywords: Awake fiberoptic intubation; Dexmedetomidine; Midazolam; Sedation

Background and Objectives: Fiberoptic intubation is indicated method for difficult airway management. Optimal intubating condition with sedation and patient comfort are important factor for fiberoptic nasal intubation. Titration between sedation and respiratory depression with usual drugs are difficult. It should provide patient comfort

and cooperation, spontaneous respiration without airway obstruction, depression of airway reflexes, haemodynamic stability and amnesia.

Dexmedetomidine (α_2 -adrenoceptor agonist) is a new drug with sedative, analgesic and amnesic properties with minimal respiratory depression and can be easily titrated by infusion. We evaluated the efficacy of this drug and compared it with midazolam in patients with normal airways undergoing cardiac surgery.

Methods: 47 patients with normal airways who were to undergo awake Fiberoptic intubation were enrolled in this study. The patients were randomly assigned two groups: the first group (n=25) received Dexmedetomidine (1 mcg/kg infusion over 5 minutes) and the control group (n=22) received Midazolam (0.05 mg/kg intravenously). The pulse rate, blood pressure, Oxygen saturations and respiratory rate were monitored after 5 min, during and after intubation. The intubation success was 100% in both groups. Post procedure patient satisfaction and comfort was assessed by a Comfort scale.

Results: In this study of patients undergoing Cardiac surgery with normal airways we found that patients treated with Dexmedetomidine had better hemodynamic safety with regard to blood pressure and heart rate and the depth of respiration and the oxygen saturations were also stable throughout the procedure. Post procedure satisfaction was better with Dexmedetomidine (14 vs 22, $P < 0.0001$). There were no significant adverse events in both groups.

Conclusions: Dexmedetomidine provided beneficial effects in patients undergoing awake Fiberoptic intubation when compared to Midazolam. It allowed better hemodynamic support and comfort levels during the procedure.

Introduction:

Awake Fiberoptic intubation is essential whenever a difficult airway is anticipated. This procedure can result in discomfort to the patient and hence good anesthesia and analgesia is essential during the procedure. While sedating the patient for this procedure a drug with good hemodynamic support and minimal respiratory depression is preferred. ^[1] As the quest for an ideal anesthetic agent for this procedure continues, dexmedetomidine is emerging as a viable alternative for the same. ^[2] Many agents such as ketamine, propofol, remifentanyl and midazolam have been used for this purpose but there are high risk for hypoxia and apnea so dexmedetomidine has been proposed as a safe and viable option for this procedure. ^[10,11, 18] The feasibility of Dexmedetomidine for fiberoptic intubation has been evaluated in several recent studies with favorable results. ^[4,5] The drug has been used in cancer patients and cervical spine instability with

upper airway obstruction.^[4,17] But no studies exist in patients undergoing cardiac surgery with a difficult airway hence we undertook this study to evaluate the safety and compare it with midazolam which has been a time tested drug in this setting.

Midazolam is a Benzodiazepine with marked respiratory depression and a potential to cause hypotension and hemodynamic instability^[18]. Whereas Dexmedetomidine is a relatively safer drug which causes minimal changes in hemodynamic with the benefits of excellent analgesia and anesthesia. This drug is an alpha -2 adrenoreceptor agonist which acts presynaptically to produce sympathoinhibition^[3]. It is more potent than clonidine and it has 8 times more alpha2-adrenoceptor agonist activity than clonidine. Dexmedetomidine produces a more predictable haemodynamic disturbance in postsurgical patients with excellent analgesic, amnesic and anxiolytic effects. Phase III clinical trials have shown that dexmedetomidine 0.2 to 0.7 mcg/kg/h produced effective sedation and significantly reduced the analgesic requirements of postsurgical ventilated patients in the intensive care unit.^[1, 4, 12] The onset of action is also rapid and has minimal post procedural consequences. Dexmedetomidine has been shown to be well tolerated in phase III studies with insignificant adverse events such as hypotension, bradycardia and nausea.^[1,12]

The main desideratum of this study was to evaluate this drug in patients undergoing awake fiberoptic intubation before cardiac surgery and to compare it with midazolam. Our endeavor was to seek out the hemodynamic profile and the comfort levels in patients receiving these two drugs.

Patients and Methods:

We undertook this study of 47 patients after approval of the ethical committee of our Medical College and Medical Council. The patients were clearly informed in detail about the procedure and written consent was obtained from each patient. All patients were in ASA II-III and all the surgeries performed were elective operations. Patients recruited in this study were those with anticipated normal airways and Fiberoptic intubation was done in all of them. Since this study was conducted in the U N Mehta Institute of Cardiology and Research Center all patients were Cardiac patients and were to undergo Cardiac surgery. All the patients gave consent to the study and intubation success was cent percent. There were no withdrawals from the study. After explaining the procedure, the patients were premedicated with Tab Haloperidol 5 mg the night before the procedure and Tablet Pantoprazole was given at a dose of 40 mg in the night before surgery and on the morning of the surgery at 5 AM.

Exclusion Criteria:

Severe Bradycardia and hypotension

Emergency procedures

Congestive cardiac failure

Thrombocytopenia and Coagulopathy.

Significant hepatic dysfunction

Nasal malformations and epistaxis

Our protocol comprised of:

- 1) Nasal spray of 10% Lignocaine HCl twice at 10 minute interval.
- 2) Injection Glycopyrrolate 0.2 mg intravenously was given to all patients.
- 3) Injection Haloperidol 5 mg intravenously was administered to all patients.
- 4) An arterial line and Iv line was inserted in all patients
- 5) Oxygen saturations were monitored with a pulse oximeter.

The patients were taken up into the operation room after the usual precautions for the procedure and the Pulse, Blood pressure, respiration and Oxygen saturations checked before the procedure. After this the study drugs were administered in the two groups according to the randomization:

- 1) In the first Dexmedetomidine infusion (in 0.9 NS) was started at 1 mcg/kg as a 5 minute infusion and the 0.1 mcg/kg/hour and it was titrated to a Ramsay score of ≥ 2
- 2) In the second group Midazolam was given intravenously at a dose of 0.05mg/kg

After giving the study drugs, 5 ml of Injection Xylocaine 2% was injected transtracheally before starting intubation and nasal spray applied again.

The sedation was titrated to a Ramsay scale of ≥ 2 . The Fiberoptic intubation was performed by two experienced senior anesthesiologists who have been performing this procedure in our center in all patients. One consultant performed the awake fiberoptic intubation and the other controlled the drug infusion and recorded the anesthetic data. The consultant who performed the fiberoptic intubation was blinded to the patient's group. The endoscope was lubricated with xylocaine jelly and the endotracheal tube inserted over the endoscope with the objective of railroading it. The intubation was performed with the aid of fiberoptic scope with a 7 mm tracheal tube in males and 6.5 mm tube in females. After tracheal intubation the nasotracheal tube was secured and general anesthesia was administered.

In both groups the heart rate, the blood pressure, respiration and saturations were monitored at the start of the procedure and immediately after drug initiation and at 1, 2,

3 and 4 minutes of drug initiation. Similarly these parameters were also assessed at the onset of intubation and at the completion of intubation. During the procedure we watched out for complications such as Hypotension, hypertension, tachycardia or bradycardia, arrhythmias, chest wall rigidity, respiratory depression, nausea, vomiting and pruritus. After the surgery vitals were tabulated and the patient comfort levels were assessed with the modified Comfort scale of Ambuel ^[7]. This score was obtained after the surgical procedure by two blinded observers to assess the adequacy of anesthesia. Since the procedure of awake fiberoptic intubation is also painful one this outcome measure was an important part of our study. In addition in this first postoperative visit we also looked for adverse events like hoarseness and sore throat and amnesia to the procedure.

Modified AMBUEL⁷ Comfort Scale

Parameter	Score	Assessment
Alertness	1	deep asleep
	2	Lightly asleep
	3	Drowsy
	4	Fully awake and alert
	5	Hyper-alert
Calmness	1	Calm
	2	Lightly anxious
	3	Anxious
	4	Very anxious
	5	Panicky
Respiratory response	1	No coughing and no spontaneous respiration
	2	Spontaneous respiration
	3	Occasional cough
	4	Coughing regularly
	5	Frequent coughing or choking
Crying	1	Quiet breathing, no crying
	2	Sobbing or gasping
	3	Moaning
	4	Crying
	5	Screening
Physical movement	1	No movement
	2	Frequent slight movement
	3	Vigorous movements limited to the extremities
	4	Vigorous movements including torso and hate
	5	

		Occasional slight movement
Muscle tone	1 2 3 4 5	Muscle totally relaxed, no muscle tone Reduced muscle tone Normal muscle tone Increased muscle tone and flexing of fingers and tones Extreme muscle rigidity and flexing fingers and tones
Facial tension	1 2 3 4 5	Facial muscle totally loss Facial muscle tone normal, no facial muscle tension evident Tension evident in some facial muscle Facial muscles contorted and grimacing
Vocal cord movement	1 2 3 4	Open Moving Closing Close
Airway obstruction score	1 2 3 4	Patent airway Airway obstruction relieved by neck extension Airway obstruction requiring jaw retraction Severe obstruction/ SPO2 <80%
Patient tolerance	1 2 3 4 5	No reaction Slightly grimacing Heavy grimacing Verbal objection Defensive movement
Total Score	48	

Statistical Analysis:

The SPSS 10.0 statistical software package was used for all statistical analysis. The p value of <0.05 was considered to be statistically significant. Numerical data were expressed as mean and the statistical analysis was carried out using the Student t test for the numerical data to compare the two groups. Having 47 patients in this study allowed us to demonstrate a power of 0.09 and a type 1 error if 0.05.

Results:

In the 47 patients who were enrolled in this study there were no differences in the baseline characteristics. The mean age of the patients was 52 years and most of them were predominantly males (70% vs 30%). All patients underwent cardiac surgery with Coronary artery bypass (70%) being the most common followed by valve surgery (30%). Fiberoptic intubation was success was 100% in both subgroups. Tables 1 give us the baseline characteristics and hemodynamics of our patients. The heart rate, blood pressure, respiratory rates were similar at baseline and were in the normal ranges. Thus, there was no overall difference in both subgroups.

Table-1

	Midazolam	Dexem	P-value
Age	52.3	52.1	0.635
Sex(M:F)	7.1:2.9	6.5:3.5	0.526
Weight	53.6	54.1	0.672
Pulse	78.2	79	0.129
SBP	131.4	132.8	0.351
DBP	77.3	79	0.2163
Respiratory rate	20	19	0.071
SpO2	98	97	0.426

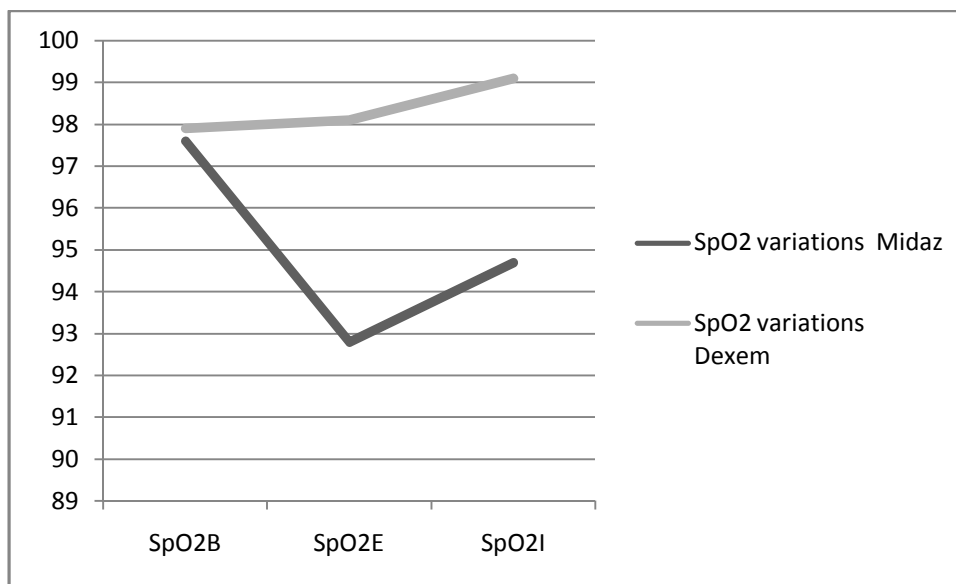
We went on to measure the vitals and saturations during the procedure and the following results were obtained with respect to the pulse and blood pressure. There was no significant difference in heart rates between the two drugs at the start of infusion but after the start of endoscopy, there was a higher pulse rate in the midazolam group, which was not statistically proven. Post intubation too there was no difference in the two groups. The blood pressure responses were significantly different between the two groups. In the Dexmedetomidine group the systolic blood pressure transiently shot up from 132 to 137 transiently but remained stable later on. Where as in the Midazolam group there was a significant fall in systolic blood pressure seen in throughout the procedure ($p<0.0001$). Table 2 gives a picture of the blood pressure responses to these two drugs.

The respiratory rate showed a stable trend throughout the procedure with dexmedetomidine where as with midazolam there was a statistically significant reduction in respiratory rate seen towards the intubation ($p<0.0001$). The Oxygen saturations were also favoring the Dexmedetomidine group. The Dexmedetomidine group had a Saturation of 98.1 vs the Midazolam group which exhibited a respiratory depressant effect with a saturation of 92.8 at the start of intubation. ($p<0.0001$). This

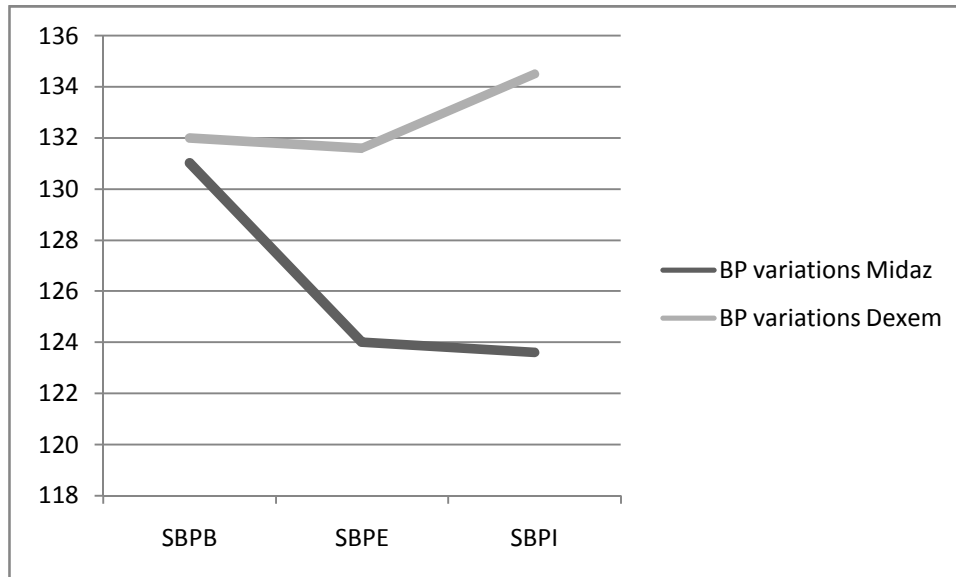
decrease in oxygen saturation was consistent during drug infusion and at the start of endoscopy. Table 2 again gives the respiratory parameters of the patients.

Table-2

Basal	Midaz	Dexem	p-value
Pulse B	85.6	82.6	0.4568
BPB	131/73.2	132/73.4	0.4386/0.5287
Resp. rate B	21.7	19.2	0.587
SpO2B	97.6	97.9	0.4944
Before Endoscopy			
Pulse E	79	75.6	0.2671
BPE	124/70.5	131.6/72.5	0.002/0.090
Resp. rate	13.5	14	0.3849
SpO2E	92.8	98.1	<0.0001
After Intubation			
Pulse I	75.6	74.2	0.5293
BPI	123.6/72.3	134.5/73.1	0.002/0.447
Resp. rate I	11.9	13.4	<0.0014
SpO2I	94.7	99.1	<0.0001



SpO2 variations



SBP variations

Other parameters that were assessed were limb movements and coughing which were more in the midazolam group. 60% of the midazolam group patients had limb movements whereas only 15% of dexmedetomidine patients had limb movements. The time taken to intubate the patients was similar in both groups (1.7+0.8 minutes) and there were no hypoxic episodes or hemodynamic instability in both groups. With both drugs sedation was reached to a level of Ramsay II or III.

Most importantly the comfort scale was assessed in all these patients after the procedure which showed a significantly better tolerability with dexmedetomidine than midazolam (14 vs 21; $p < 0.0001$). The level of recall of the procedure was also lower with dexmedetomidine due to a superior amnesia effect of this drug. The recall rates of endoscopy and intubation with dexmedetomidine were 25% and 10% while those with midazolam were 50% and 45%, respectively. ($p < 0.0001$ and < 0.0001 in both subsets)

There were no adverse events such as Cardiac arrhythmias, hemodynamic instability or profound respiratory depression in both the groups. Post procedure patients in either group did not report any sore throat or hoarseness of voice. All the surgical procedures were carried out successfully in both the groups and there was no in hospital mortality related to the surgical procedure

Discussion:

Awake fiberoptic intubation can be an unpleasant procedure with inadequate sedation. Adequate sedation, analgesia and amnesia is of paramount importance in optimizing outcomes. Patient comfort and acceptability should be eminently required but it should not be at the cost of hemodynamic instability and respiratory depression.^[19] Many agents such as Propofol, Fentanyl, Remifentanyl and midazolam have been used for anesthesia during this procedure but each one with its inherent problems.^[10, 11, 15] Opioid

anesthetic agents are known for their respiratory depressant properties.^[10] Even Midazolam which has been a popular drug is known to cause severe and life threatening respiratory depression. The USA Department of Health and Human resources have noted at least 80 deaths due to midazolam when it has been used to sedate patients undergoing various medical and surgical procedures. Bailey et. al. have shown that that use of Midazolam especially with Fentanyl I produced significantly hypoxemia and apnea in healthy volunteers. They also recommend that when these drugs are administered one needs to monitor saturations and supplemental oxygen must be at hand.^[18] Hence considering all these adverse events there is a need for an agent with minimal respiratory and cardiovascular depression but with good naesthetic, analgesic and amnesic properties. Dexmedetomidine is a recently introduced drug that has been shown to be safe and effective for this purpose. Dexmedetomidine is an alpha-2 adrenoreceptor agonist which acts at the locus coeruleus and produces a conscious sedation due to activation if the endogenous sleep promoting pathway. It has been demonstrated to have anesthetic and analgesic properties in addition to amnesic effects.^[1,3] It has been also shown to have anti-sialogogue effects due to sympatholytic and vagomimetic effects by Kamibayshi et. al.^[3, 14] Since this drug causes sympatholysis it has been contraindicated in shock and severe hypovolemia.^[9]

In the present study the hemodynamic response with dexmedetomidine was superior to midazolam with a more predictable heart rate response with dexmedetomidine. The blood pressure response was significantly different in the two groups with a mild depression of blood pressure with midazolam. The Blood pressure response with Dexmedetomidine was more stable with a mild rise initially and a more stable course thereafter during the procedure. A typical biphasic response with dexmedetomidine has been observed in other studies by other authors too.^[6] This comprises of an initial rise in blood pressure with a more stable course thereafter. Bloor et. al. have shown that the hypertension is due to the vasoconstrictive effect of the drug on the blood vessels.^[9] This biphasic response has not been uniformly observed by other authors.^[1, 13] Several authors have also shown a lower heart rate with dexmedetomidine when used as a bolus or infusion due to the vagomimetic and sympatholytic effect of the drug. But this response was not observed in our study. It has been also recommended that anticholinergics be used to obviate this effect.^[13]

We also observed a stable respiratory rate with no change in oxygen saturations with dexmedetomidine when compared to midazolam. Tsai et al have shown than dexmedetomidine produced less respiratory depression than propofol for awake fiberoptic intubation.^[16] Thus in spite of achieving a good degree of sedation dexmedetomidine did not produce respiratory depression. Even though we had used a lower dose of midazolam with the fear of respiratory depression, the respiratory stability with dexmedetomidine was superior. Chu et. al have shown the safety and superior efficacy of dexmedetomidine in patients of oral cancer with difficult intubation. Summing

up, these studies and ours clearly show the safety and efficacy of dexmedetomidine with regard to respiration and oxygenation. ^[17]

Patient comfort is an important parameter to assess in anesthesia and on a comfort scale dexmedetomidine showed superior comfort levels over midazolam. Bergese et. al. in their study of 55 patients undergoing awake fiberoptic intubation have shown that Dexmedetomidine treated patients were more satisfied and were calmer and more cooperative during the procedure. ^[6] Avitsian et. al. have used this property of dexmedetomidine in intubating patients with cervical spine injury and have shown that the drug provided significant and smooth anesthesia. ^[8] Other minor parameters such as limb movements and level of recall were also less with the dexmedetomidine group. Porro et. al. have shown that midazolam has antegrade but not retrograde amnesia. But this effect has not been consistently observed by other authors. This has been typified in our study which showed that dexmedetomidine produced better amnesia than midazolam. ^[20] Finally, one important aspect of dexmedetomidine which needs to be mentioned is the need for infusion whereas midazolam can be given easily as an injection.

Limitations of the study: The patient population was small and a larger trial testing dexmedetomidine with other agents is warranted to detect greater differences in these agents. A lower dose of midazolam was used in this study and hence the amnesic effects may have been inadequate.

Conclusions:

Dexmedetomidine when compared to midazolam produced superior hemodynamic and respiratory stability in patients undergoing awake fiberoptic intubation for cardiac surgery. The former provided excellent anesthesia with analgesia and amnesia without producing adverse effects. So, dexmedetomidine appears to be an excellent choice to sail between the Scylla of respiratory depression and the Charybdis of cardiovascular stability. Further studies are needed on a larger scale to compare it with other anesthetic agents.

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17) IMPACT OF THE LEVEL OF THE INTESTINAL SHORT CHAIN FATTY ACIDS IN INFLAMMATORY BOWEL DISEASE PATIENTS VERSUS HEALTHY SUBJECTS

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Abstract:

The aim of this study was to determine the changes of short chain fatty acids (SCFAs) in feces of inflammatory bowel disease (IBD) patients compared to healthy subjects. SCFAs such as pyruvic, lactic, formic, acetic, propionic, isobutyric and butyric acids were analyzed by using high performance liquid chromatography (HPLC). This study showed that the level of acetic, 162.0 $\mu\text{mol/g}$ wet feces, butyric, 86.9 $\mu\text{mol/g}$ wet feces, and propionic acids, 65.6 $\mu\text{mol/g}$ wet feces, decreased remarkably in IBD fecal samples when compared with that of healthy individuals, 209.7, 176.0, and 93.3 $\mu\text{mol/g}$ wet feces respectively. On the contrary, lactic and pyruvic acids showed higher levels in fecal samples of IBD than in healthy subjects. In the context of butyric acid level, this study also found that the molar ratio of butyric acid was higher than propionic acid in both fecal samples. This might be due to the high intake of starch from rice among Malaysian population. It was concluded that the level of SCFAs differ remarkably between fecal samples in healthy subjects and that in IBD patients providing evidence that SCFAs more likely play an important role in the pathogenesis of IBD.

Keywords: Organic acid, human fecal, IBD, HPLC.

INTRODUCTION

Short chain fatty acids (SCFAs), are carboxylic acids with 1 to 6 carbon atoms that include different other functional groups, such as hydroxyl or dicarboxyl. In human, SCFAs arise from bacterial fermentation of carbohydrates, proteins, peptides and glycoprotein precursors (1, 2). SCFAs such as acetic, propionic and butyric acids are mainly formed during microbial fermentation of carbohydrate in the colon. The most important role of SCFAs in colonic physiology is their trophic effect on the intestinal epithelium. In human, SCFAs production from inulin-type fructan can increase the metabolic activity, pointing to trophic effects for colonocytes. Approximately 80-90% of SCFAs, which are produced from the breakdown of dietary food, are absorbed in colon while the rest are excreted in feces. SCFAs content in feces could be used as a biomarker for the physiological processes in the organisms as well as for the effect of nutritional interventions (1). The level of SCFA content in fecal samples have been shown to be related with some diseases such as IBD, irritable bowel syndrome (IBS), cardiovascular disease (CVD), diarrhoea (3), and cancer. It was also reported that increased lactic acid may modulate diarrhea in UC. In addition, fecal SCFAs, acetic and propionic acids, in patients with diarrhea-dominant IBS were found to be of lower levels than in healthy individuals (4, 5). Therefore, there has been increasing evidence that the majority of SCFAs play an essential role in maintaining the health of colonic mucosa. However, butyric, acetic, and propionic acids have mainly been emphasized. In addition, butyric acid appears to induce differentiation of tumor cell lines (6). Several methods were used to analyze the fecal SCFAs in rat and human samples. For example, a rapid and reliable gas chromatographic (GC) method has been developed to determine eight SCFAs, in the colonic and fecal samples of rats and humans. In addition, methods such as vacuum ultrafiltration followed by GC, ion chromatography (IC), and IC with solid phase extraction were used for the determination of SCFAs in fecal samples. In addition to GC, high performance liquid chromatography (HPLC) has

also been applied to the analysis of fecal SCFAs in humans (7). HPLC is convenient for the quantification of SCFAs, and it is less time-consuming. To date, data on IBD cases is still scarce in that very few studies, if any, were conducted on the content and the role of SCFAs in feces of healthy and IBD subjects. Therefore, the current study was conducted to determine the level of fecal SCFAs (pyruvic, lactic, acetic, formic, propionic, butyric and isobutyric acids) in IBD patients by using HPLC methods. The level of each fecal SCFA was compared to counterpart samples from healthy individuals.

MATERIALS AND METHODOLOGY

Chemicals and Reagents

Formic acid, 98-100%, and acetic acid, 100%, were obtained from Merck, pyruvic acid, 99%, and propionic acid, 99%, were obtained from Merck, isobutyric acid, 99%, was obtained from Sigma, lactic acid, 100%, and butyric acid, 99.5%,

The Study Population and Fecal Samples

Fecal samples were obtained from 50 healthy subjects (male = 18, female = 32) and 8 IBD (male = 6, female = 2) subjects from March 2010 to December 2011 in vadodara, Gujarat. The age of the studied patients ranged from 34 to 68 years and the age for the healthy subjects ranged from 22 to 55 years. Six of IBD patients were at remission phase except for 2 UC were at active phase; nevertheless, all of the involved patients showed no diarrheal symptoms within 2 weeks before the time of sampling. The nutritional status of the involved patients was within average and patients did not change their nutritional habit during sampling. The IBD samples were collected from patients who had been diagnosed as CD ($n=2$) and UC ($n=6$). Diagnosis of IBD was confirmed in all cases by colonoscopy and histology. The main symptoms of the involved IBD patients within the last month were: for UC, loose stools (1 patient), low grade fever (2 patients), mild diarrhea with blood stain (1 patient), abdominal pain (1 patient), and abdominal distension (1 patient), for CD, patients did not have remarkable symptoms. Furthermore, IBD patients did not experience any extra-intestinal manifestations. It is noteworthy to mention that IBD patients and the healthy volunteers did not receive antibiotics, probiotics, and prebiotics one month prior to the samples collection. Moreover, IBD patients did not receive mesalazine 2 weeks before sampling. The fecal samples were collected into clean sterile containers. They were immediately taken to the laboratory and kept frozen at -20°C for analysis. Dealing with human subjects was carried out within the scope of the ethical principles of biomedical research. All of the involved subjects signed formal written consents.

Preparation of Samples for Analysis

Fecal samples of weight 0.2 g were used and diluted at ratio 1:4 to 1:8 (w/v) in sterile distilled water. The samples were then vortexed for 1 min and the homogenate was centrifuged at $10,000g$ for 10 min. The SCFA-containing supernatant was filtered through cellulose acetate membrane with a pore size of $0.2\ \mu\text{m}$ and stored at -20°C until HPLC analysis.

Determination of Organic Acids

SCFAs analyses were carried out by using HPLC. Briefly, 40 µl of fecal samples extraction were injected directly into HPLC System. SCFA in fecal samples were separated using an ionic exchange resin, at 65°C. The target compounds were detected using a UV detector set at wavelength of 210 nm. Filtered 0.01 N H₂SO₄, through 0.45 µm nylon membrane, was used as a mobile phase at a flow rate of 0.6 ml/min.

Preparation of Calibration Standard Curve

Quantification of SCFAs in fecal samples was carried out using external calibration standard curves method. Seven calibration standards were prepared at six levels of concentration ranging from 0.005M to 0.03M for pyruvic acid, 0.01M to 0.06M for formic acid and acetic acid, and 0.02M to 0.12M for lactic acid, propionic acid, isobutyric acid and butyric acid. The reference samples were injected repeatedly for nine times to measure the retention time. The calibration curves were constructed by plotting the relative peak area versus the molarity of solution. Fecal SCFA concentrations were expressed as mean µmol per gram wet weight feces using the following equation as described by Hoshi *et al.* (8) with modification. Fecal SCFA (µmol/g) = [organic acid in fecal contents (mmol/ml) X Vd (ml) X 1000]/ Wet weight feces (g) Whereas: Vd = Total Volume of Dilution

Statistical Analysis

Data analysis was conducted. The normality of data was checked using Anderson-Darling test before statistical analysis was done. Differences between means of SCFA concentration between healthy and IBD groups were analyzed by using unpaired Student's *t*-test. The means were considered statistically significant at *P*<0.05. Data was expressed in mean ± SEM (µmol/g wet faeces).

RESULT

Validation of Retention Time for Analytical Methods

The reference standard in different concentrations was analyzed on three different days to show the retention times. Since external standard was used for calibration, the method requires precise analytical technique and requires that the detector sensitivity must be constant from day to day if the calibration curve is to remain valid. Samples were injected nine times in different concentrations and the average of retention time (Rt) was used. From the analysis, the Rt for pyruvic, lactic, formic, acetic, propionic, isobutyric and butyric acids was 9.28, 12.07, 13.38, 14.60, 17.28, 19.49, and 21.82 min respectively.

Short Chain Fatty Acids in Fecal Samples

The mean concentrations of SCFA in fecal samples of healthy and IBD subjects are shown in Table 1. From the table, results revealed that the mean concentrations of butyric and propionic acids, 86.9 and 65.6 µmol/g wet feces, respectively in IBD fecal

samples were lower than in healthy subjects, 176.0 and 93.3 $\mu\text{mol/g}$ wet feces respectively ($P < 0.05$). Acetic acid was also lower in fecal samples of IBD patients than of healthy subjects but the difference was not so significant ($p = 0.16$). The fecal concentration of formic acid, isobutyric, lactic and pyruvic acids were also determined and compared between healthy and IBD groups. Formic acid was only detected in five healthy subjects and isobutyric acid was only detected in two samples of healthy group while no detection of formic and isobutyric acids was found in the fecal samples of IBD patients. In contrary, the fecal concentration of lactic and pyruvic acids was lower in healthy subjects, 24.5 $\mu\text{mol/g}$ and 0.5 $\mu\text{mol/g}$ respectively, than in IBD patients, 73.5 $\mu\text{mol/g}$ and 2.1 $\mu\text{mol/g}$ respectively, but this difference was not significant ($P > 0.05$).

Molar Ratio of Main SCFA in Fecal Samples

There has been no report about the molar ratio of main SCFAs in fecal samples in Indian subjects. Therefore, the molar ratio of acetic, propionic and butyric acids were calculated. From the current study, the molar ratio of acetic: propionic: butyric acids in fecal samples of healthy subjects were 45:20:38 and in fecal samples of IBD were 49:20:27. This finding showed that the molar ratio of butyric acid and propionic was 1.5 and 1.35 in healthy and IBD subjects, respectively.

DISCUSSION

In this study, it was shown that butyric and propionic acids were decreased significantly in IBD subjects. This finding was similar to that reported by Takaishi *et al.* (7) who revealed that the concentrations of butyric and propionic acids were significantly decreased in IBD patients than in healthy controls. In addition, Vernia *et al.* (11) reported similar decreasing trend of butyric acid in UC patients. The decreasing level of butyric acid could be due to the assumption that the distribution of intestinal microbiota changes in IBD patients (7). Furthermore, it was reported that the fecal proportion of butyric acid in patients with UC increased after consuming oat bran. Moreover, it was suggested that when the butyric acid is low in UC patients, the risk of colon cancer increases (9). On the other hand, the increasing propionic acid was shown to be associated with decreasing serum cholesterol in blood (10). Comparing acetic acid concentration between healthy and IBD fecal samples, Takaishi *et al.* also reported that the acetic acid in IBD feces was not significantly lower than in healthy control and they found that the concentration of acetic acid in CD was lower than in UC (7). Nilsson *et al.* reported that the mean level of acetic acid in healthy subjects ($n = 20$) before giving oat bran diet was 54.2 $\mu\text{mol/g}$ wet feces ranging from 19.5 $\mu\text{mol/g}$ to 126.2 $\mu\text{mol/g}$ of feces. They showed that, after 8 weeks of giving oat bran, the mean level of acetic acid increased 77.2 $\mu\text{mol/g}$ wet feces

Table 1. SCFA in Fecal Samples of IBD Patients and Healthy Subjects

	Healthy Subjects (n=50)	Range	%PC*	IBD Subjects (n=8)	Range	% PC	P-values
Acetic Acid	209.7±14.0	21.5 –400.5	(100)	162.0 ± 28.0	64.2 – 308.9	(100)	0.160
Butyric Acid	176.0 ±16.0*	45.2–503.3	(100)	86.9 ± 21.0*	32.7 – 204.2	(100)	0.004
Propionic Acid	93.3 ± 5.3*	33.8 –185.1	(100)	65.6 ± 5.3*	45.1 – 91.7	(100)	0.001
Lactic Acid	24.5 ± 4.8	0 –120.6	(48)	73.5 ± 37.0	0 – 254.4	(62.5)	0.237
Formic Acid	21.5 ± 9.7	0 –364.2	(10)	No detection			
Pyruvic Acid	0.5 ± 0.3	0 –16.4	(8)	2.1 ± 1.3	0 – 10.1	(37.5)	0.261
Isobutyric Acid	17.9 ± 13.2	0 –591.3	(4)	No detection			

*PC = Positive cases.

Results are expressed in $\mu\text{mol/g}$ wet feces (mean $\pm$ SEM).

Value marked with asterisk are significantly different between two groups ($P<0.05$).

Ranging from 22.9 to 125.6 $\mu\text{mol/g}$ of feces ($P<0.001$). And acetic acid absorption in the colon has been shown to increase cholesterol synthesis. However, addition of propionate to acetate resulted in no significant rise in cholesterol. With respect to lactic acid, the current study yielded similar results to a previous report stating that higher lactic acid concentration was found in both of fecal UC and CD samples than in healthy subjects (3). High concentration of lactic acid was associated with higher risk of diarrhoea and mucosal inflammation (2). The importance of low lactic acid concentration in fecal samples of healthy subjects is still unknown. However, lactic acid can be further metabolized by propionibacteria to propionic acid and acetic acid. In this study, fecal formic acid was only detected in five healthy subjects. Quantification of formic acid in fecal samples was always unsatisfactory and frequently at very low or undetectable level. This might be attributed to the fact that formic acid has been believed to be formed by microorganisms in the colon only at the initial phase of dietary fermentation. Furthermore, formic acid is an intermediate product, not an end-product, of bacterial fermentation and is converted readily to CO_2 and water. Furthermore, formic acid was probably metabolised by bacterial enzymes during incubation at 50°C . In addition, it is extremely volatile and losses cannot be avoided during preparation of sample. For these reasons formic acid in feces is rarely detected. Takaishi *et al.* (7) and Vernia *et al.* (3) showed that pyruvic and succinic acids in fecal IBD were higher than in healthy subjects and they found that the concentration of pyruvic acid in patients with UC was significantly higher than in patients with CD. Their findings are similar to that of current study that pyruvic acid was higher in fecal IBD than in healthy group. However, this increase was not significantly different. Other SCFAs such as iso-butyric, *n*-valeric, iso-valeric and *n*-caproic acids were presented in minor amounts in the human colon. All these SCFAs were too low to be detected. The branched chain fatty acids (BCFA), iso-

butyric and iso-valeric acids are primarily produced from catabolism of protein particularly from branched amino acids fermentation. An increase of BCFA tends to be observed only when carbohydrate is limited. Approximately, these SCFAs account for 90 to 95 % of total fatty acids. Of the SCFAs, the major products are acetic, propionic, and butyric acids which are commonly found in proportions approximately 60:20:20 (acetic: propionic: butyric) (1). However, these ratios are very rare to achieve in practice. The patterns of the molar ratio of SCFA were attributed to the bacterial species present. In addition, it was also influenced by the composition of diet and type of indigestible carbohydrates. Moreover, the molar ratio of butyric and propionic acids was 1.5 and 1.35 in healthy and IBD subjects which might be due to the high intake of starch from rice. The possible anti-inflammatory mechanism of SCFAs, namely propionic, butyric, and acetic acids, are still not clarified adequately. However, a recent study showed that propionic and butyric acids were equipotent, whereas acetic acid was less effective, at suppressing NF-kappa B reporter activity, inflammation-related gene expression and cytokin release *in vitro*. Therefore, these findings suggested that propionic and acetic acids, in addition to butyric acid, could be useful in the treatment of inflammatory disorders, including IBD (11). Moreover, it was shown that butyric acid suppresses nuclear factor-kappa B activation *via* GPR109A receptors in normal and cancer colon cell lines as well as in normal mouse colon. This study showed that GPR109A mediates the tumor-suppressive effects of the bacterial fermentation product, butyric acid in colon (12). In addition, it was confirmed that SCFA, adenine nucleotides, and phospholipids can modulate intestinal epithelial repair mechanisms.

CONCLUSION

From this study, it was concluded that the level of SCFAs might play an important role in the pathophysiology and/or progression of IBD. The current study showed that the level of SCFAs differs remarkably between the fecal samples of healthy subjects and those of IBD patients. As compared to the healthy subjects, acetic, butyric and propionic acids decreased dramatically in fecal samples of IBD as well as formic and isobutyric acids were not detectable in fecal samples of IBD while the level of acetic and pyruvic acids increased in feces of IBD patients. In this study, the molar ratio of butyric acid also showed higher proportion than propionic acid in fecal samples. However, future studies need larger sample size to determine more precisely the distribution of SCFAs among IBD patients in the region. The relationship between rice consumption and the reduction of IBD incidence also need to be determined since the incidence of IBD in this region is still not very common.

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18) THE STUDY OF ASSESSMENT OF PLACENTAL MIGRATION IN LOW LYING PLACENTA

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Background: Low lying placenta is the common observation when obstetrician seats on sonography machine. But as we know as the pregnancy advances most of them migrate. This study is to assesse the rate of migration of a low-lying placenta during the third trimester by transvaginal sonography and the eventual route of delivery.

Study design: This is the longitudinal type of study which includes the patients with a placenta lying within 3 cm of the internal cervical os between 20 -22weeks. The exact distance between the center of the internal cervical os and the leading edge of the placenta was measured by transvaginal sonography, repeated at approximately 4-weeks intervals until delivery.

Results : Total 600 antenatal patients were undergone TVS at 20-22 weeks . Prevalence of low lying placenta in mid trimester was 9.1% .Follow up trans vaginal sonography showed that in 41 cases placenta has migrated beyond 3cm from the internal os. In late 3rd trimester or at term, age and parity did not influence the migration. Highest migration rate (94.28%) was found where distance between placental edge and internal os was >2cm. Anterior low lying placenta showed lesser migration (70%).

Conclusion : Low lying placenta is more concerned to obstetrician. Placental migration may occur progressively throughout the third trimester. The initial position of the placental edge and the subsequent rate of migration can be used to predict the eventual route of delivery.

INTRODUCTION :

In 2nd trimester in routine obstetric ultrasonography low lying placenta is the common observation by the obstetrician. Placental migration is an apparent change in the position of the placenta as gestational age advances. Transvaginal sonography (TVS) is well established as a safe and accurate method of placental location that is demonstrably superior to abdominal ultrasonography . It allows accurate visualization of a low-lying placenta at any stage in pregnancy, and the exact relationship between the edge of the placenta and the internal cervical os can be accurately measured... Low lying placenta is where placenta is within 3 cm from internal os. Incidence of low lying placenta in 2nd trimester ranges from 6 to 46% and at term 0.5%.This migration is due to differential growth of placenta towards well vascularised fundus. This study is to evaluate placental migration.

MATERIAL AND METHODS :

Registered antenatal women attended VS Hospital, which underwent routine trans abdominal ultrasonography at 20-22 weeks of gestation were subjected to trans vaginal sonography .Total 600 patients underwent serial ultrasonography using a 5-MHz probe after the patient had emptied their bladder. The line of the cervical canal was visualized and the distance between the center of the internal cervical os and the leading edge of the placenta measured. An

average of three measurements was used to calculate this distance and the films were later inspected for quality and accuracy. The patients included were of 3cm distance from internal os to placental edge. Repeated TVS done every 4 weekly until the placental edge was migrated beyond 3cm or patient had delivered.

Table no.1: Prevalence of low lying placenta and rate of migration.

Number of low lying placenta at 20-22 weeks	Number of low lying placenta at term or delivery	Rate of Migration
55(9.1%)	14	74.54%

Table no.2: Placental migration in relation to initial distance from internal os.

Initial distance from internal os	Number of mid trimester low lying placenta	Number of placenta migrated	% of migration
<1.5cm	10	1	10
1.5 to <2cm	10	7	70
2 to 3cm	35	33	94.28

Table no.3 : Placental migration in relation to placental position.

Position	Number of mid trimester low lying placenta	Number of placenta migrated	% of migration
Anterior	40	28	70

Table no. 4 : Relation between previous pregnancy event and migration.

Previous pregnancy events outcome	Number of mid trimester low lying placenta	Number of placenta migrated	Percentage of migration
Vaginal delivery	40	37	92.5
Cesarean section	10	4	40

RESULTS:

Total 600 antenatal patients were undergone TVS at 20-22 weeks. Out of them 55 had low lying placenta .Prevalence of low lying placenta in mid trimester was 9.1% .Follow up trans vaginal sonography showed that in 41 cases placenta has migrated beyond 3cm from the internal os. In late 3rd trimester or at term, age and parity did not influence the migration. Highest migration rate (94.28%) was found where distance between placental edge and internal os was >2cm. Only 1 of low lying placenta had shown migration where initial distance was <1.5cm .Anterior low lying placenta showed lesser migration (70%). The rate of placental migration was 92.5% in women with previous vaginal deliveries when compared with women having previous cesarean section (40%).

DISCUSSION :

This study has demonstrated progressive migration of the low-lying placenta during the third trimester. The exact mechanism of placental migration is still debated, although it seems possible that atrophy of thin portions of the placenta implanted over the cervix can occur due to poor blood supply, whilst other placental regions migrate towards more vascular sites. This process has been called trophotropism. This may explain why we observed migration in some placentae which overlapped the internal os by up to 20 mm, while a greater degree of overlap beyond the body of the cervix would establish an improved blood supply and make atrophy less likely to occur. Alternatively, or additionally, uptake of the lower segment may contribute to an apparent change in placental position. It has been suggested that the modern classification of placenta previa should be based on direct measurement by transvaginal sonography.

Now a days diagnosis of low lying placenta in mid trimester sonography is increased. Increased prevalence could be because of increased ultrasonography practice and increased in previous cesarean births. Previous cesarean more likely increases the incidence and persistence of low lying placenta. This is because of endometrial damage in the cesarean section leads to implantation of placenta at lower segment and also that prevents the placental migration...Placental migration observed depends on initial distance between placental edge and internal os. Maximum migration is when distance is >2cm and placenta is anterior. Maternal age and multiparity are risk factors for low lying placenta but they do not appear to be the risk factors for persistence of the placental previa at term.

CONCLUSION:

Low lying placenta is more concerned to obstetrician. Our results suggest that the rate of migration based on TVS repeated at 4-week intervals, together with the initial placental position, can give an indication early in the third trimester as to whether or not migration is likely to take place. This information will assist in patient counseling and allow greater confidence in outpatient management. 75% of midtrimester low lying placenta migrate to upper segment by term. However 90% of low lying placenta within 1.5cm from internal os persist as placenta previa at term. Previous cesarean prevents the placental migration.

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19) STUDY ON SACRALISATION OF LUMBER VERTEBRA.

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ABSTRACT

AIM: To study the incidence of sacralisation in dry bones.

INTRODUCTION: Sacralisation means addition of sacral elements by the incorporation of fifth lumbar vertebra. Sometimes the transverse process becomes unduely elongated and fuse with ilium or sacrum, or both. The clinical significance of sacralisation of lumbar vertebra lies in the findings that it causes fifth lumbar nerve compression resulting in pain along the sciatic nerve distribution.

MATERIAL & METHODS: The study included examination of 65 dry sacra. Non-pathological sacra of both sexes were included i.e. 51 male & 14 female.

OBSERVATION: Total incidence of sacralisation was observed to be 13.84 % in the present study. Out of 9 sacralised bones, 7 (77.77%) bones showed bilateral sacralisation, whereas 2 (22.22%) bones showed unilateral sacralisation.

DISCUSSION: J. L. Bron, in a systematic review on the subject, analyzed all relevant studies from 1986 till 2006 and documented that the mean prevalence of sacralisation to be 12.3 %.

CONCLUSION: The study concludes that the incidence of sacralisation in Gujarat is significantly high. Reports in 2012 and this study have constantly showed the incidence to be above 10 %.

Key words: Sacralisation, lumbar vertebra, sacrum

INTRODUCTION

Of late years the condition known as Sacralisation of the lumbar vertebra has come into considerable prominence on account of the fact that radiography has thrown its beam of light upon a condition about which previously very little was known, and which most certainly is entirely undiagnosable without an x-ray examination and is rarely if ever suspected of being present from any symptoms which may be complained of.

Until recent years there was very little literature on the subject, and practically all there was, was purely anatomical. Thus the Index Medicus from 1917 to 1920, inclusive, gives no references under the heading of Sacrum or Sacralization, but in 1921 a considerable number of papers are recorded.¹

The late Professor Paterson, of Liverpool University, published a monograph in the Scientific Transactions of the Royal Dublin Society in 1893, on the Sacrum i.e., two years prior to the discovery of x-rays. He points out in this paper, which is a very elaborate one, that the lateral mass of the sacral region equals (or represents) the transverse processes and ribs of the thoracic portion of the spine; he figures two unilateral and three bilateral cases of sacralization, and one embryo of seven months with the unilateral condition.²

In 1979, Bertolotti was the first to describe an association between LSTV (Lumbosacral Transitional Vertebra) s and low back pain (LBP). However, this has remained a matter of debate in the literature for almost a century now.³

Because it articulates or fuses the sacrum, a lumbosacral transitional vertebra is an important part of the weight-bearing platform. Repetitive flexion and extension stress the transitional lumbosacral osseous complex, which is delineated superior disc space above the vertebra and inferiorly by the sacroiliac joint. Stress is greatest at the superior

disc space and the articulation between the transitional transverse process and sacrum.⁴

Spondylolisthesis is a complication documented arising as a result of sacralization.⁵

MATERIAL & METHODS

The project “A study on sacralisation of lumbar vertebra” was carried out in Smt. B. K. Shah Medical Institute and Research Centre, Piparia, Gujarat.

The study included examination of 65 dry sacra.

Non-pathological sacra of both sexes were included i.e. 51 male & 14 female

The sacra available in the department of Anatomy, SBKSMI&RC, and Piparia were selected for the study.

The analyzed data was recorded and tabulated for observation and interpreted in the light of relevant precedence.

Exclusion criteria:

- 1) Natural, accidental, operative and pathological manipulations of bones.

Inclusion criteria:

- 1) Both sexes and all races.

OBSERVATIONS

65 sacra were included in the present study. Of them, 51 were male and 14 were female sacra.

It was observed that out of 65, 9 (13.84 %) sacra showed sacralisation. (Table 1) (Figure 1)

8 sacralised bones were male and 1 female.

Out of 9 sacralised bones, 7 (77.77 %) bones showed bilateral sacralisation, whereas 2 (22.22 %) bones showed unilateral sacralisation. (Table 2)

DISCUSSION

This anatomic variant is reported as having an incidence of 4% to 21%. Recently very high incidence of 30% has been reported.³

The range of findings may be attributed to the difference in inclusion criteria, diagnostic criteria, imaging techniques where live subjects were made to participate.

Bertolotti (1917)⁸ described the relationship between the low back pain and sacralisation of fifth lumbar vertebra. In young patients with back pain the possibility of Bertolotti's syndrome should always be taken in account.

Hsieh et al found a prevalence of 4% in mainly Chinese population with anteroposterior plain radiograph for diagnosis.⁶

J. L. Bron, in a systematic review on the subject, analysed all relevant studies from 1986 till 2006 and documented that the mean prevalence of sacralisation to be 12.3 %.³

Kubawat Dharati et al have reported the incidence of sacralisation in Gujarat to be 11.1%⁷

Present study found an incidence of 13.84 %, which very well falls within the documented range, and close to the global mean percentage.

The incidence in our study was much higher than that 3.6 % reported by Moore and Illinois (1925)⁵

Table 3 shows a comparison of various studies with our study, and is self-explanatory.

CONCLUSION

The study concludes that the incidence of sacralisation in Gujarat is significantly high. Reports in 2012 and this study have constantly showed the incidence to be above 10 %.

The present study shows that the incidence of sacralisation of fifth lumbar vertebra is 13.84 %, which is more in males than female. Based on the literature, sacralisation varied by race and incidence, in our study was close to the Arabs 10 % reported by Bustami (1989)¹,

Due to sacralisation of fifth lumbar vertebra may cause greater difficulty during labour because of less mobile pelvis & may cause low back pain.

This study can be of use as a prelude to any type of experimental work in biomechanics, and therapeutic purpose in low back pain.

Many unexplained cases of low-back pain, especially in young adults, may be investigated and treated keeping sacralisation as one of the etiologic factor.

However, the low number of samples may be one reason attributed to high incidence recorded in this study. Inclusion of more number of samples, and undertaking radiographic studies in live adults may substantiate or fine-tune the documented evidence.

Table 1: Sex wise distribution of sacralisation

	Male (%)	Female (%)	Total (%)
Sacra studied	51(78.46%)	14(21.53%)	65 (100%)
Sacralisation	8 (12.30 %)	1(1.53 %)	9 (13.84%)

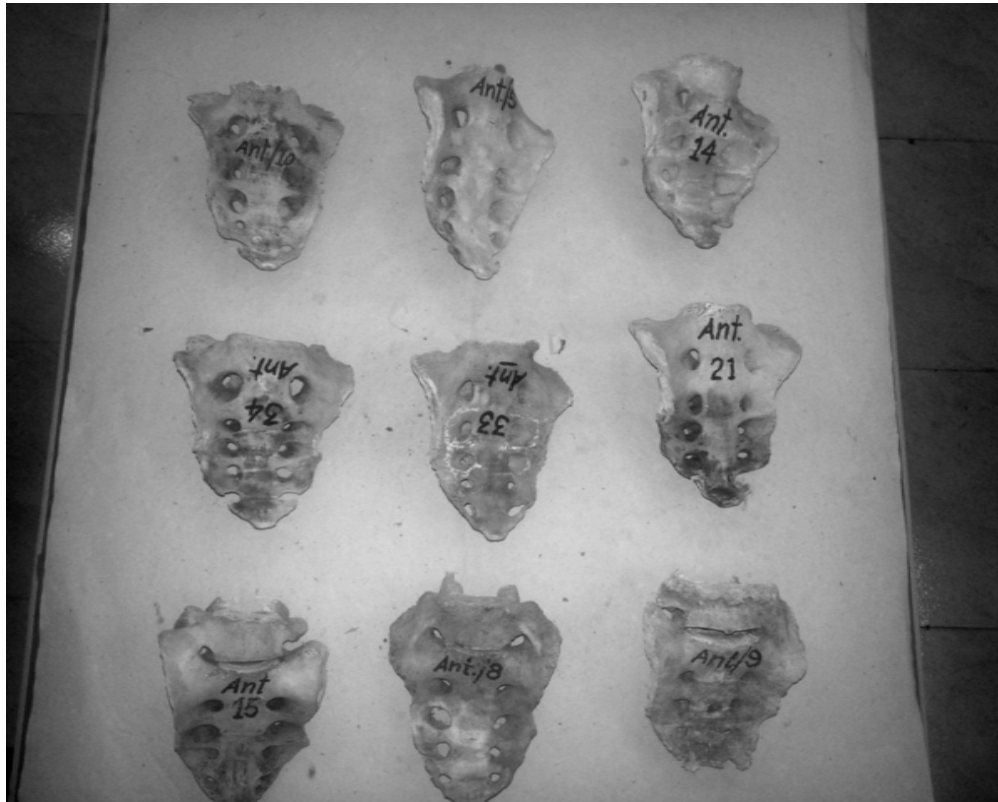
Table 2: Classification of sacralisation (total 9 sacra)

	Male (%)	Female (%)	Total (%)
Unilateral sacralisation	1(11.11 %)	1(11.11%)	2 (22.22%)
Bilateral Sacralisation	7 (77.77%)	0 (0 %)	7 (77.77%)

Table 3: Comparison of various studies on sacralisation since 1986^{3, 7}

First author	Year	Number Patients	Sacralisation
Kubawat	2012	189	21(11.1%)
Hughes	2006	500	46 (9.2%)
Steinberg	2003	464	65 (14%)
Kim	2003	690	12 (1.7%)
Chithriki	2002	441	22 (5.0%)
Santiago	2001	138	16 (11.6%)
Peh	1999	129	8 (6.2%)
Hald	1995	5781	451 (7.8%)
Hahn	1992	200	15 (7.5%)
Leboeuf	1989	530	29 (5.5%)
Present Study	2012	65	9 (13.84%)

Figure 1: Sacralised lumbar vertebrae.



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20) A COMPARATIVE STUDY EVALUATING USE OF AUDIO-VISUAL AIDS IN HEMATOLOGY LABORATORY FOR FIRST YEAR B.P.T. STUDENTS

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ABSTRACT:

Introduction :

It was observed that the students attending the practicals in hematology laboratory find difficulty in understanding the concept and topic with usual lectures and demonstration practices.

Aim and Object:

The efficacy of regular lecture delivery system was challenged with the introduction of audio-visual aids along with lecture. This led us to the present study in which the efficacy of lecture was determined by scoring performance of students on the basis of pre-designed test evaluated on basis of MCQ and VIVA exam which was taken after the lectures with and without audio-visual aids.

RESULT:

The study revealed significant ($p < .005$) increase in understanding and performance of the students who attended practicals along with audio-visual aids.

Conclusion:

The students had better understanding towards the identification of various cells present in a smear of differential count. When we asked the students for feedback, 99% students of study group were satisfied and enjoyed this new way of learning.

INTRODUCTION:

For years MCI has insisted of using different approaches to enhance the efficacy of lectures and demonstration. The use of power point presentations, over head projectors in a class full of hundred students has successfully established its efficacy during the regular lecture delivery. In various studies it has been shown that the use of audio visual aids during lectures has wider acceptance among the students and keep to maintain their focus for longer duration. During the practicals of hematology laboratory, the usual lecture delivery with demonstration is highly practiced. It was observed that students either lose their concentration very quickly or it is very hard for them to understand the concept. The slides were not upto the mark and teacher had to repeat instructions again and again. To increase the efficacy of teaching a pre designed audio-video was used in the study group against the control group. The effectiveness of teaching method was then evaluated by MCQ set and few oral questions after the completion of practicals. Slides were assessed by teachers not participating in the study.

AIMS AND OBJECTIVE:

To study the effect of audio visual aids on improvement of skills during practicals.

INCLUSION CRITERIA:

Students of first year BPT were taken as subjects for study. The study and control was a random group of students having both average and above average students. The age group was 17 -19years. In both groups, teacher was same and same set of information was delivered.

EXCLUSION CRITERIA:

students who have already read the topic or performed the practical were excluded. For evaluation the teacher who took the lecture was not allowed to take viva exam. Viva voice was conducted by another teacher who was not a part of study.

MATERIAL AND METHOD:

The present study was carried out among 50 healthy students of first year BPT students. A pre designed audio video was used as alternative method along with the lecture in the study group while the control group was taken for lecture only. The information set for lecture was common to both. The video had the demonstration of how to perform the differential count and how to prepare a good slide. The video also showed the distinguishing feature of various cells present in smear. Post lecture and demonstration, the practical was conducted as routine. The analysis was done after the completion of practical hours with the help of pre designed MCQ based on the information delivered. A preset viva card was given to different teacher. Students were

scored on their performance in the test. Slides were compared by the teachers for the skill and performance of students.

For statistical analysis, SSPS software was used.

RESULTS: The mean age of students was 18 ± 1.0 years. As shown in the Table, the test score of students of study group was more than the control group.

Table: Analysis of performance on the basis of scores given

	GROUP A Mean $\pm$ SD	GROUP B Mean $\pm$ SD	P value, .005
MCQ Test scores	8.0 $\pm$ 2.4	5.5 $\pm$ 2.12	Significant
Viva Voice	7.5 $\pm$ 1.6	4.5 $\pm$ 1.36	Significant
Slide analysis	Subjective results +++	Subjective results +	Significant

Group A: students of study group with audio-visual aids

Group B: students of control group.

DISCUSSION:

As per strict guidelines of Medical Council of India alternative teaching methodology has been incorporated in the Indian medical teaching system. But unfortunately they remained confined to the walls of lecture theatres and seminar halls. The newer technologies are still waiting to be tried and tested in the laboratories for the teaching and demonstrations. With the availability of automated cell counters, we somehow forgot the basic manual necessity of performing and learning the skills of practicals.

An audio video was taken as an alternative approach to demonstrate how practicals can be improved and the skills of students can be increased.

The present study shows that the efficacy of teaching and delivering information was easier and effective in terms of recollecting facts by students. These can be attributed to the fact that Wernick's area of brain can integrate the information received via auditory and visual pathway. This information is better understood and registered for a longer time.

The present study was conducted to evaluate the effectiveness of using alternate method with regular practicals and demonstrations. The study clearly shows that the students exposed with newer media performed better in MCQ and oral exams. The slides when analyzed showed that students who were regularly shown the video of demonstration made a good slide. The staining was uniform and much better than the students belonging to control group. The students had better understanding towards the identification of various cells present in a smear of differential count. When we asked the students for feedback, 99% students of study group were satisfied and enjoyed this new way of learning.

Limitations:

This study is a convenience based study. A bigger study group can be taken. Other tests like cognitive function analysis, micro teaching can also be done to increase the effectiveness of study. More practicals can be tried for the efficiency.

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21) COMPARATIVE STUDY OF PREVALENCE OF MYOPIA IN MEDICAL STUDENTS & STUDENTS OF ARTS STREAM.

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Abstract:**Background:**

In the present study we assess the relationship between near work like reading, writing, computer work etc. for longer duration and its effect on occurrence and progression of myopia which is the most common morbidity of eye now a days. At present many ophthalmologists and scientists strongly believe that myopia has only genetic basis and factors like near work for longer duration has no any role in occurrence of myopia.

Method and result:

So we have found percentage prevalence of myopia in students who read for longer duration like more than 7 hours in a day for many years and also in students who read very less. We have also assess genetic component of myopia by finding percentage prevalence of myopia in students whose both or one or none of the parents are myopic.

Conclusion:

Near work like reading for longer duration can cause myopia as in this study prevalence of myopia is more in students read for more hours as compared to the students who read very less, in both streams.

Key words:

Myopia, Medical students, Arts students, Hours of reading.

Introduction:

Myopia is the state of refraction in which parallel rays of light are focused in front of the retina of a resting eye. Myopia is the most common eye morbidity now a days. Myopia has been classified as either physiological or pathological. Physiological myopia occurs due to an increase in the axial length of the eye over that which is attained by normal growth. Both environmental and genetic factors are believed to be associated with the onset and progression of myopia.

Environmental factor is mainly near work. Near work includes activities that require high accommodative demand, such as reading, writing, computer work, and close television viewing. There is an increase in pressure in the posterior part of the eye during accommodation which is when poorly resisted by the sclera, resulting in increased ocular length. The Genetic theory is based on the natural individual variation in the growth of eye-ball. Genetic theory of myopia can be done by twin studies, pedigree studies, and studies of familial correlation.

Aims & Objectives:

The Aim of this study is to found correlation between near work like reading & myopia which is a topic of debate till today. Also to study genetic component of myopia, as some scientists still believe that myopia is purely genetic.

The objectives of this study to found prevalence of myopia, the most common ophthalmic morbidity today in students of age group 17-20. To increase awareness in students about possible risk factors of myopia, sources of vitamin A and knowledge about balanced diet, ideal distance of watching Television & computer work, measures to prevent progression of myopia & preventive measures in non myopic students.

Materials & Methods:

100 students of 1st year M.B.B.S. from B.J. Medical College, Ahmedabad. and 100 students of 1st year B.A from Smt. S.R. Mehta Arts College, Ahmedabad were screened in this study. Age group of these students was 17-20 years.

First of all, history of all these students was taken about number of hours of their reading, number of hours & approximate distance of watching Television, have them difficulty in distant vision or is it clear, number of years of wearing spectacles, family history of myopia, awareness about sources of vitamin A and their daily food habit.

Visual acuity of these students was measured by Snellen's chart from distance of 6 meters. Torch-light examination of eyes was done. Statistical analysis was done by online graph pad software with fisher's test as it gives exact p value while.

Fisher's exact test:

The two-tailed P value equals 0.0005

The association is considered to be extremely statistically significant.

Results and observations:

Table 1 : As per number of hours of reading, students are divided into three groups, < 4 Hr. , 4-7 Hr. and > 7 Hr. This chart shows that majority of medical students read for more than 4 hours while majority of arts students read for less than 4 hours.

X-axis : Hours of reading

Y-axis : No. of students

Hours of reading	No. Of Students	
	Medical	Arts

Table 1	19	61
	52	35
> 7 Hr	29	4

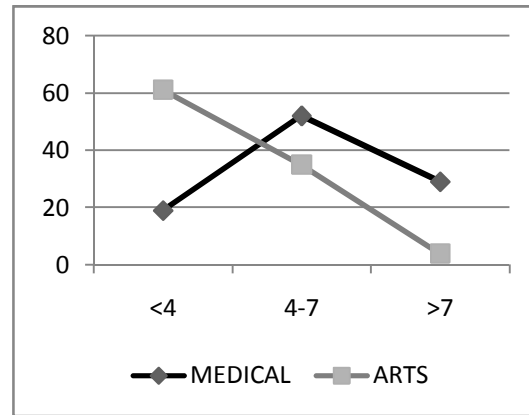


Table 2 : This table is showing % prevalence of myopia in arts and medical students. Out of 100 students who were screened each in Arts and Medical, **29** students out of 100 in Arts are myopic as compared to **54** in Medical stream.

	No. of Students	
	Medical	Arts
Myopic	54	29
Non Myopic	46	71

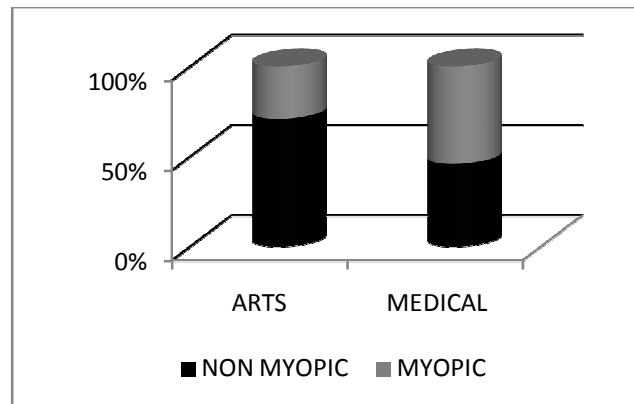


Table 3 : This chart shows number of hours of reading and its relation to % prevalence of myopia. As the number of hours of reading increases, there is increase in prevalence of myopia in both Arts and Medical streams. Here we have taken percentage prevalence of myopia and not the number of students because number of students in particular range of hours of reading is different in medical and arts stream. X-axis: Hours of reading Y-axis: % prevalence of myopia

Table 3		
Hours of reading	Percentage prevalence of myopia in	
	Medical (%)	Arts (%)
< 4 Hr	47	26
4-7 Hr	50	31
> 7 Hr	65	50

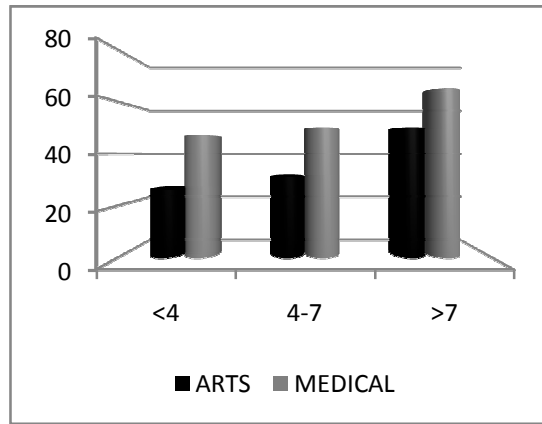
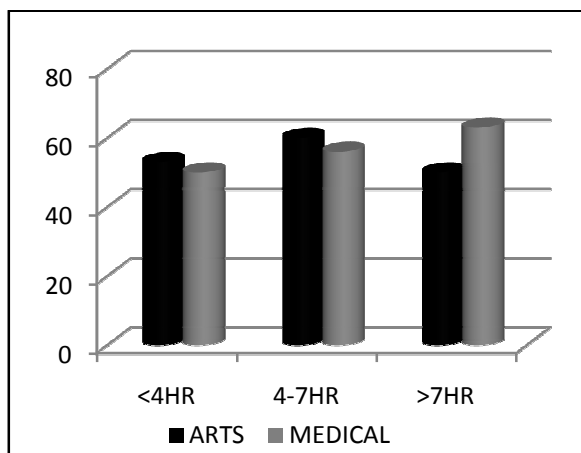
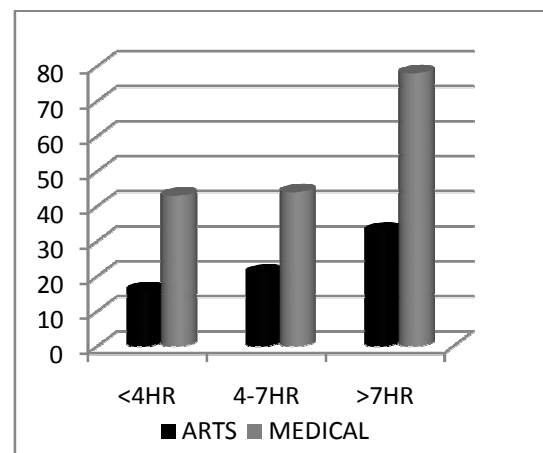


Table 4 : But when we separate the gender we have observed that our previous result is significant only in males while in females % prevalence of myopia is almost similar in all groups of hours of reading.. So the difference is significant only in male, which can be further studied on larger group of students.



% Myopic Female



% Myopic Male

Table 4 :		
Hours of reading	Percentage of Myopic Female	
	Medical (%)	Arts (%)
< 4 Hr	50	53
4-7 Hr	56	60
> 7 Hr	63	50

Hours of reading	Percentage of Myopic Male	
	Medical (%)	Arts (%)
< 4 Hr	43	16
4-7 Hr	44	21
> 7 Hr	78	33

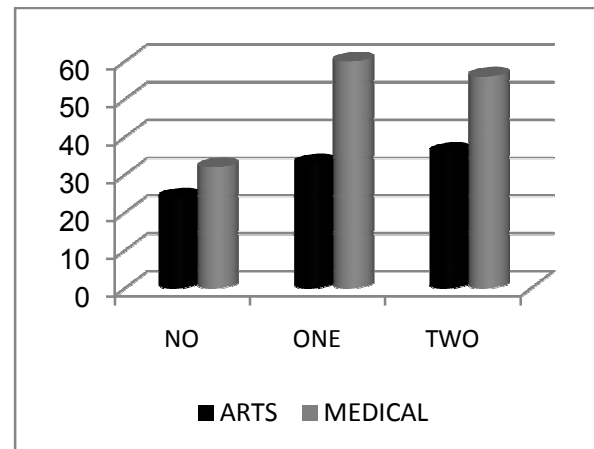
Table 5 : This chart shows % prevalence of myopia with their Parent's myopic status. It is seen from chart that % prevalence of myopia is more in students having one or both parents myopic.

No : Parents are non-myopic.

One : only one parent is myopic.

Two : Both are myopic.

Table 5		
Parent's myopic status	Percentage prevalence of myopia in	
	Medical (%)	Arts (%)
No	30	23
One	60	33
Both	56	36



Discussion:

Near work like reading for longer duration can cause myopia as in this study prevalence of myopia is more in students read for more hours as compared to the students who read very less, in both streams. Thus environmental factors can cause myopia, which is against belief of some scientists that myopia is purely genetic. One reason for relation of near work for long duration and myopia is the accommodation. During accommodation there is increase pressure in posterior part of eye ball which is resisted by sclera. But when it is poorly resisted it results in increase in axial length of eye ball. So rays coming from infinity are focused in front of retina and it results in short sightedness.

From the gender based difference that we have found, we can conclude that prevalence of myopia is more in female whether they do more near work or not but when we consider overall result then our hypothesis of relation of near work and myopia becomes true. And this gender based difference can be confirmed only after studying very large group of students.

Genetic component also contribute in prevalence of myopia so it is an important parameter that we have to consider.

Still this debate is continue between genetic and environmental factors on occurrence and progression of myopia.

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22) A CASE OF COELIAC TRUNK VARIATION.

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ABSTRACT:

The coeliac trunk is the first anterior branch of abdominal aorta at the level of the twelfth thoracic vertebrae. Main classic branches of the coeliac trunk are hepatic, splenic and left gastric arteries. We came across a case of coeliac trunk which gave off five branches. It gave off three classical branches of coeliac trunk i.e. hepatic, splenic and left gastric arteries. Besides these three branches right and left inferior phrenic arteries arose from coeliac trunk. In our opinion arterial variations should not be ignored during abdominal operative procedures. Complications in abdominal surgeries can be avoided with an accurate knowledge of the anatomical variations of coeliac trunk.

Key words: Coeliac trunk; Right phrenic artery; Left phrenic artery

INTRODUCTION:

The coeliac trunk is the first anterior branch of abdominal aorta at the level of the twelfth thoracic vertebrae¹. The branches of the coeliac trunk are hepatic, splenic and left gastric arteries. During development, both dorsal aortae give rise to many ventral segmental (omphalomesenteric) arteries. Both dorsal aortae fuse together in about four weeks. The ventral segmental arteries regress shortly after fusion of dorsal aortae. The dorsal aorta gives off segmental branches to the digestive tube (ventral splanchnic arteries), to the mesonephric ridge (lateral splanchnic arteries) and intersegmental branches to the body wall (somatic arteries)². Anatomic variations involving the visceral arteries are common³. In addition, many authors reported variations of branches of the coeliac trunk⁴.

The inferior phrenic arteries are two small arteries which supply the diaphragm. They usually arise from the aorta just above the coeliac trunk. They may arise by a common aortic stem or from the coeliac trunk⁵.

The anatomical variations of the coeliac trunk are due to developmental changes in the ventral segmental (splanchnic) arteries. These ventral segmental arteries supply the yolk sac, allantois and chorion. Three ventral segmental arteries remain as coeliac trunk, superior mesenteric artery and inferior mesenteric artery. During embryological period, there are longitudinal anastomoses between roots of four upper ventral segmental arteries of abdominal region. The two central roots disappear and the longitudinal anastomoses join the first and fourth root. The hepatic, splenic and the left gastric arteries originate at this longitudinal anastomoses. These branches usually become separated from the fourth root (the future superior mesenteric artery) below their last end. If this separation takes place at the higher level, one of the branches is displaced to the superior mesenteric artery. If the first or fourth root disappears, a coeliacomesenteric trunk will be formed.^{6,7} In our case, the variations of the

coeliac trunks are due to developmental changes in the longitudinal anastomosis between above mentioned ventral segmental arteries.

The vascular anomalies are usually asymptomatic, and so knowledge of these vascular anomalies is important in handling patients undergoing diagnostic angiography for gastrointestinal bleeding, coeliac axis compression syndrome, prior to an operative procedure or transcatheter therapy⁸.

CASE REPORT:

During a routine dissection of the posterior abdominal wall of a middle aged male cadaver for undergraduate MBBS batch, the following variation of the coeliac trunk was found.

The coeliac trunk arose from the ventral surface of the abdominal aorta at the level of the intervertebral disc between T12 and L1 vertebrae. It gave off five branches. Besides three classical branches of celiac trunk i.e. hepatic, splenic and left gastric arteries, the right and left inferior phrenic arteries also arose from celiac trunk (Figure 1). Right inferior phrenic artery passed upward and laterally; then beneath the gall bladder and right lobe of the liver and was supplying the right dome of diaphragm. The left inferior phrenic artery passed upward and laterally; then by the side of the left crus of diaphragm and was supplying the right dome of diaphragm.

The length of coeliac trunk from its origin to the point where it gave off main branches was measured to be 8 mm. The diameter of the right and left inferior phrenic arteries was 4 mm and 3 mm respectively. While the diameters of splenic, common hepatic & left gastric arteries were 5 mm, 6 mm & 4 mm respectively.

DISCUSSION:

The coeliac trunk arises from the ventral portion of the abdominal aorta opposite the thoracolumbar junction as a single trunk. It supplies all derivatives of the foregut that lie in the abdominal cavity... It is about 1.25 cm in length and 6-8 mm in diameter. It gives three main branches as left gastric, hepatic and splenic arteries.²⁻⁵

Mburu KS et al¹., in their study found that the celiac trunk was trifurcated in 76 (61.7%), bifurcated in 22 (17.9%) and gave collateral branches in 25 (20.3%). Collaterals were observed in 25 (20.3%) cases and included dorsal pancreatic (DPA), gastroduodenal, inferior phrenic and ileal arteries. DPA was the most common collateral occurring in 14.8% of the cases, while inferior phrenic arteries were found in 4.9%.

Piano et al⁸., stated that the right and left inferior phrenic arteries occasionally originated as a common trunk from the aorta, coeliaco-mesenteric system or adreno-renal system. They observed that inferior phrenic arteries were usually paired (left and right) and their origins were summarized as follows; a) the aorta itself (61.6%), b) ventro-visceral arteries (coeliaco-mesenteric system of aorta) including the coeliac trunk (28.2%), and left gastric artery (2.9%), c) the latero-visceral arteries (adreno-renal system of the aorta) including the middle adrenal artery (2.9%), and renal artery (4.3%).

Yuksel et al.,⁹ in their study found an extremely long celiac trunk. They also found an inferior phrenic artery arose from celiac trunk and an aberrant right hepatic artery derived from the superior mesenteric artery.

Vandamme and Bonte⁴ observed the absence of coeliac trunk in 1.25% of cases of the series. Cavdar et al.,¹⁰ reported a case, in which the left inferior phrenic artery and the left gastric artery arose from the long coeliac trunk (4.3cm) via a common trunk.

Peterella S et al.,¹¹ studied 89 cadavers, comprising 72 males and 17 females from 5 centers in Brazil. In 31 of the cadavers (26 males and 05 females), the inferior phrenic arteries had their origin in the coeliac trunk. The inferior phrenic artery origin in the left contour of the coeliac trunk was observed in 19(21.35%) of the 89 cases, while the inferior phrenic artery origin in the right contour of the coeliac trunk was observed in 05 of the 89 cases.

Chiang et al.,¹² studied 405 patients angiographically for evaluation of hepatic artery variations. While a single accessory hepatic artery was found in 28.1% (114) of these cases, more than two hepatic arteries were found in 2.0% cases and seventeen patterns were identified in this study. Some of the important patterns were accessory hepatic artery direct branch from coeliac trunk, branch from common hepatic, left gastric etc.

Pamidi N et al.,¹³ discovered a left inferior phrenic artery as direct branch of coeliac trunk in a 45 year old male cadaver. Left superior suprarenal artery arose from left inferior phrenic artery. In this case coeliac trunk emerged from the abdominal aorta as two roots named as left gastric artery and hepatosplenic artery.

Anatomical variations in the branching pattern of the celiac trunk are of considerable importance in liver transplants, laparoscopic surgery, radiological abdominal interventions and penetrating injuries to the abdomen. Vascular variations are usually asymptomatic. They may become important in patients undergoing celiacography for gastrointestinal bleeding, celiac axis compression syndrome, prior to an operative procedure, transcatheter therapy, chemoembolization of pancreatic and liver tumors. Careful identification and dissection of celiac trunk branches is therefore important to avoid iatrogenic injury [Astik & Dave, 2011]¹⁴. Knowledge of variation found in the present case is very useful in surgical, oncologic or interventional procedures and should be kept in mind to avoid complications.

In our opinion; arterial variations should not be ignored during abdominal operative procedures. Complications in abdominal surgeries could be avoided with the accurate knowledge of the anatomical variations of coeliac trunk.

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FIGURE:

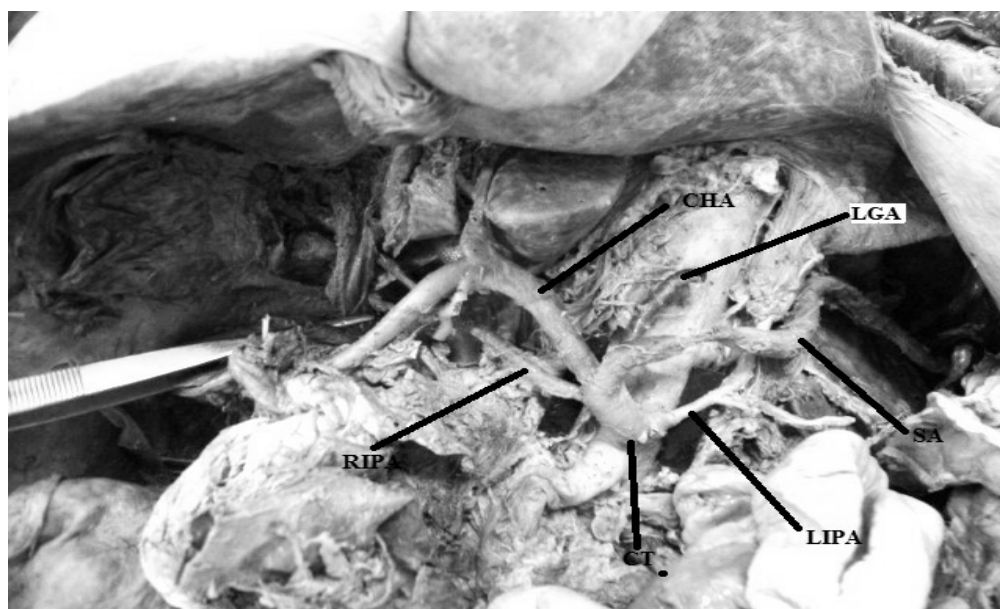


Figure 1. Dissection of abdomen showing the variant branching pattern of coeliac trunk.

LEGENDS:

Figure 1. Dissection of abdomen showing the anomalous branching pattern of coeliac trunk.

CT- Coeliac trunk, RIPA- Right inferior phrenic artery, LIPA- Left inferior phrenic artery, SA- Splenic artery, CHA- Common hepatic artery, LGA- Left gastric artery

24) A STUDY OF VARIATIONS OF SCIATIC NERVE

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Abstract:

A sciatic nerve is nerve of choice in case of anesthesia and analgesia of lower limb as it supplies larger number of structures and it is simple, reliable and common in use. Sciatic nerve leaves the pelvis by passing through the greater sciatic foramen below piriformis muscle. This site also makes it prone for compression. Here, awareness for variations of sciatic nerve and its level of division serves as a very useful guide to prevent post procedure complications. The study was carried on donated human bodies; we had come to a conclusion which is far different from other studies...

Key words: sciatic nerve, variations, piriformis muscle, tibial nerve, common peroneal nerve

Introduction:

Sciatic nerve is the largest nerve of body. It leaves the pelvis by passing through the greater sciatic foramen below piriformis muscle. The nerve lies slight medial to midpoint between greater trochanter and ischial tuberosity.⁽⁸⁾ This site is common for sciatic nerve compression in

case of posterior hip joint dislocation. Post operative palsy of sciatic nerve after surgery around hip joint always leads to poor result ⁽¹⁾. This can occur due to variable relationship of sciatic nerve with piriformis muscle. Such variations are stated 15-30% in various literatures ^(2,3,7). Usually this nerve divides into tibial nerve and common peroneal nerve at the apex of the popliteal fossa. There may be numerous variations in its course and distribution. (Beaton and Anson 1938, Kubota et al., 1960,) In recent period sciatic nerve and its divisions are used for anesthesia and analgesia for lower limb.

Material and Method:

The present study was undertaken on 12 lower limbs of donated human bodies in SBKS MI & RC, Sumandeep Vidyapeeth, Piparia, Vadodara, Gujarat. The cadavers were donated by relatives with consent letter and death certificate. None of them had any pathological lesions, traumatic lesions or surgical procedures in the lower limb. As per cunningham's Manual of Practical Anatomy Volume -1, dissection was carried out and studied.

Result:

We found the following results:

1. Sciatic nerve division was found in pelvic cavity in one case on left side. Both the divisions passing through the piriformis muscle.
2. Division of sciatic nerve found just below the piriformis muscle in one case on left side.
3. Division of sciatic nerve 3 cm below the piriformis muscle in one cadaver bilaterally.
4. Division of sciatic nerve 2-3 cm above the popliteal crease in one cadaver bilaterally and in 1 cadaver unilaterally on left side.
5. Usual division of sciatic nerve at apex of popliteal fossa found in 5 lower limbs.
6. Total number of variations for the level of division of sciatic nerve found in 7 lower limbs out of 12 made it 58.33% of variations.

Figures:

Fig. 1: sciatic nerve divisions passing through the piriformis muscle.

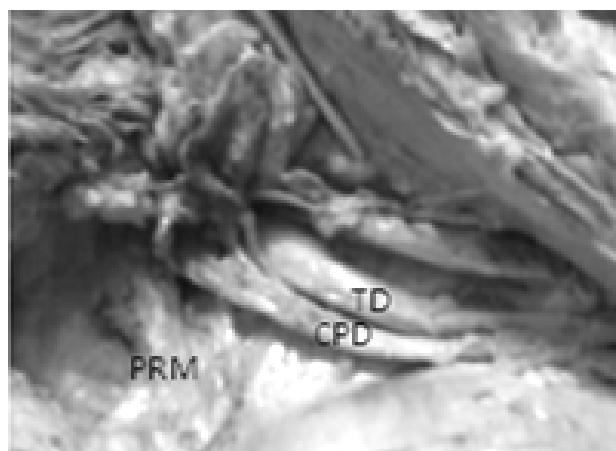
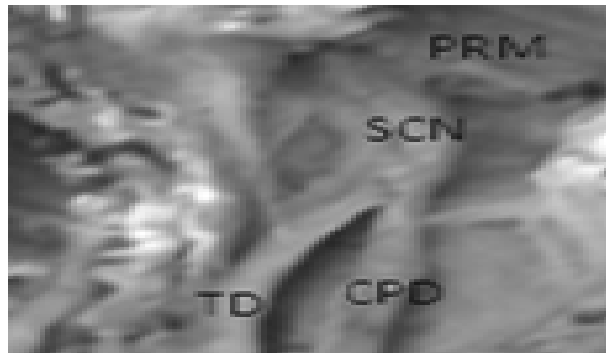


Fig. 2: Division of sciatic nerve 3 cm below the piriformis muscle



Tables:

Level of sciatic nerve division	Right side	On left side
In the pelvis	0 case	1 case
just below the piriformis muscle	0 case	1 case
3 cm below the piriformis muscle	1 case	1 case
2-3 cm above the popliteal crease	1 case	2 case
at apex of popliteal fossa or normal level of division	4 case	1 case

Discussion:

Sciatic nerve is the thickest nerve of the body having the root value of ventral rami of L4,L5,S1,S2,S3. Sciatic nerve leaves the pelvis by passing through the greater sciatic foramen below piriformis muscle ⁽⁸⁾. This nerve is prone for compression in long bed ridden condition, posterior hip dislocation, during surgical procedure for total hip replacement arthroplasty or post operative hematoma ⁽¹⁾.

Beaton LE, Anson and many authors found variations for sciatic nerve division and stated 15-30%. In present study we found in general 58.33% variation in case of level of sciatic nerve division but variation in relation to piriformis muscle we found in 33.33% cases which is comparable to other studies ^(2,3).

One very rare variation we found was division of sciatic nerve present in the pelvic region and both the tibial and common peroneal divisions passing through the piriformis muscle. In previous studies dictated by other authors, they found the tibial division passing below the piriformis muscle and the common peroneal division leaving the pelvic cavity passing the muscle. This variation makes the nerve prone for compression by contraction of piriformis muscle called piriformis syndrome ⁽⁷⁾. Such result is different from previous study where only common peroneal division may get compressed by contraction of muscle leading to foot drop.

Tibial nerve supplies hamstring muscles in thigh and muscles of posterior compartment of leg which can hamper a great range of movement of muscles of lower limb.

The use of specific nerve block like sciatic, femoral nerve and its divisions are preferred to regional techniques as it has additional advantages in that the nerve blocks are not associated with autonomic blockade thus making them suitable for use in patients with cardiovascular and respiratory diseases. The nerve can be blocked along its course in case of anesthesia and analgesia of lower limb. In these techniques such knowledge of variations can guide in useful direction to prevent possible post procedure complications ^(4, 5, 6).

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