INDIAN JOURNAL OF APPLIED BASIC MEDICAL SCIENCES

[PREVIOUSLY PUBLISHED AS ACADEMY JOURNAL OF APPLIED-BASIC MEDICAL SCIENCES]

PUBLISHED BY

FORUM

THE BASIC MEDICAL SCIENCES FORUM

[Reg. No GUJ/17809/Ahmadabad and F/17323/Ahmadabad]

PUBLISHED SINCE 1999 ;PUBLISHED AS PRINT PDF, Online

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VOL -17 B [24] **JULY- 2015**

p ISSN: 0975-8917 , **e ISSN: 2249 –7935,**
NLM ID: 101538966, **LCCN: 2010243656**

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EDITORIAL
YOGA AND BASIC MEDICAL SCIENCES
FIRST YEAR OF INTERNATIONAL DAY OF YOGA 21 June 2015
Dr janardan Bhatt

With effort of Honorable Prime Minister of India Shri Narendra Modi, United Nations General Assembly (UNGA) declared and celebrated on 21 June as INTERNATIONAL DAY OF YOGA for purpose of spread of knowledge and application use of YOGA for health, harmony and inter peace. Though in a particular case that one may require diagnosis or medical attention, consult health experts before practicing Yoga. Yoga is an invaluable gift of ancient Indian tradition. It embodies unity of mind and body; thought and action; restraint and fulfillment; harmony between man and nature and a holistic approach to health and well-being. Yoga is not about exercise but to discover the sense of oneness with ourselves,

the world and Nature. By changing our lifestyle and creating consciousness, it can help us to deal with climate change. Let us work towards adopting an International Yoga Day."
WHO has already mentioned the value of spiritual well being health in definition of health and YOGA practice gives true answer to spiritual dimension of health

Yoga is essentially a spiritual discipline based on an extremely subtle Science which focuses on bringing harmony between mind and body. It is an art and science for healthy living. The word "Yoga" is derived from the Sanskrit root *yuj* meaning "to join", "to yoke" or "to unite".
According to Yogic scriptures, the practice of Yoga leads to the union of individual consciousness with universal consciousness. According to modern scientists, everything in the universe is just a manifestation of the same quantum firmament. One who experiences this oneness of existence is said to be "in Yoga" and is termed as a yogi who has attained a state of freedom, referred to as *mukti, nirvāna, kaivalya*or*moksha*. "Yoga" also refers to an inner science comprising of a variety of methods through which human beings can achieve union between the body and mind to attain self-realisation. The aim of Yoga practice (*sādhana*) is to overcome all kinds of sufferings that lead to a sense of freedom in every walk of life with holistic health, happiness and harmonyBrief history and development of Yoga
The history of yoga is in many millenniums but sage MaharishiPatanjali systematized and codified the existing Yogic practices, its meaning and its related knowledge through Patanjali's Yoga Sutras.
After Patanjali, many sages and Yoga masters contributed greatly for the preservation and development of the field through well documented practices and literature. Yoga has spread all over the World by the teachings of eminent Yoga masters Traditional schools of Yoga .The different philosophies, traditions,
lineages and guru-shishya paramparas of Yoga led to the emergence of different traditional schools. These include gnāna Yoga, Bhakti Yoga, Karma Yoga, Pātanjala Yoga, Kunḍ ạ lini Yoga, Haṭha Yoga, Dhyāna Yoga, Mantra Yoga, Laya Yoga, Rāja Yoga, Jain Yoga, Bouddha Yoga etc. Each schoolhas its own approach and practices that lead to the ultimate aim and objectives of Yoga Yogic practices for health and wellness
The widely practiced Patanjal Yoga sadhanas have eight steps they are: Yama, Niyama, Āsana, Prānāyāma, Pratyāhara, Dhārana, Dhyāna, Samādhi.
A few dietary guidelines can ensure that the body and mind are flexible and well-prepared for practice. A vegetarian diet is usually recommended, and for a person over 30 years, two meals a day should suffice, except in cases of illness or very high physical activity or labour.
Though Yoga is essentially a path to liberation from all bondage., medical research in recent years has uncovered many physical and mental benefits that Yoga offers, corroborating the experiences of millions of practitioners. A small sampling of research shows that: Yoga is beneficial for physical fitness, musculoskeletal Functioning and cardio-vascular health.It is beneficial in the management of diabetes, respiratory

disorders, hypertension, hypotension and many life style related disorders. Yoga helps to reduce depression, fatigue, anxiety disorders and stress. Yoga regulates menopausal symptoms. In essence, Yoga is a process of creating a body and mind that are stepping-stones, not hurdles, to an exuberant and fulfilling life. Now we people basic medical sciences had responsibility to prove real benefits by doing basic and applied researches give prove more insight in evidence based medicine.

Reference with thanks: from INTERNATIONAL DAY OF YOGA **booklet on Common Yoga Protocol**
Published by : Ministry of AYUSH ,Government of India AYUSH Bhawan, B-Block, GPO Complex, INA, New Delhi-110 023
Compiled by :Dr Janardan V Bhatt

2]

PREVALENCE OF LEARNING STYLE PREFERENCES AMONGST FIRST YEAR MEDICAL STUDENTS.

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Abstract :

Introduction: First year medical students have to incorporate vast amount of information. Learning is influenced by the mode of the input that has been presented to the students. Visual ,auditory ,reading/writing and kinesthetic are amongst the known modes of information presentation.

Objective: The present study was aimed at trying to understand the different learning preferences that medical students prefer to have and thereby, try and incorporate those learning preferences into teaching methods.

Method: The present study was conducted on 120 first year medical students in the dept of physiology at grant govt. medical college Mumbai. Standard 16 question based VARK questionnaire was administered to the students and assessed to decipher their learning styles.

Results: Analysis of the study revealed that only 34.17% preferred a single mode or uni-modal way of information presentation and 65.83% preferred multimodal learning methods. Out of the uni-modal learners, preference wise, 4.87% were visual,21.95% were auditory,12.19% were read/write and 60.97% were kinesthetic learners. Amongst the multimodal ones preference wise distribution was 26.58% for two modes(bi-modal),20.25% for three modes(tri-modal), and 53.16 % for all four modes(quad-modal).

Conclusion: knowing about learning preferences can thus enable the instructor to address this diversity of learning styles amongst students and develop appropriate learning approaches.

Keywords: Visual , Auditory, Read/Write, Kinesthetic , uni-modal ,bi-modal, tri-modal, quad-modal, multi-modal, learning styles ,learning preferences.

Introduction

Medical students undergo a drastic change in content as well as matter, in terms of syllabus, when they enter the professional medical colleges. These students in general vary widely in terms of culture ethnicity medium of instruction and level of preparedness but have the same matter to study once they are into the professional course. Owing to their diverse backgrounds and thereby possible different learning styles and preferences, it is indeed a challenge for the teaching faculty to meet the educational needs of all students. Meeting this challenge becomes an onus on the teaching faculty to address this diversity of learning styles amongst students and develop appropriate learning approaches.(1)

A learning style or preference is the complex manner in which , and conditions under which, learners most efficiently and most effectively perceive ,process, store and recall what they are attempting to learn.(2)

We in this study are using Vark as an acronym that stands for four major sensory modes of learning : Visual, Auditory, Read /Write and Kinesthetic depending upon the mode by which a learner prefers to receive information. Amongst the four modes one or more modes are often dominant and preferred by the learners. The present study sheds light on the chosen modes of learning that the medical students tend to adopt during their first year of medical career.

Coming on to the different modes of learning, visual learners learn through seeing drawings, pictures and other image rich teaching tools. Auditory learners learn by listening to lectures , exploring material through discussions, and talking through ideas. Reading /Writing learners learn through interaction with textual materials, whereas kinesthetic learners learn through touching and experiences, that emphasize doing, physical involvement and manipulation of objects.(3)

Our interest to know about preferred learning modes led us to use the Vark inventory tool for assessing individual preferences. The Vark questionnaire developed by ND Fleming was used as the required tool to meet our needs.(4)

Materials and methods.

The Vark questionnaire has been developed by Fleming which identifies the preferences of students for particular modes of information presentation.(4) This questionnaire can be administered both as a hard copy as well as a freeware that can be completed online. We preferred to use the hard copy version on our first year medical students for ease of use and administration. The study was conducted on 120 first year medical students in the department of physiology at Grant Govt. Medical

College and J.J. group of hospitals, Mumbai , after obtaining proper approval from the institutional ethical committee. Even an e-mail confirmation and consent to use this questionnaire for the study was taken from N.D. Fleming, the developer of the VARK questionnaire. Only those students who were interested and volunteered for the present study were taken into consideration after taking their written consent. Students also had the option open, of not participating for the study, if they so wished.

Analysis

The number of students who preferred each mode of learning was divided by the total number of responses to determine the percentage of students in each category. These percentages were then plotted on pi charts to have a clear and vivid imagery about the distribution of different modal preferences amongst the students.(3 for pi charts)

Results

Figure 1 shows the percentage of students who preferred different modes of information presentation. They are as follows: visual (1.67%) auditory (7.5%) reading/writing (4.16%), kinesthetic (20.83%) and multiple modes (65.83%). 34.17 % thus preferred a single mode of information presentation (i.e visual,auditory reading/writing or kinesthetic.)

Figure 2 now shows the further division of the 79 students (65.83% of all students)who preferred multiple modes of information presentation. Of these 79 students some students preferred two modes (bimodal 26.58%),some preferred three modes (trimodal 20.25%) and some preferred four modes (quad modal 53.16 %). Thus quad modal preferences were seen to occupy more than half of the preferences of multi modal ones.

Figure 3 now goes on to show the percentage wise breakup of trimodal and bimodal preferences. Of the students who preferred three modes of information presentation, some students preferred auditory read/write and kinesthetic (ARK 11.39%) , some preferred visual, auditory and kinesthetic(VAK 7.59 %) and some preferred visual ,read/write and kinesthetic (VRK 1.26%).None of the students preferred visual,auditory and read/write combination (VAR 0%).

Of the students who preferred two modes of information presentation, some students preferred auditory and read/write (AR 2.53%) , some preferred visual and auditory (VA 2.53 %) and some preferred read/write and kinesthetic (RK 6.32%),some preferred visual and kinesthetic (VK 5.06%),some preferred auditory and kinesthetic (AK 10.13 %).None of the students preferred visual and read/write combination (VR 0%).

Discussion

Our study involved the first year medical students who had just stepped into a complete different environment after years of school study. The syllabus in the schooling days and that in the professional medical career nowhere match each other in terms of matter, content , vastness and ease of understandability. It is a daunting task for both the medical student as well as the teacher to channelize this vast matter , material and

knowledge into its requisite place. I.e. the memory and understanding of the ardent student.
In this attempt we designed our present study to be conducted on these new comers of professional medical college. The standard 16-item, self reported multiple choice VARK questionnaire designed by Fleming was used for this purpose of evaluating the students preferred modes of information presentation.(4) Out of the 120 students included in the present study 41 (34.17%) preferred a single mode of information presentation whereas 79 students (65.83%) turned out to prefer multiple modes of the students. Of the students who preferred a single mode of information presentation only 7.5% preferred auditory mode of learning which comprised, hearing to instructions, lectures and audio-aids. 4.16 % were those who preferred gathering information just by reading/writing. Probably targets those people who are fervent "BOOK-WORMS" or those who solely rely on notes been dictated by their teachers. Visual mode was preferred by just 1.67 % of students. Most likely, they are those, who prefer information to be presented in the form of visual cues like graphs, charts and flow diagrams. Spatial arrangements and working with symbols seem to be their niche. 20.83 % of the students preferred learning using a mix combination of multiple sensory modes like touch,hearing,sight etc. They would like their learning to be by multisensory inputs like real life situations, workshops, tasks, hands on experiences and role playing.(3,5)
Quite a sizeable proportion of students i.e. 65.83% preferred the multimodal mode of information presentation. These students preferred their information to arrive in a variety of modes, thus balancing their preferences(3), by not clinging on to any specific sensory mode of input. They are often gifted by their innate ability to adapt to different teaching styles encountered during their course of study. They find it easy to opt in and out of different teaching strategies like being more visual in one system and being auditory in the other. Changing input tracts 'as and when' required and aligning themselves according to the information modes provided by the instructor seem to be their forte. Thus instructors would seem to provide more benefit by switching on to active learning strategies rather than sticking on to the traditional lecture format, which assumes that all students are auditory learners. Just by introducing active learning strategies and motivating teachers to move from their preferred modes to other learning modes the instructor could easily reach more students because of the better match between teacher and learner styles.(6-17)
Some students prefer one of the modalities over the other three so much that they find it difficult to understand the subject matter unless special care is taken to present it in their own preference mode. To make it so happen ,teaching should be multisensory and filled with variety. Visual learners can thus be targeted by the presence of models and demonstrations. Auditory learners can be reached through discussion during peer instruction(18-19),collaborative testing(20,21) debate (22), games (23-28) and answering questions(9). Manipulating models (30,31) and role playing(32) satisfies

kinesthetic and tactile learners..Cooperative learning exercises, role playing, simulations, models, debates and games are amongst active learning strategies that can be used rampantly and efficiently in large classrooms. All these promote appreciable levels of motivation and involve enthusiasm.

Conclusion and summary

We thus conducted the present study with a motive to check out the prevalence of different learning modes and styles in the students who have managed to make it up to the medical career. Also in the backdrop, keeping in mind the scope of future research, wherein we could possibly see the effect of gender or probably their pre medical schooling and medium of instruction, we keep this study as a building block and foundation, meriting further innovations and research in the future.

Taking into consideration the present study, where we didn't delve into the nuance of doing anything apart from getting a random pool of students and analyzing their learning modes and choices ,we could reason up the proposition that, active learning strategies may be superior to the traditional lecture format in promoting thinking, reasoning, problem solving and decision making skills.

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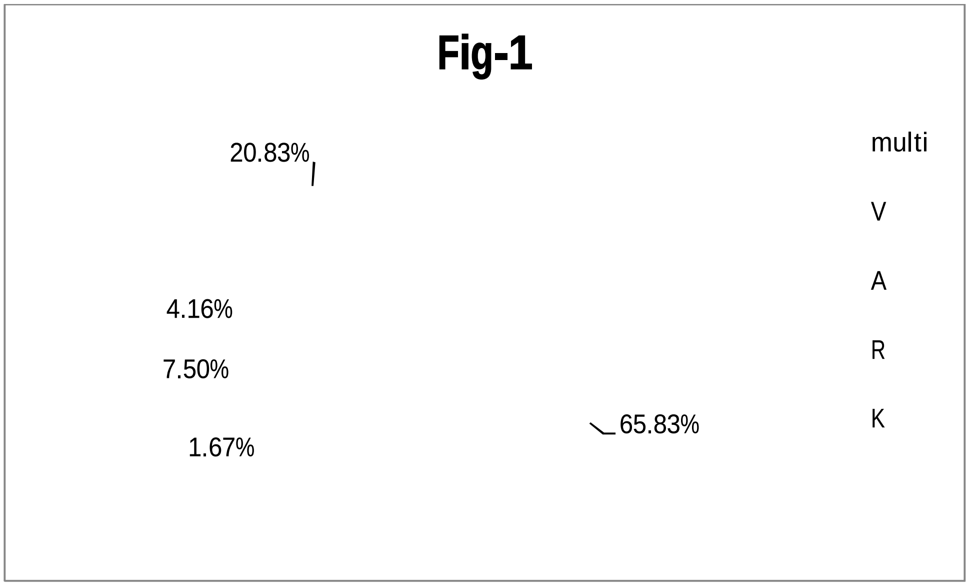

Fig-1 shows percentages of students who preferred visual ,auditory,reading/ writing kinesthetic and multiple modes of information presentation.

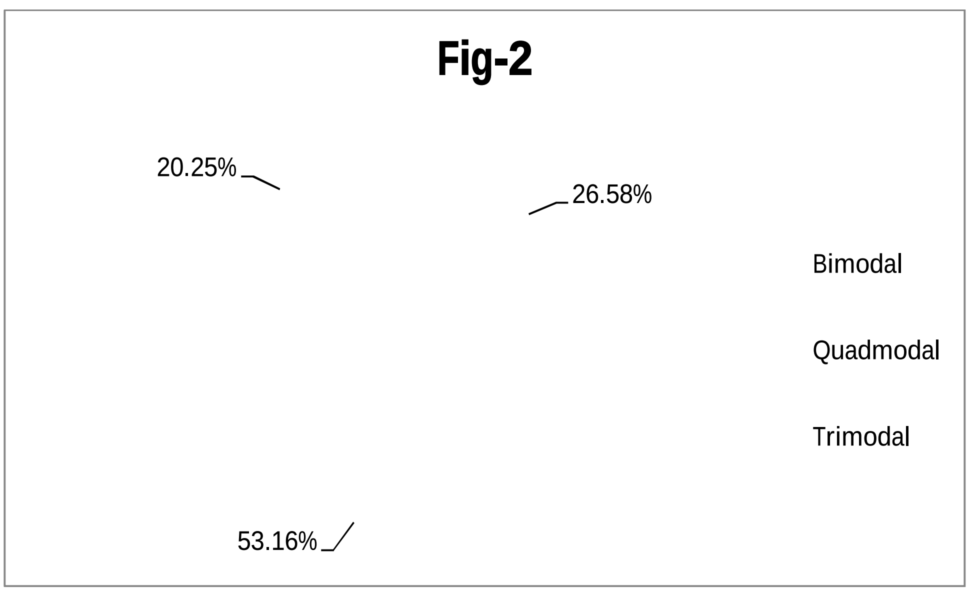

Fig-2 percentages of students who preferred two , three or four modes of information presentation.

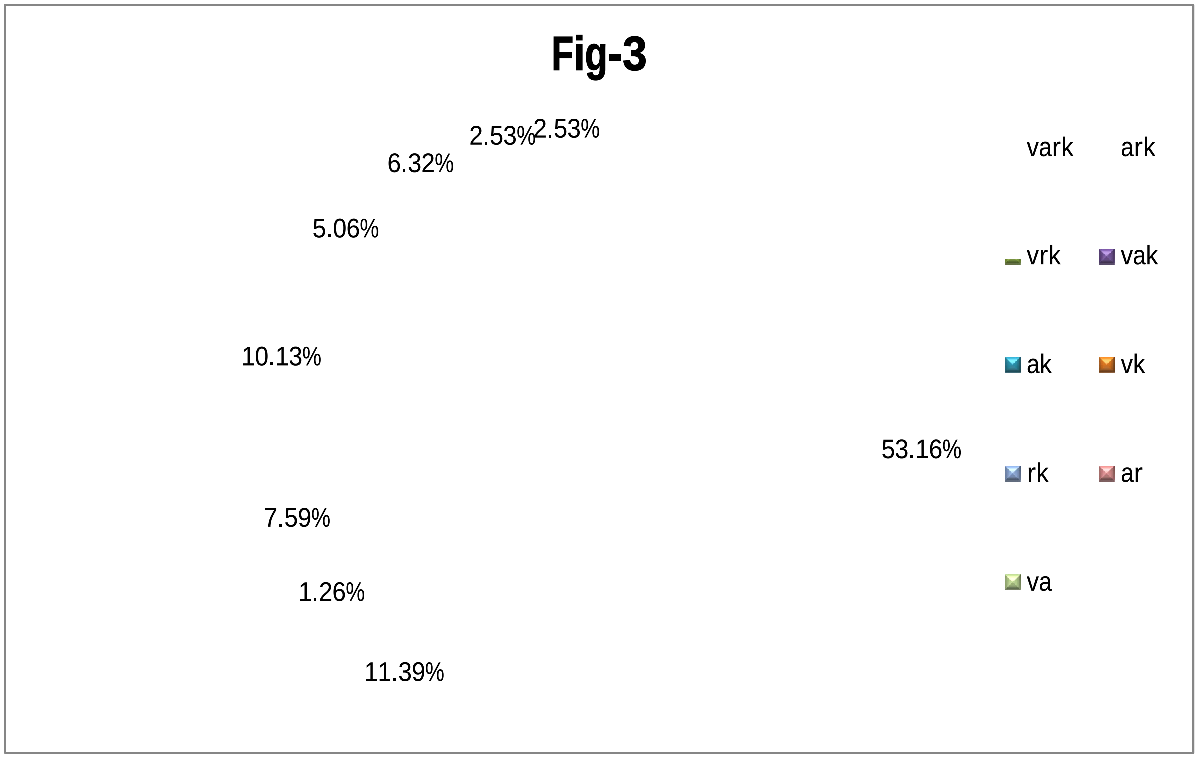

Fig -3 breakup of percentage of students who preferred three modes like VRK, VAK and ARK
And two modes like VA, AR, VK, RK and AK.VAR had zero preferences amongst trimodal students and VR had zero preferences amongst bimodal students and hence could not be represented in the pi chart.

3]

A CASE STUDY OF COMPARATIVE STUDY OF EPIDURAL ANESTHESIA USING 0.5% BUPIVACAINE AND 0.75% ROPIVACAINE IN CAESAREAN SECTION

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Abstract

Background: Early studies suggested that Ropivacaine had clinical advantages over Bupivacaine with respect to cardio toxicity and motor block, and that it was suitable for epidural caesarean section. This study was set up to compare epidural 0.75% Ropivacaine with a popular 0.5% Bupivacaine for elective caesarean section.

Methods: 60 women having elective caesarean section under epidural anaesthesia were randomly allocated to receive 18- 20 mL of either 0.75% Ropivacaine or 0.5% Bupivacaine.. Times were recorded for onset of sensory block, density and duration of motor block, and the need for supplementation.

Results: The mean time taken to achieve sensory block at T10 was 9.33+/-2.54 min in group B and 11.33+/-2.60minutes in group R . . In group B 93.33% patients had achieved T10 level with in 10 min as against 76.67%in group R. In group B 6.67 % patients had achieved T10 level after 10 min as against 23.33 % patients in group R. However, Ropivacaine produced a
motor block that was denser time to achieve modified bromage score 3 was10 to 25 minutes in group and 10-30 minutes in group R . The mean time taken to achieve modified bromage score 3 was 15.83+/-2.96 minutes in group Band 16.33+/- 3.7 min in group R

Conclusions: This study suggests that epidural 0.75% Ropivacaine may be used as an alternative to
Bupivacaine 0.5% for elective caesarean section, with a denser and prolonged motor block. With the onset time of anaesthesia

Keywords: Epidural Anaesthesia; Caesarean section; bupivacaine; ropivacaine

Introduction

Neuraxial analgesia is frequently administered to women in for LSCS. The choice of anaesthesia depends on the indications for the surgery , the degree of urgency , maternal status (full stomach) and the desire of the patient for the type of anaesthesia as well as whether to stay awake during child birth or not [5].

Most caesarean section are now performed with single –shot spinal anaesthesia . Epidural anaesthesia provides segmental block of spinal sensory and sympathetic nerve fibres with partial block of motor fibres. Lumbar epidural analgesia is a gold standard and widely used technique for providing labour analgesia[5].It can provide analgesia for both stages of labour and can be extended to provide anaesthesia for caesarean section or instrumental delivery if need arises. It has some advantages over spinal like lower incidences of hypotension ,lower risk of high spinal block since it provides segmental block , then there is no risk of post dural headaches , the risk os spinal cord injury is less , top of doses can be given to extend post operative analgesia though motor block is less pronounced

For many years, bupivacaine has been used because of its long duration of action, limited placental transfer, and minimal neonatal effects. Compared with older local anesthetics such as tetracaine, bupivacaine provided better analgesia without excessive motor block. In addition, compared with lidocaine, there was less tachyphylaxis with long-term administration. However, Bupivacaine is more cardio toxic than other local anesthetics and motor blockade accompanies the analgesia especially at higher concentrations. Many local anesthetics such as Bupivacaine exist in 2 forms, levorotatory and dextrorotatory. Ropivacaine is an amide local anesthetic produced in the pure levorotatory form. Its use may address some of the concerns related to bupivacaine.[7,9,14]

The **AIM of this study** was to assess whether there is an advantage to the use of either of these local anesthetics for neuraxial analgesia, so we compared 0.5% Bupivacaine with 0.75% Ropivacaine as local anaesthetic agents in caesarean section Sensory and motor blocking properties , hemodynamic properties and intraoperative and postoperative complications and side effects of equal concentrations of Bupivacaine and Ropivacaine was compared .

Methods

Sixty pregnant women posted for elective caesarean section were selected after taking written informed consent. All women ASA I or II, at P36 weeks of gestation over 18 years old were randomly allocated into two groups(n=30) each and received 18-20ml

Group B : Inj. bupivacaine. 0.5%

Group R : Inj Ropivacaine 0.75 %.

Women in labour,with known contraindication to regional anaesthesia like who had significant back surgery,injury or scoliosis,coagulopathy , psychiatric illness local infection and those known to have an allergy to amide local anaesthetics were **excluded**. Women in whom there was any concern about fetal wellbeing were also excluded.

All women were premedicated with oral ranitidine150 mg and Ondansetron 8mg and On arrival in the Operation theatre were preloaded with Ringer lactate solution 500 mL intravenously. The epidural was performed by anaesthetist or with the patient in left lateral position. The epidural space was identified according to normal practice in the L2-3 or L3-4 interspace with a 18-gauge Tuohy needle, bevel cephalad, using a midline approach, with loss of resistance to either air or saline. An epidural catheter was inserted with 3 cm left in the epidural space, and patients were then positioned supine with approximately 15° uterine tilt to the left (ensuring that the abdominal bump looked displaced) . A second anaesthetist, not involved in the study, prepared and administered the study solution according to instructions found within a pre-randomised, sealed, numbered envelope. Subjects were randomly allocated to receive either 18- 20 mL of 0.75% ropivacaine (group R) or 18- 20 mL of 0.5% bupivacaine . Five minutes after a 3-mL test dose of 2% plain lidocaine had been given by the investigator, the study solution was given The solution was given slowly over 2 min . All assessments (preoperative, intraoperative and postoperative) were made The timing period for the study began once all the study solution had been given. Electrocardiogram (ECG) and pulse oximetry were started upon arrival in theatre. An automated sphygmomanometer recorded maternal blood pressures every 5 min. Hypotension (systolic pressure <100 mmHg, or a 20% drop from baseline, or symptoms of nausea, dizziness or faintness) was treated using additional fluids and/or ephedrine 3–6 mg boluses.

Evaluation

Sensory Block : was assessed by using pinprick test every 5 min after injection of drug through epidural catheter till sensory block at T10 and after surgery every hourly till regression of sensory block below T10.

Onset of sensory Blockade :Time required to produce loss of pinprick sensation at dermatome at T10

Duration of sensory block : Time of regression of analgesia to pin prick below T10 dermatome

Motor blockade : It was assessed by using modified bromage score every 5 min after injection of drug through epidural catheter till patient was unable to perform straight leg rise (modified bromage score 3) and surgery every hourly till patient was able to perform straight leg rise test (modified bromage score 6)

Modified Bromage score by Breen et.al[1,2]

1 Complete block (able to move hips, knees, feet and lift legs up)

2 Almost complete block(able to move knees and feet)

3 Partial Block (only able to move feet)

4 Detectable weakness of hip flexion while supine (full flexion of knees)

5 No detectable weakness of hip flexion while supine

6 Able to perform partial knee bend

During surgery, all women received oxygen (8 L min_1) via a mask until delivery of the baby, whereupon Syntocinon 10 units (in two divided doses) - were given intravenously. Assessment
of the baby, according to obstetric and neonatologist protocol, included routine preoperative fetal heart monitoring using a cardiotocograph, Apgar scores at 1, 5 and 10 min after delivery .
The postoperative analgesic regimen used for all women was standard for this hospital at the time of
the study. This comprised 50mg tramadol via epidural route .At the end of surgery, time was noted . pulse rate blood pressure and level of sensory and motor blockade were evaluated hourly till six hours and then at 12 and 24 hours after surgery.

Time of regression of analgesia of analgesia to pin prick below T10 dermatome was considered as duration of sensory block and the time at which patient was able to perform straight leg rise was considered as duration of motor block .Nausea , vomiting , bradycardia , hypotension and urinary retention were assessed . Epidural catheter was removed 24 hours after surgery .
Data were analysed using unpaired 't'test with P< 0.05 considered statistically significant and presented as mean values and mean +/- SD .

Results

Both groups were demographically comparable in terms of mean age (26.93yr,25.57yr), mean weight (62.63kg, 59.83 kg), mean height (152.53cm, 151.9 cm)in group Bupivacaine and Ropivacaine respectively.

Table 1. Demographic Data

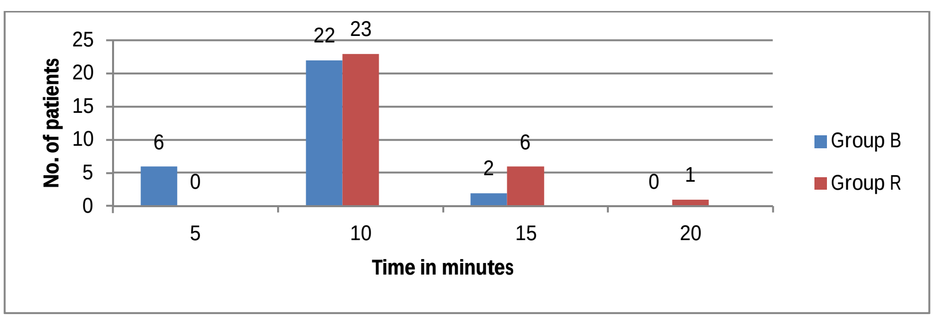
Demographic Data	Group B (Mean±SD)	Group R (Mean±SD)
Age (years)	26.93±3.96	25.57±3.66

Weight (kg)	62.63±5.57	59.83±6.46
Height (cm)	152.535.33	151.9±5.52

Table 2 : Time taken for onset of sensory block

	Group B (no. of patients)	**Group R (no. of patients)**
5	**6**	**0**
10	**22**	**23**
15	**2**	**6**
20	**0**	**1**
Total	**30**	**30**
Mean +/- SD	**9.33+/- 2.54**	**11.33+/-2.60**

Figure - 1 Time taken for onset of sensory block at T10

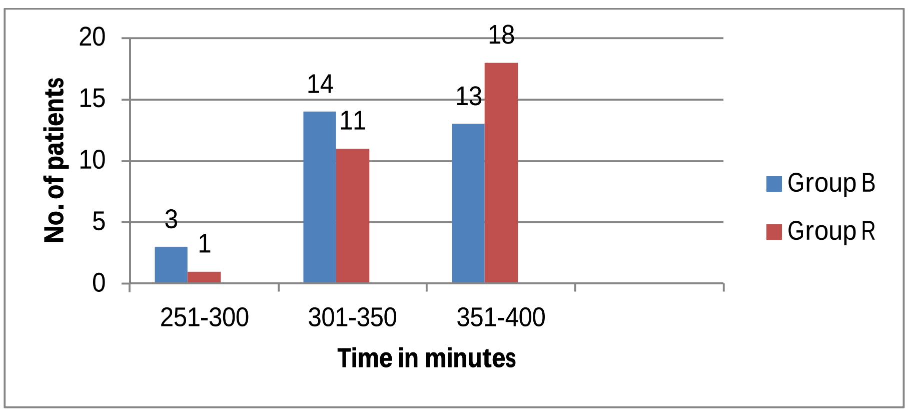


The range of time taken to achieve sensory block at T10 was 5-15 minutes in group B and 10-20 min in group R . The mean time taken to achieve sensory block at T10 was 9.33+/-2.54 min in group B and 11.33+/-2.60minutes in group R . . In group B 93.33% patients had achieved T10 level with in 10 min as against 76.67%in group R. In group B 6.67 % patients had achieved T10 level after 10 min as against 23.33 % patients in group R showing a statistically significant difference between the two groups ($p < 0.05$).

Table 3 Duration of Sensory Block

Duration(min)	**Group B (No. of patient)**	**Group R (No. of patient)**
251-300	**3**	**1**
301-350	**14**	**11**
351-400	**13**	**18**
Total	**30**	**30**
Mean±SD	**340.67±40.42**	**352.67±34.95**

Figure 2 Duration of Sensory Block



The range of Duration of sensory was 255 to 380 minutes in group B and 250 to 380 min in group R. The mean time for duration of sensory block was 340.67 +/-40.42 min and group B and 352.67 +/- 34.95 minutes in group R showing no statistically significant difference between the two groups (P>0.05)

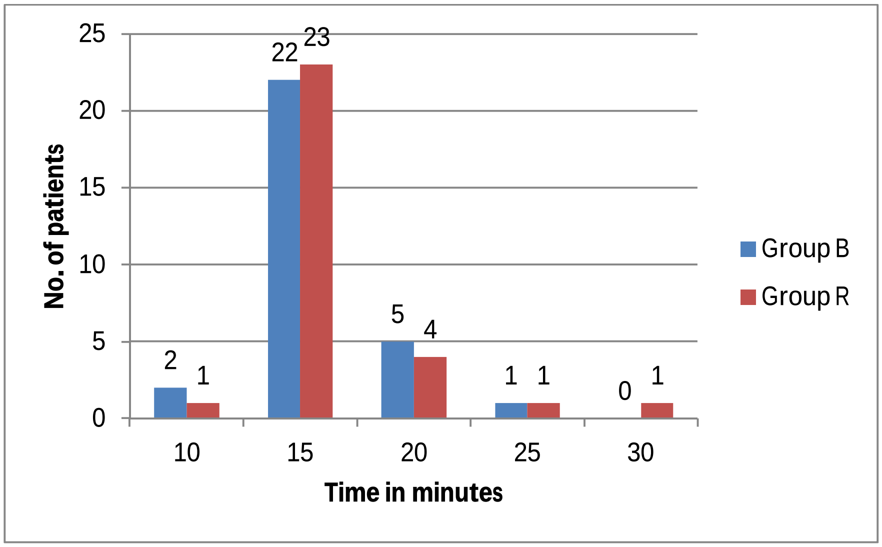
Table 4 Time for onset of Motor Block

Time(min)	Group B (No. of patient)	Group R (No. of patient)
10	2	1
15	22	23
20	5	4

25	1	1
30	0	1
Total	30	30
Mean±SD	15.83±2.96	16.33±3.7

t =0.5780, p=0.5655(>0.05) not significant

Fig 3. Time for Onset of Motor Block Modified bromage score 3



The range of time to achieve modified bromage score 3 was10 to 25 minutes in group and 10-30 minutes in group R . The mean time taken to achieve modified bromage score 3 was 15.83+/-2.96 minutes in group Band 16.33+/- 3.7 min in group R showing no ststistically significant difference between the two groups . p.0.05

Table 5 Degree of motor block at the time of onset of sensory block at T10 by modified bromage score

Modified bromage score	**Group B (No. of patient)**		**Group R(No. of patient)**	
	No.	**%**	**No.**	**%**
5	7	23.33	2	6.67
4	23	76.67	24	80
3	0	0	4	13.33
Total	30		30	

At time of onset of sensory block at T10, modified bromage score was 5 in 23.33% patients of group B and 6.67% patients of group R , 4 in 76.67 % of group B and 80 % of Group R and 3 in 0 patientof group B and 13.33 % of group R .
The range of duration of motor block was 185 to 375 minutes in group B 255 to 440 minutes in group R. the mean time for duration of motor block was 306.17 +/-47.83 min in group B and 369.67+/-42.51 min in group R showing a statistically significant difference between the two groups (p<0.05).

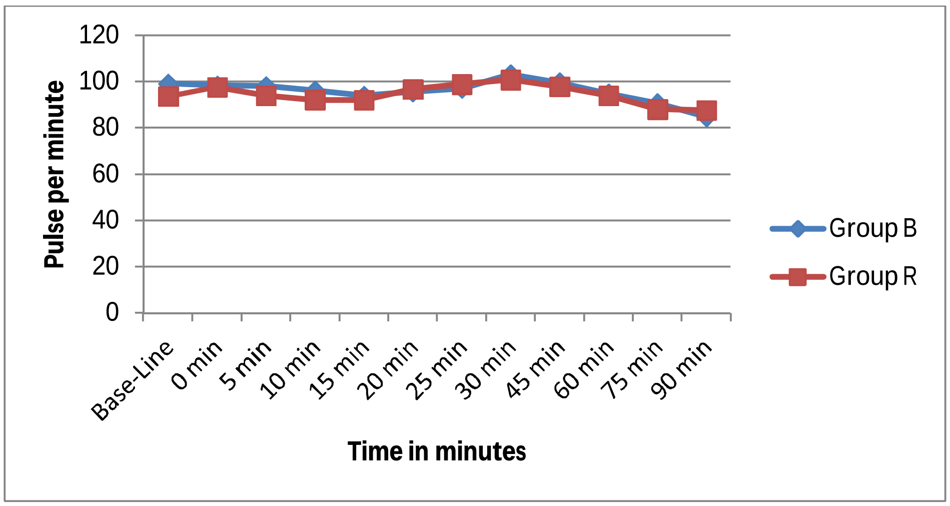
Table 6 : Pulse Rate Changes

Time interval	Group B		Group R		T Test	P Value
	Mean	±SD	Mean	±SD		
Base-Line	99.10	20.26	93.63	12.71	1.252	0.216
Intra Operative						
0 min	98.27	20.08	97.60	15.54	0.141	0.886
5 min	98.03	17.4	93.90	18.16	0.900	0.372
10 min	96.03	19.28	92.13	13.62	0.905	0.369
15 min	93.87	19.47	92.07	11.09	0.440	0.662
20 min	95.63	16.22	96.63	12.73	0.266	0.791
25 min	97.10	17.46	98.83	12.63	0.440	0.661
30 min	103.07	17.82	100.77	13.54	0.563	0.576
45 min	99.60	14.48	97.83	14.2	0.477	0.635
60 min	94.83	12.7	93.93	14.70	0.254	0.801
75 min	90.67	8.84	88.03	12.20	0.957	0.342
90 min	84.77	8.76	87.60	10.63	1.127	0.265
Post Operative						
1st hr	89.6	12.33	85.87	8.56	1.362	0.179
2nd hr	87.20	11.23	84.93	9.36	0.849	0.399
3rd hr	84.60	11.29	83.77	7.24	0.340	0.735
4th hr	82.47	9.58	83.07	5.45	0.298	0.767

5th hr	80.60	8.77	83.07	5.95	1.301	0.198
6th hr	80.27	6.55	81.93	4.41	1.156	0.253
12th hr	78.13	5.12	76.47	3.63	1.455	0.151
24th hr	78.07	5.32	78.47	4.48	0.315	0.754

The changes in pulse rate between the two groups were not statistically significant during intraoperative as well as post operative period

Figure 4:intraoperative pulse rate changes



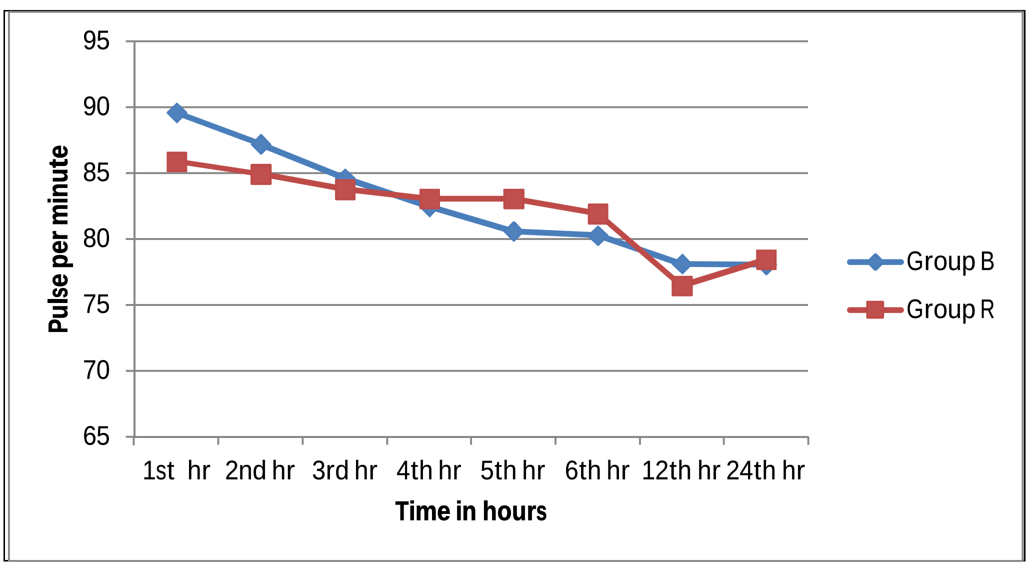


Figure – 5 Pulse rate changes during post op period

Changes in Systolic blood pressure between the two groups were not satistically significant during intraoperative period p> 0.05 but in post operative period at 2nd , 3rd and 4th hour , changes in systolic blood pressure between the two groups were statistically significant .p<0.05

Figure 6: Changes in Systolic blood pressure

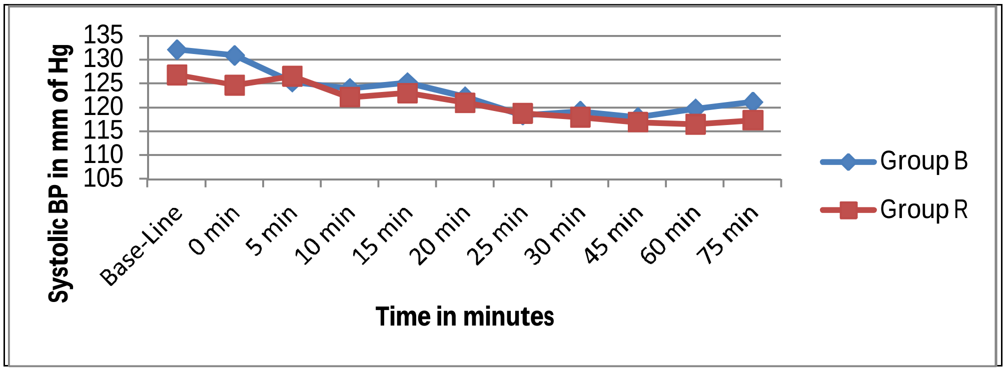


Figure – 7 Systolic Blood Pressure Changes during intra op period

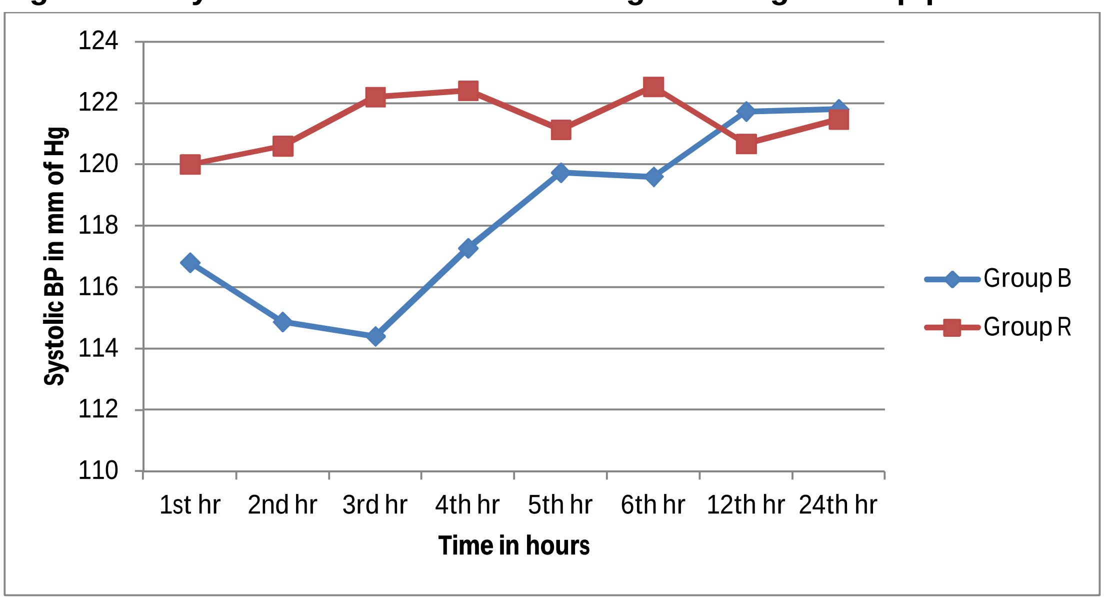
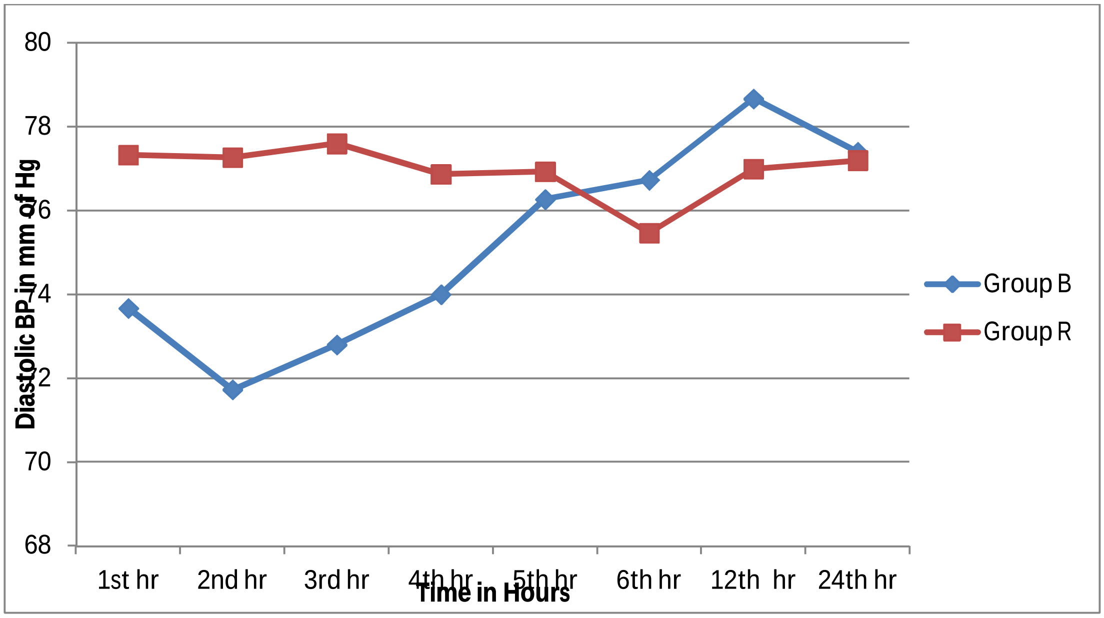


Figure – 8 Systolic Blood Pressure Changes during intra op period

Changes in diastolic blood pressure between the two group were not statistically significant during intraoperative period p>0.05 but in post operative period at 2nd and 3rd hour , changes in diastolic blood pressure the two groups were statistically significant p<0.05

Figure9: Diastolic Blood Pressure changes during post op period



Side Effects : During intraoperative hypotension was noted in one patient of both groups . there was no incidence of any other side effects in intraoperative period . no other side effects were noted in either group during post operative period like nausea vomiting hypotension ,bradycardia and urinary retention .

Side effects	Group B	Group R
Nausea/Vomiting	**0**	**0**
Bradycardia	**0**	**0**
Hypotension	**1**	**1**
Urinary retention	**0**	**0**

Discussion

When ropivacaine was first released it was widely promoted as a potentially superior agent to bupivacaine because of lower toxicity and less motor block. Studies suggested that ropivacaine is less cardiotoxic than Bupivacaine. Ropivacaine is a long acting amide type local anaesthetic relased for clinical use in 1996 . In comparison with Bupivacaine it is equally effective for subcutaneous infiltration,epidural and peripheral nerve block for surgery , obstetric procedures and post operative analgesia . Ropivacaine because of its pure S- enantiomer form is less cardiotoxic than Bupivacaine . the motor blocking characteristics it is less potent than Bupivacaine .
In our study , Both groups were demographically comparable in terms of mean age (26.93yr,25.57yr), mean weight (62.63kg, 59.83 kg), mean height (152.53cm, 151.9 cm)in group Bupivacaine and Ropivacaine respectively

David L. Brown , Randall L.Carpenter, Gale E. Thompson [6]observed onset of sensory block at T10level in 10.7 +/- 5.6 min in 0.5% . Ropivacaine and 13.0+/- 10.7 min in 0.5% Bupivacaine, at T5 level in 20.5 +/-7.9 in o.5% Ropivacaine and 19.5+/- 10.2 min in 0.5%. Bupivacaine, duration of sensory block 333+/- 54 min for Ropivacaine and 394 +/- min for Bupivacaine. Our study supports these in which, onset of sensory block at T10 was9.33 +/- 2.55 min in group B and 11.33+/-2.60 minutes in group R . Duration of sensory block was 340.67 +/-40.42 min in group B and 352.67 +/- 34.95 min in group R.

Increasing the concentration of Ropivacaine resulted in greater degree and longer duration of motor block . A positive correlation was noted between the total dose of Ropivacaine and the sensory block profile by **Brendan T. Finucane, et al in 1994**[3], did a double – blind comparative study of Ropivacaine 0.5%,0.75%,!% and Bupivacaine 0.5%,in 125 patients of abdominal hysterectomy . It was the first study to test the efficacy of Ropivacaine when injected epidurally for major abdominal surgery . Increasing doses of Ropivacaine were associated with an increased clinical effect .The main difference between Ropivacaine 1.0 % and Bupivacaine 0.5% was in sensory duration and between different doses of Ropivacaine in motor duration.

Our study supports this Duration of motor block for 0.75 % Ropivacaine is longer and more intense .The mean time taken to Ropivacaine is longer and more intense .The mean time taken to achieve modified bromage score 3 was comparable in both groups . Degree of motor block was observed and considered as the modified bromage score at that time of onset of sensory block at T10 . It was 5 in 23.33% patients of group B and 6.67% patients of group R, 4 in 76.67% of group B and 13.33% of group R at time of onset of sensory block.

The range of duration of motor block was 185 to 375 minutes in group B and 255 to 440 min in group R . The mean time for duration of motor block was 306.17 +/-47.83 min in group B and 369.67 +/- 42.51 min in group R which was statistically significant $p<0.05$

In 2005 , N.Christelis , J. Harrad , P.R Howell[10] did a comparative study of epidural Ropivacaine 0.75% and Bupivacine o.5% fentanyl mixture for elective caesarean section .and suggested that epidural 0.75% ropivacaine without opioid could be used as an alternative to bupivacaine 0.5% with fentanyl for elective caesarean section, but it did not induce anaesthesia any faster but resulted in a denser, more prolonged, motor block our study supported this study .

I**n 2011, Sara Korula,et al**[13], found that duration and intensity of motor block with 0.75% Ropivacaine was comparable to 0.5% Bupivacaine .

In our study we found that epidural 0.5% Bupivacaine and 0.75% were similar in both sensory and motor blocking characterstics for Caesarean section , with the the exception that Ropivacaine produced slightly longer and dense motor blockade . As Ropivacaine is less cardiotoxic and neurotoxic than Bupivacine , it is recommended for epidural anaesthesia in caesarean section .

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4] STUDY OF ORAL CLONIDINE PREMEDICATION IN LAPAROSCOPIC SURGERIES

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ABSTRACT
Clonidine has anti-hypertensive properties and augments the effects of anaesthesia, so it is considered to be an ideal agent to reduce the stress response to pneumoperitoneum in laparoscopic surgeries. The aim of the study was to investigate the clinical efficiency of oral clonidine premedication in prevention of haemodynamic response associated with pneumoperitoneum. Clonidine premedication provides perioperative haemodynamic stability, hence it can be recommended as a routine premedication for laparoscopic procedure.

KEY WORDS : Laparoscopic surgeries; Pneumoperitoneum, Haemodynamic response; Clonidine premedication.

INTRODUCTION

Laparoscopic surgeries has now become the “gold standard”. It offers many benefits than conventional surgeries and promoted as a “gentle surgery”.[1] However,it is not risk free. It produces significant haemodynamic changes specially in elderly and haemodynamically compromised patients.[2]

The hallmark of laparoscopy is creation of carbon dioxide (CO_2) pneumoperitoneum and change in the patient’s position from Trendelenberg to reverse Trendelenberg. Pneumoperitoneum(Pnp) affects several homeostatic systems leading to alteration in acid-base balance, cardiovascular, pulmonary physiology and stress response.[3] The extent of cardiovascular changes associated with pneumoperitoneum include an increase in mean arterial pressure, decrease in cardiac output and increase in systemic vascular resistance which in turn compromise tissue perfusion.[4]

Various pharmacological agents like nitroglycerine, adrenergic receptor agonist, dexmedetomidine, clonidine were chosen to prevent haemodynamic changes associated with pneumoperitoneum.[2,4]

Clonidine is an α–2 adrenoreceptor agonist. [5] It exerts central sympatholytic effect and has a half life of 9-12 h. Premedication with clonidine blunts the stress response to surgical stimuli and intubation. The narcotic and anaesthetic doses are also reduced. [6] In addition, clonidine increases cardiac baroreceptor reflex sensitivity to increase in systolic blood pressure, and thus stablises blood pressure. Clonidine inhibits the

release of catecholamine[7] and vasopressin and thus modulates the haemodynamic changes induced by pneumoperitoneum.
Considering all these observations, the present study was designed to evaluate the type and extent of haemodynamic changes associated with laparoscopic surgery and also to find out the efficacy of clonidine in prevention of such haemodynamic changes.

METHOD

50 adult patients of ASA physical status I & II, scheduled for elective laparoscopic surgerieswere recruited for a prospective randomized, single-blinded comparative study. The study was approved by the institutional Ethical Committee and written informed consent was obtained from all the patients before being included in the study. They were randomly allocated to one of the two groups to receive either with oral clonidine 150 µg (Group A) or without oral clonidine (Group B), 60 minutes before induction of anaesthesia.

On arrival in the operation theatre, monitors were attached and baseline parameters such as heart rate, blood pressure and peripheral oxygen saturation were noted down. Level of sedation (sedation score) was assessed by sedation scale : (1) awake and agitated (2) awake and comfortable (3) asleep but arousable (4) asleep with sluggish response to persistent call or touch and (5) no response to call or touch.
After intravenous cannulation, glycopyrrolate 0.2 mg and fentanyl citrate 1 µg/kg i.v.given. Patients were induced with thiopentone sodium 5-7-mg/kg and succinylcholine 2mg/kg and endotracheal intubation was done. Anaesthesia was maintained with oxygen, nitrous oxide, sevoflourane and vecuronium bromide 0.1 mg/kg. Pneumoperitoneum was created by insufflation of Carbon dioxide. Intra abdominal pressure (IAP) was not allowed to exceed 15 mm Hg throughout the surgical procedure. Ventilation was done to maintain end tidal carbon dioxide between 35-45 mm Hg. Systemic arterial pressure including the systolic, diastolic and mean arterial pressure, heart rate, SpO_2, $EtCO_2$ were recorded at the following points of time : (1) prior to induction (2) during intubation (3) 3 minutes after endotracheal intubation (4) before pneumoperitoneum (5) five minutes after pneumoperitoneum (6) ten minutes after pneumoperitoneum (7) fifteen minutes after pneumoperitoneum (8) thirty minutes after pneumoperitoneum (9) five minutes after exsufflation of gas and (10) ten minutes after extubation.

Significant rise in heart rate was observed following pneumoperitoneum in Group B as compared to Group A (98±9.1Vs84.44±5.7bpm). Similarly, rise in systolic arterial pressure (124.96±7.0Vs150.6±3.8 mm Hg), diastolic arterial pressure (94.04±3.8 Vs79.1±3.6 mm Hg) and mean arterial pressure (112.7±3.2Vs94.2±4.1 mm Hg) was more in Group B following pneumoperitoneum.
At the end of surgery residual neuromuscular block was assessed and reversed by appropriate dose of glycopyrrolate and Neostigmine intravenously. Patients were extubated and transferred to recovery room, where they were monitored for complications or adverse events.

Results

Demographic profile and preoperative vital parameters were compared among the two groups of patients and no significant difference was found (Table 1 & 2).

Table 1 Demographic profile (Mean ± SD)

	Gr A	**Gr B**	**P Value**
Age	39.84±13.60	42.4±10.65	0.27
Sex(M:F)	9:16	8:17	

Table 2 Preoperative vital parameters (Mean ± SD)

Parameters	**Gr A**	**Gr B**	**P value**
Pulse	85.48±8.4	84.08±9.0	0.5736
SBP	125.8±10.4	124.6±11.1	0.7055
DBP	79.2±6.6	82.2±6.5	0.1153
MAP	94.5±7.3	96.2±7.3	0.4375
Sedation			

Table 3 Changes in pulse rate in two groups

Changes in Pulse Rate(bpm)

	HR of gr A (Mean±SD)	**HR of gr B (Mean±SD)**	**p value**
1 hr prior to sx	85.48±8.4	84.08±9.0	0.5736
before intubation	81.84±6.2	85.76±9.5	0.094
during intubation	92.88±6.6	101.16±9.7	<0.005
3 min after intubation	86.04±6.5	95.16±9.2	<0.005

10 min after intubation	83.56±7.8	94.4±10.3	<0.005
before pneumopertonium	83.16±6.9	93.68±8.9	<0.005
5 min after pneumoperitonium	84.04±5.8	97.96±10.1	<0.005
10 min after pneumoperitonium	84.44±5.7	98±9.1	<0.005
15 min after pneumoperitonium	83.4±6.6	96.24±9.5	<0.005
30 min after pneumoperitonium	82.76±7.0	98.04±5.9	<0.005
5 min after exsufflation	83.48±5.7	92.72±9.0	<0.005
During Extubation	90.88±5.9	99.6±8.1	<0.005
5 min After Extubation	83.36±5.7	93.48±8.1	<0.005

Table 4 Changes in systolic blood pressure in two groups

Changes in SBP(mm Hg)

	SBP of gr A (Mean±SD)	**SBP of gr B (Mean±SD)**	**p value**
1 hr prior to sx	125.8±10.4	124.6±11.1	0.7055
before intubation	122.72±10.8	125.2±10.6	0.4106
during intubation	134.56±10.0	144.8±8.9	<0.005
3 min after intubation	126.76±9.3	140.8±10.6	<0.005
10 min after intubation	123.08±9.7	137.04±9.9	<0.005
before pneumopertonium	122.92±8.2	136.44±9.4	<0.005
5 min after pneumoperitonium	126.48±10.6	141.6±11.2	<0.005
10 min after pneumoperitonium	124.96±7.0	150.6±3.8	<0.005

15 min after pneumoperitonium	123.56±8.3	155.6±4.8	<0.005
30 min after pneumoperitonium	122.92±7.5	152.7±3.2	<0.005
5 min after exsufflation	123.72±7.6	130.7±8.0	<0.005
During Extubation	132.64±7.4	140.68±7.4	<0.005
5 min After Extubation	123.32±7.8	133.08±7.1	<0.005

Table 5 Changes in mean arterial pressure in two groups

Changes in MAP(mm Hg)

	MAP of gr A (Mean±SD)	**MAP of gr B (Mean±SD)**	**p value**
1 hr prior to sx	94.5±7.3	96.2±7.3	0.4375
before intubation	92.4±7.6	96.7±7.0	0.0426
during intubation	102.0±6.9	110.7±5.9	<0.005
3 min after intubation	95.5±6.0	107.3±6.9	<0.005
10 min after intubation	93.3±6.3	104.9±7.3	<0.005
before pneumopertonium	93.6±4.9	104.2±6.7	<0.005
5 min after pneumoperitonium	95.0±5.6	107.6±8.1	<0.005
10 min after pneumoperitonium	94.2±4.1	112.7±3.2	<0.005
15 min after pneumoperitonium	93.3±4.5	116.2±4.7	<0.005
30 min after pneumoperitonium	93.1±4.3	114±4.2	<0.005
5 min after exsufflation	93.4±4.3	99.8±5.8	<0.005
During Extubation	100.6±4.9	107.2068±5.4	<0.005
5 min After Extubation	92.9±5.3	101.1±5.0	<0.005

Table 6 Changes in diastolic blood pressure in two groups

Changes in DBP(mm Hg)

	DBP of gr A (Mean±SD)	**DBP of gr B (Mean±SD)**	**p value**
1 hr prior to sx	79.2±6.6	82.2±6.5	0.1153
before intubation	77.4±6.5	82.6±6.2	0.0061
during intubation	86.0±6.1	93.8±5.4	<0.005
3 min after intubation	80.1±4.9	90.8±6.2	<0.005
10 min after intubation	78.6±5.2	89.2±7.1	<0.005
before pneumopertonium	79.1±3.6	88.2±6.9	<0.005
5 min after pneumoperitonium	79.5±4.2	91.04±8.5	<0.005
10 min after pneumoperitonium	79.1±3.6	94.04±3.8	<0.005
15 min after pneumoperitonium	78.4±4.1	98±3.1	<0.005
30 min after pneumoperitonium	78.4±3.8	96.04±3.1	<0.005
5 min after exsufflation	78.5±3.6	84.68±6.2	<0.005
During Extubation	84.8±4.2	90.7±5.6	<0.005
5 min After Extubation	77.92±4.4	85.32±5.4	<0.005

Table 7 Changes in etco2 in twogroups

6) Changes in etco2

	Mean Etco2of cases	**Mean Etco2of control**	**p value**

1 hr prior to sx	-	-	-
before intubation	-	-	-
during intubation	-	-	-
3 min after intubation	29.4±0.9	29.6±1.8	0.36
10 min after intubation	30.6±1.4	30.9±1.2	0.4
before pneumopertonium	30.3±1.1	30.5±0.8	0.49
5 min after pneumoperitonium	31.1±1.3	31.6±1	0.2
10 min after pneumoperitonium	31±1.6	31.7±0.9	0.07
15 min after pneumoperitonium	30.7±1.6	31.3±1.2	0.14
30 min after pneumoperitonium	31.6±1.7	31.8±1.1	0.56
5 min after exsufflation	29.8±1	29.9±0.7	0.54
During Extubation	-	-	-
5 min After Extubation	-	-	-

Table 8Post operative monitoring

	Gr A	**Gr B**
Nausea- Vomiting	4	2
Sedation (sedation score) 1	8	27
2	20	3
3	2	

Discussion
Pneumoperitoneum during laparoscopy produces significant haemodynamic changes, which can be detrimental especially in elderly and in haemodynamically compromised patients. Various techniques and pharmacological agents have been used to counteract these detrimental effects of pneumoperitoneum.

This single blinded prospective study was carried out in 50 adult patients, to evaluate the effect of clonidine premedication in attenuating haemodynamic stress response associated with intubation and pneumoperitoneum. [3]
Clonidine, an imidazoline derivative is a selective α-2 adrenergic agonist. It produces a fall in the heart rate and blood pressure associated with decreased SVR and cardiac output.[8] 100 µg clonidine was administered orally, 60 minutes before surgery. In operation theater standard monitoring devices wereapplied. Inj. glycopyrrolate and Inj. Fentanyl 1 µg/kg were given and patients were induced with pentothal sodium and Succinyl chorine and maintained with oxygen, nitrous oxide, sevoflourane and vecuronium bromide 0.1 mg/kg. all throughout surgeries haemodynamic parameters were monitored. Following pneumoperitoneum with carbon dioxide, patients were hyperventilated to maintain normocapnia .Intra abdominal pressure (IAP) was maintained below 14 mm Hg.

Following intubation and pneumoperitoneum, increase in arterial pressure was noticed but it never crossed more than 30% of baseline value in group A. Hence clonidine premedication was able to achieve haemodynamic stability during pneumoperitoneum.[9,10,11]

The adverse effects in the postoperative period were less in the patients who had clonidine premedication in comparison with placebo premedication.
In conclusion, premedication with 150 µg oral clonidine, has been found to be relatively safe as well as effective method that provides stable haemodynamics and protection against stress response triggered by pneumoperitoneum in patients undergoing laparoscopic surgeries. Clonidine also affords an added advantage of reduction in postoperative complications such as nausea-vomiting . Hence 150 µg oral clonidine can reasonably be recommended as premedication for all laparoscopic procedures in otherwise healthy patients.

SUMMARY
To conclude, the administration of oral clonidine 150 µg as a simple and cost effective form of premedication in patients undergoing laparoscopic surgeries. It has good perioperative haemodynamic stability.

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5

”EFFECTS OF LOWER LIMB EXERCISE IN OLD AGE GROUP IN BERG BALANCE SCORE”

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ABSTRACT

Falls are a relatively common event in older people. Approximately 30% of individual's over65 years of age fall at least once a year, and about half of those do so recurrently. Fall related injuries and death in older people are a major health care problem worldwide, with the numbers continuing to rise. Thus, falls prevention in older people remains a major health care priority. In the old age group muscle weakness, joint stiffness, proprio ceptive deficit is very common which leads to imbalance and ultimately increasing the risk for fall. Fall itself is very hazardous for the old age group as bone density will be reduced and can cause fracture of upper limb or lower limb bone. So it is highly advised that weight bearing exercise like one leg standing, tandem walking as well as functional strengthening exercises like forward lunges, mini squatting and stepping exercises can be very helpful for the older individual which increases the balance and strength in the lower limb and reduces the chances of fall.

1: INTRODUCTION

Falls are a relatively common event in older people. Approximately 30% of individual's over65 years of age fall at least once a year, and about half of those do so recurrently. Fall related injuries and death in older people are a major health care problem worldwide, with the numbers continuing to rise. Thus, falls prevention in older people remains a major health care priority.

FEAR OF FALLING (FoF), defined as a disabling symptom of impaired mobility among frail older people, is common in community of older adults. It has been associated with depression, functional limitations, and gait impairments.[1] FoF has been identified as one of the greatest fears experienced and felt by the older individual in the current era.[2]

Delbaere et al [3] discussed the "vicious cycle" of FoF: those with FoF exhibit decreased activity and participation in their environment, leading to further decreases in strength and balance, thus placing them at greater risk for falls and increased FoF.

Development of FoF has been associated with worsening in performance of activities of daily living, mobility, mood, life satisfaction, and generalhealth[4, 5]. Further, it has been shown to limit participation within roles and diminish social functioning, self-efficacy, and quality of life. [6, 7]

Rapid increase in the number of older people is a global phenomenon. Developing countries are graying as the elderly population is growing much faster than expected. An unprecedented increase in human longevity was one of the most spectacular events of the 20th century. The resultant population aging with all its ramifications is more evident in most parts of the world.[8]

Aging is a universal phenomenon. India is the second largest country in the world, with 72 million elderly persons above 60 years of age as of 2001.[10] World health organization (WHO) uses 60 years of age and older as the general definition of an older person. However an elderly can be defined in three main categories 1) chronology 2) change in social role (i.e. change in work patterns adults status of children and menopause) 3) change in capabilities (i.e. change in physical characteristics).[9] Aging is a cumulative and continuous process taking place in human from conception to death. This age group is classified as young old group between 60-75 years, middle old group between 75-85 years; old old group is older than 85 years of age.[11] With advancing age, structural and functional deterioration occurs in most physiological systems; this age related physiological changes affect a broad range of tissues, organ, systems and functions, which cumulatively can impact activities of daily living (ADL) and the preservation of physical Independence in older adults.[12]

According to Bowen RL, Atwood CS 2004 human body composition changes with age, but the causes and consequences of these changes are only partly understood. One such serious and a silent problem with which an elderly suffers is frailty syndrome. Rockwood et.al described the concept of frailty as “a multidimensional syndrome which involves loss of reserves (energy, physical activity, cognition and health) which gives rise to increased vulnerability.[14] Subjects with the frailty syndrome have increased risk of adverse events such as death, disability, and institutionalization.[13] Loss of muscle strength in old age is a prevalent and disabling condition. Muscle strength declines with age such that, on average the strength of people in their 80 years is about 40 percent less than that of people in their 20 years. Muscle weakness particularly of the lower limbs, is associated with reduced walking speed, increased risk of disability and falls in older people.[16]

This decline that is increasingly recognized to have important consequences in old age was given the name “sarcopenia” by Rosenberg (1989).[17] Sarcopenia is a syndrome characterized by progressive generalized loss of skeletal muscle mass and strength, usually accompanied by physical inactivity, decreased mobility, slow gait speed and poor physical endurance which are also common features of the frailty syndrome.[14] Sarcopenia is an important independent predictor of disability linked to poor balance, gait speed, and falls thus, leading to functional disability.[13]

Effect of aging and the subsequent loss of strength have a pronounced effect on the capacity of older people to lead viable and independent lives. The deterioration in functional capacity can decrease the ability to perform common activities of daily living in the older population. A recent study in the United States showed that above the age of 65, 28% of the men and 66% of the women could not lift objects weighing more than 4 kg, so, the viability of the musculoskeletal system definitely declines with age.[18] Prevalence of fall and fear of falling is potentially increasing with age, of the medical conditions predisposing to falls in elderly, musculoskeletal problems ranks first followed by others.[15] Disability in Activities of Daily Living (ADL), such as bathing, dressing, walking which are the essential activities that a person needs to perform to be able to live independently.[20] Disability can be identified accurately through responses to a wide variety of questions about the ability to perform activities ranging from basic self-care to household activities.[21] Disability in the older population, and the attendant need for informal and formal care, will increasingly affect older people, their families, and the health care system as the population continues to age.[20]

The performance of all activities of daily living requires good balance control while at rest or when moving from one position to another. Maintenance of balance requires the coordination of sensory, neural and musculoskeletal systems. Many of these systems undergo deterioration as people age. This has the potential to affect balance, restrict safe mobility, increase the likelihood of a fall and adversely affect quality of life. Therefore the assessment of balance with older people is important to direct appropriate interventions to improve balance performance and to monitor changes in balance over-time.[22]

Various approaches to measure balance have been developed. Questionnaires such as Rivermead Mobility Index and the Activities Specific Balance Scale provide self-report information regarding functional status. Laboratory measures such as computerized force platforms provide accurate measurements of postural sway. Functional performance-based tests such as the Berg Balance Scale and the Timed Up and Go Test may be defined as tests which objectively measure a person performing balance or walking tasks. An advantage of functional balance tests is their practically for assessment in a variety of settings because of their low cost, lack of complex equipment and time efficacy. [22]

There are vast numbers of functional balance assessment tests. To measure the risk of fall in older people around 17 functional outcomes, like Functional Reach Test (FRT), Berg Balance Scale (BBS), Lateral Reach Test (LRT), Performance Oriented Mobility Assessment (POMA), Fullerton Advanced Balance Scale (FAB), Timed Up and Go Test (TUGT) Physical Mobility Scale (PMS), Balance Screening Tool (BST) etc are available. Of the numerous functional balance tests available, only the TUGT, BST, BBS and FAB have established reliability and concurrent validity with community dwelling older adults. TUGT and BST provide efficient screen of a person’s balance abilities, however do not offer enough detail to determine the source of impairment. The FAB scale may be more applicable for older people living independently, however further research with higher methodological quality is required to establish its reliability and validity. While being the most rigorously developed functional assessment balance test, the BBS may be more appropriate for use for frail older adults due to limited assessment of dynamic balance. [22]

It has been shown that individuals prone to falls possess lesser strength and power in their lower extremity as compared to those without a history of falls. It has been shown that 6 week of progressive resistance training program is likely beneficial for improving static and single leg stance balance in untrained older adults.[24] so, in geriatric population functional disability is the major problem. The evaluation of functional disability focuses on the performance of activities and functions in different areas, among which the tasks of everyday life, and other requisitions of the day to day activity.[19]

The association between reduced lower extremity strength, poor mobility and functional dependence in frail elders are well known. Older person's functional mobility performance and independence can be improved by enhancing lower extremity muscle function. Hip extension, knee extension, and planter flexors are significant predictors of ambulation functions in older adults in the community. Planter flexors and quadriceps muscle accounts for 42% to 59% of variance as being important determinant of ambulation capacity in community dwelling elderly fallers. They provide stability for the weight bearing limb and allow for advancement of the swinging limb in both walking and stair climbing tasks.[23] so, to measure physical dysfunction power is a reliable measure of muscle performance in younger and older individuals. The significance of impairments in muscle power has been demonstrated in studies confirming the positive association between muscle power and functional mobility tasks and the identification of peak muscle power as a strong physiological predictor of functional limitations and disability in older people.[25]

In 1980's it was thought that resistance training for older adults would only be beneficial for neural adaptation and that older muscles are unable to hypertrophy, however in the next decade Frontera et. al., (1988) and Fiatarone et. al., (1990) clearly established by the more sophisticated imaging techniques in their studies that older adults could achieve muscle hypertrophy with short term (8-12 week) high intensity training. Recent studies show that resistance training has remarkable beneficial effects on the musculoskeletal system including prevention and treatment of this syndrome. Studies demonstrate that regular progressive resistance training develops the strength and size of muscle and increase bone mass from young male athletes to older women.[13]

PRT is the most commonly used resistance therapy in older people. Progressive resistance exercise is a method of increasing the ability of muscles to generate force and improves the physical function in elder people.[29] A Cochrane review of 121 randomized controlled trials of PRT 2-3 times per week improved physical function, gait speed, timed get up go score, climbing stairs, balance and more importantly had a significant effect on muscle strength especially in the high intensity training group.[14]

Sigrid Tieback et.al., described the PRT for older hospitalized patients have an effect on functional status, there is a significant improvements in the 10m walk test, barthel index and timed get up and go test after 8 week of resistance training with 2-3 session per week.[11] Daily adjusted progressive resistance exercise protocol is used for the special consideration like osteoporosis, geriatric population, children and pregnant women.[28] The DAPRE system is a 5-RM to 7-RM (repetition maximum), 4-set system. DAPRE allows patients to exercise to their fullest potential while simultaneously accounting for daily variations in their strength levels. With excessive resistance The DAPRE system allows for maximum strength gains to be attained in the quickest amount of time possible without endangering the patient by overloading his or her tissues and joints.[29] The DAPRE system provides our patients with a simple and reliable means of advancing their exercises that ensures they receive the desired benefits of the exercise without the worry that they will overload their tissues and reinjure themselves. It also provides a safety net for apprehensive patients who may be less inclined to advance their exercises due to fear of re injury. The DAPRE system is a reliable, valid, and flexible tool that can be adjusted to a myriad of patients and rehabilitation settings and is a valuable resource for rehabilitation professionals.[29]

Balance is staying upright and steady when stationary, such as when standing or sitting, or during movement. The loss of ability to balance may be linked with a higher risk of falling, increased dependency, illness and sometimes early death. However, it is unclear which types of exercise are best at improving balance in older people living at home or in residential care.

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