IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 12 Ver. X (Dec. 2015), PP 19-26
www.iosrjournals.org

A comparative study of epidural ropivacaine 0.75% alone with ropivacaine plus fentanyl and ropivacaine plus clonidine for lower abdominal and lower limb surgeries

Sindhu Baglur S [1], Dinesh K[2], Ravi M* [3],Somasekharam P [4]
[1](Consultant Anaesthesiologist /Bangalore) [2,3](Professors,Dept of Anaesthesiology, Sri Devaraj Urs Medical College/ SDUAHER/Kolar, Karnataka, India),[4] (Professor, Department of Anaesthesiology , MVJ Medical College, RGUHS,Bangalore, India) (Corresponding author)*

Abstract : *Clonidine has been extensively evaluated as an alternative to neuraxial opioids for control of pain and has been proven to be a potent analgesic. It is used in combination with opioids and local anaesthetics in labour analgesia and orthopaedic surgery. However there are not many studies for using epidural clonidine in lower abdominal and lower limb surgeries. This clinical study was conducted on 90 adult patients of ASA grade 1 & 2 in the age group of 18 to 55 years posted for elective lower abdominal and lower limb surgeries under epidural anaesthesia. Onset of anaesthesia was faster when additives, fentanyl and clonidine are added. Time to attain maximum sensory level of T6-T7 and maximum motor blockade was faster when fentanyl was used as compared with clonidine. Two segment regression, recovery of motor blockade were prolonged with fentanyl and duration of analgesia was prolonged with clonidine, delaying the need for rescue analgesia. In clonidine group side effects like mild sedation, bradycardia and hypotension were seen. We conclude that clonidine is more effective than fentanyl in prolonging the duration of analgesia with fewer side effects and dose sparing action on local anaesthetics*

Keywords *- epidural anaesthesia, ropivacaine, clonidine, fentanyl.*

I. Introduction

Epidural anaesthesia is a well established technique to provide anaesthesia and good analgesia both during the surgical procedure as well as the post operative period. Epidural anaesthesia can be used as sole anaesthetic for procedures involving the lower limbs, pelvis, perineum and lower abdomen. It has the ability to maintain continuous anaesthesia after placement of an epidural catheter, thus making it suitable for procedures of long duration. Central neuraxial blockade causes physiological changes, mainly variation in heart rate and blood pressure that results from decreased sympathetic tone and unopposed parasympathetic tone. The main advantage of epidural anaesthesia is to provide post-operative analgesia. An ideal local anaesthetic in the epidural space should provide quick onset, sufficient motor block for surgical relaxation and good sensory block for providing post operative analgesia with minimal central nervous system and cardiovascular toxicities. The advantage of this technique is that graded epidural anaesthesia or supplementation of the drug is possible even during the surgery. Several drugs like Mepivacaine, Tetracaine, Chlorprocaine, etc., have been used before and most of these drugs produce unnecessary side effects that led to discontinuation of use of these drugs. Among the drugs used currently are Lignocaine, Bupivacaine, Levobupivacaine and Ropivacaine.

Even though bupivacaine is popularly used in epidural space, the fear of inadvertent injection of the drug intravascularly resulting in cardiac arrest which is difficult to resuscitate is a major problem. Ropivacaine, the recently introduced long acting amide local anaesthetic derived from Bupivacaine is claimed to have lesser cardiovascular side effects due to it being the S-enantiomer. It is said to be better in its cardiovascular profile as patient can be revived from cardiovascular side effects of ropivacaine than when it occurs with bupivacaine [1,2,3].

In the quest for searching the ideal drug for epidural space, Ropivacaine has been introduced recently. It is said to have similar pharmacological profile as that of bupivacaine with better safety margin. Studies are being conducted to study the efficacy of ropivacaine and its side effect profile. Because ropivacaine has to be given in larger doses to achieve the analgesic and anaesthetic effects, the addition of adjuvants like opioids and clonidine can decrease the dose requirement and permit use of more diluted solutions for better analgesia and prevent side effects associated with larger doses of ropivacaine.

Fentanyl, a highly lipophilic opioid, has relatively rapid onset of action following administration. It has become very popular additive in recent times and is a established technique now. However, fentanyl has side effects like pruritus, nausea and vomiting. Clonidine is being extensively evaluated as an alternative to neuraxial opioids for control of pain and has been proven to be a potent analgesic. It is used in combination with opioids

and local anaesthetics in labour analgesia and orthopaedic surgery. However there is still dearth of studies for using epidural clonidine in lower abdominal and lower limb surgeries. The present study was taken up to compare epidural ropivacaine 0.75% alone with ropivacaine plus fentanyl and ropivacaine plus clonidine for lower abdominal and lower limb surgeries.

II. Objectives

To study, Time to Onset of sensory block in all 3 groups, Time of maximum sensory blockade level & complete motor blockade, Time to two segment regression & Complete recovery of motor blockade, Duration of analgesia. Changes in vital parameters like heart rate, mean arterial blood pressure and SpO2, Incidence of side effects were noted.

III. Material And Methods

This clinical study was conducted on 90 adult patients of ASA physical status 1 & 2 in the age group of 18 years to 55 years, of either sex, posted for elective lower limb, lower abdominal, gynaecological and urological surgeries under epidural anaesthesia.

After approval from the hospital ethical committee, a prospective double blind randomized clinical study was carried out on 90 adult patients. Patients were randomly divided into three groups of 30 each using computer generated random numbers. Group "R"- Plain Ropivacaine plus normal saline; Group "RC" - Ropivacaine plus clonidine group; Group "RF" - Ropivacaine plus fentanyl group.

3.1 INCLUSION CRITERIA

Ninety patients of ASA Grade I and II in the age group of 18 years to 55 years, of either sex, posted for elective lower abdominal and lower limb surgeries.

1.2 EXCLUSION CRITERIA

Patients belonging to ASA Grade III and IV, physically dependant on narcotics, history of drug allergy, gross spinal abnormality, localized skin sepsis, hemorrhagic diathesis, neurological involvement / diseases, Head injury cases, Patients with hypertension, diabetic mellitus, cardiac, pulmonary, hepatic or renal disorders, Patients with peripheral neuropathy and psychiatric diseases were excluded from the study.

3.3 Pre- anaesthetic evaluation and Premedication:

Patients were visited on the previous day of the surgery, a detailed clinical examination was undertaken. Basic laboratory investigations like complete haemogram, bleeding time, clotting time, blood sugar, blood urea, serum creatinine and urine analysis were carried out routinely on all patients. ECG was done in patients more than 40 years of age and chest x-ray when indicated. The patients were explained about the epidural technique with catheter in situ, its advantages and disadvantages. A written informed consent was taken from each patient. Premedicated with tab. Alprazolam 0.5mg orally along with tab. Ranitidine 150mg orally. Patients were kept nil orally for 8 hrs before surgery. On the day of surgery in the pre operative room, an intravenous line was secured and the patients were preloaded with 15 ml kg-1 Ringer's lactate, 30 minutes prior to epidural anaesthesia. On the OT table, patient's basal vitals were recorded.

3.4 Anaesthetic technique:

The subjects were given epidural block in sitting position in L2-3 or L3-4 space with 18 gauge Touhy needle and epidural space localized and confirmed by loss of resistance technique. Epidural catheter was secured 3-5 cm into the epidural space. 3ml of 2% lignocaine with adrenaline 1:2,00,000 was injected through the catheter as a test dose. After confirming correct placement of the catheter, epidural anaesthesia was activated with 19ml of 0.75% ropivacaine with 1ml of normal saline in Group "R". Group "RF" patients were administered 19ml of 0.75% ropivacaine with 50micro gram of fentanyl while group "RC" received 19ml of 0.75% ropivacaine with 50 micro grams of clonidine. Surgical procedure was initiated after establishment of adequate surgical anaesthetic effect with level of upto T6-T7 dermatome. The bilateral pin prick method was used to evaluate and check the sensory level while the modified bromage scale (Grade 0 - Full flexion of knees and feet. Grade 1 - Just able to flex knees, full flexion of feet. Grade 2 - Unable to flex knees, but some flexion of feet possible. Grade 3 - Unable to move legs or feet.) was used to measure motor blockade.

3.5 The following block characteristics were observed and recorded:

1. Onset of analgesia(sensory block): is defined as the time interval between administration of local anaesthetic epidurally to the loss of pinprick sensation at the site of surgical incision.
2. Maximum level of sensory blockade: is the maximum sensory dermatome level after 30 minutes of administering the local anaesthetic in the epidural space. The local anaesthetics usually get fixed to their respective receptors by 20 minutes and regression of 2 dermatome usually occurs after 30 minutes.

3. Time to attain maximum sensory level: is defined as the time in minutes at which maximum sensory level was attained after administering the drug epidurally.
4. Time to complete motor blockade: is defined as time interval between administering of drug epidurally to complete loss of motor activity(modified bromage scale score of 0-3).
5. Time for two segment regression: is defined as interval between onset of analgesia epidurally to regression of two segments from maximum sensory level attained.
6.Duration of motor block: Duration of motor block was recorded from onset time to time when the patient was able to lift the extended leg.
7. Duration of analgesia: The duration of analgesia was taken from the time of epidural drug administration to the time of first supplementation with rescue analgesic.

Standard monitoring was carried out in the form of pulse oximetry, ECG and non invasive arterial blood pressure. Pulse rate, respiratory rate, arterial blood pressure and oxygen saturation were recorded every 3mins for first 20 mins, every 5 mins for next 40 min and then every 15 mins intra operatively. A note was made of blood loss, urine output, IV fluid input. Patients were observed for hypotension (defined as >20% decrease in SBP from baseline and were treated with IV fluids and IV mephenteramine 3-6 mg in incremental boluses), bradycardia(pulse <50 beats/min were treated with IV atropine sulphate 0.6mg bolus doses) and other adverse effects such as anxiety, nausea, vomiting, pruritus,urinary retention, shivering, etc., recorded and the need for additional medications also be attended.

3.6 Sedation assessed by four point score described by Cherniket al [4].

(Grade 0 – patient wide awake.Grade 1 – patient is sleeping comfortably, but responding to verbal commands. Grade 2 – deep sleep but arousable. Grade 3 – deep sleep, unarousable)

The onset of pain was managed with top up doses of 8ml of 0.75% ropivacaine plus 1ml of normal saline in 'R' group, 8 ml 0.75% ropivacaine plus 50 micrograms of fentanyl in 'RF' group and 8 ml 0.75% ropivacaine plus 50 micrograms of clonidine in 'RC' group. At the end of the surgery, the vitals were recorded and sedation assessed.

3.7 Statistical Methods:

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance. Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Leven's test for homogeneity of variance has been performed to assess the homogeneity of variance. Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

Statistical software: The Statistical software namely SAS 9.2, SPSS 15.0, State 10.1, Medical 9.0.1 ,System 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

IV. Results

The three groups were comparable with regard to demographic data as shown in table1. There was no statistically significant variation between the three groups with respect to age, gender, height, weight, ASA grading(p>0.05).

Table 1:Demographic data:

Demographic Variables	Group R	Group RF	Group RC	P Value
Age	40.70±10.07	40.43±9.93	36.17±10.15	0.153.
Height	169.43±5.05	167.73±5.11	170.10±3.83	0.139
Weight	59.57±6.68	57.47±5.99	59.70±5.93	0.300
ASA (I/II)	28/2	26/4	28/2	0.578
Gender(M/F)	15/15	11/19	19/11	0.118

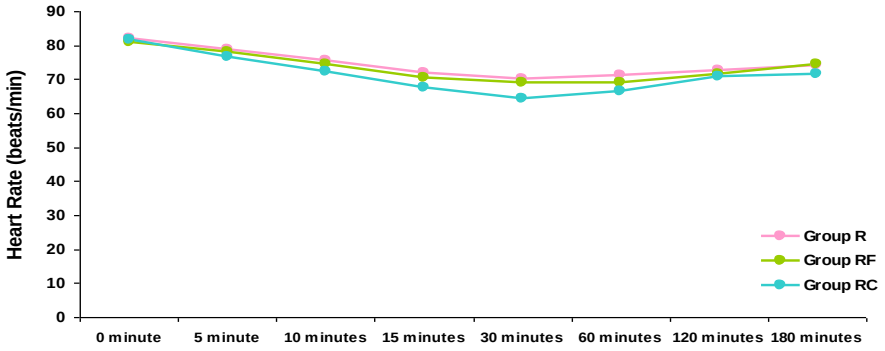
Onset of anaesthesia was faster in group RF and Group RC when compared to Group R($p<0.001$), with no statistically significant variation in between Group RF and Group RC($p=0.197$) as shown in table 2.

Time to attain maximum sensory level of T6-T7 was faster in Group RF when compared to Group R($p<0.001$) and Group RC($p<0.027$) which are statistically significant. However once the sensory level to T6-T7 was established, there was no noticeable difference in sensory anaesthesia in any of the three groups throughout the surgical procedure. Establishment of complete motor blockade was faster in Group RF when compared to Group R($p<0.001$) and Group RC($p<0.001$) which are statistically significant.

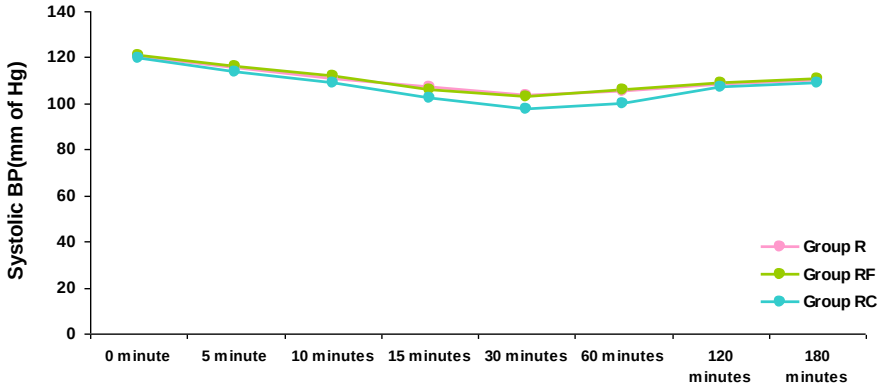
Table 2: Comparison of block characteristics

Variables	Group R	Group RF	Group RC	Significance		
				R-RF	R-RC	RF-RC
Onset of Analgesia T10 (min)	11.47±2.18	7.17±1.82	8.03±1.77	<0.001**	<0.001**	0.197
Time to attain maximum sensory level(min)	15.80±1.88	12.40±1.98	13.80±2.31	<0.001**	0.001**	0.027*
Complete motor block(min)	21.57±2.14	15.67±2.12	17.97±2.04	<0.001**	<0.001**	<0.001**

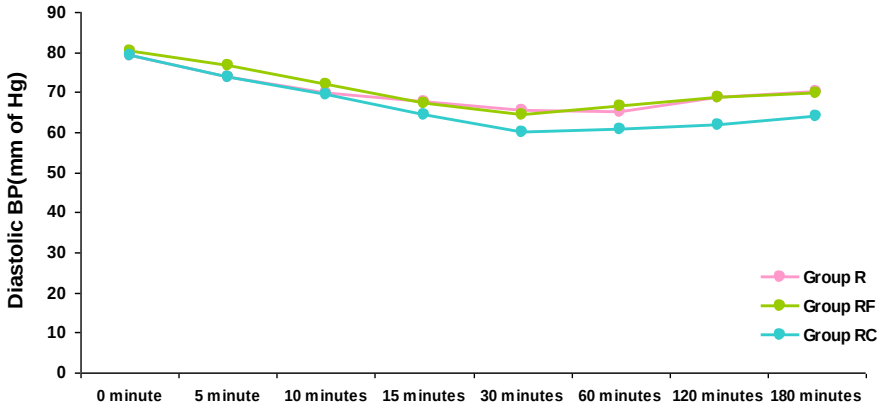
Hemodynamic Variables: Graph 1: Comparison of Heart rate (beats/min) of three groups of patients



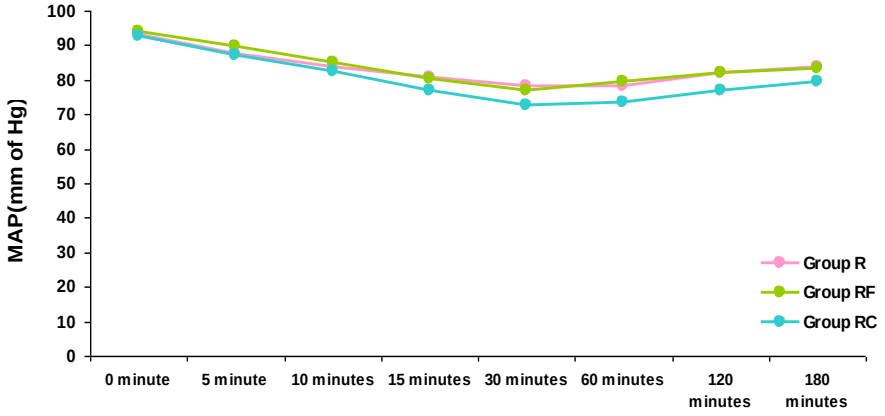
Graph 2: Comparison of Systolic BP (mm of Hg) of three groups of patients



Graph 3:Comparison of Diastolic BP (mm of Hg) of three groups of patients



Graph 4: Comparison of MAP (mm of Hg) of three groups of patients



Hemodynamic Variables:

The fall in heart rate was statistically significant in Group RC when compared to Group R between 10 min and 60 min(p being significant) and to group RF at 15 min and 30 min(p value being Significant). It was observed that there was bradycardia(PR<50) in 5 patients in Group RC, which required a single dose of Inj. Atropine 0.6mg IV, and further no doses of atropine were required. None of the patients in Group R or Group RF had bradycardia. The systolic blood pressure showed statistically significant difference($p<0.001$) in between Group R and Group RC and also between Group RC and RF(p being significant).With hypotension commoner in Group Rc. This is due to hypotensive action of clonidine. The incidence of diastolic hypotension was more in Group RC when compared to Group R($p<0.001$) from 15 min to 180 min and also Group RF(p being significant) from 15 min to 180 min as shown.

With similar statistically significant difference in mean arterial blood pressure in between Group R and Group RC and also between Group RC and Group RF from 15 min to 180 min. The hypotension was treated with incremental doses of mephenteramine 3mg bolus doses, but the total dose did not cross 18mg in any of the groups. The least requirement was in Group R followed by Group RF and lastly Group RC.

Table 3: Comparison of study variables of three groups of patients

Variable	Group R	Group RF	Group RC	Significance		
				R-RF	R-RC	RF-RC
2 segment regression (min)	88.40±8.74	116.83±12.64	95.60±5.23	<0.001**	0.010*	<0.001**
Duration of analgesia (min)	299.10±22.35	338.07±7.71	446.57±12.35	<0.001**	<0.001**	<0.001**
Complete recovery of Motor Block (Min)	229.30±13.79	261.20±10.33	240.00±10.48	<0.001**	0.002**	<0.001**

Two segment regression was prolonged in Group RF when compared to other two groups with statistically significant difference. However the duration of analgesia was significantly longer in Group RC when compared to Group R($p<0.001$), also there was significantly longer duration in Group RF when compared to Group R($p<0.001$), and also significant difference was observed between Group RC and Group RF($p<0.001$). Thus denoting that addition of additives like fentanyl and clonidine prolongs the duration of analgesia which is more in clonidine group. Time to complete motor recovery was significantly longer in Group RF when compared to Group R($P<0.001$) and Group RC($p<0.001$), while mild significance was observed between Group RC and Group R($P=0.002$). However from this it is observed that addition of fentanyl intensifies the motor blockade, while clonidine has no much influence on duration of motor blockade.

Table 4: Sedation score

Sedation score	Group R		Group RF		Group RC	
	No	%	No	%	No	%
0	26	86.7	26	86.7	0	0.0
1	4	13.3	4	13.3	14	46.7
2	0	0.0	0	0.0	16	53.3
Total	30	100.0	30	100.0	30	100.0
Inference	Incidence of sedation (score >0) is more associated with Group RC with P<0.001**					

P = <0.001**

From Table 4 it is clear that sedation was more in Group RC in comparison to other two groups.

The incidences of side effects in various groups were studied. Bradycardia was observed in 16.7% of patients in Group RC whereas none of the patients in Group R and Group RF had bradycardia. The incidence of dry mouth was 13.33 % in Group RC which is again statistically significant. Nausea, vomiting and pruritis and urinary retention was observed in Group RF which were statistically significant.

V. Discussion

Ropivacaine, the new local amide anaesthetic agent is popular in the conduct of epidural anaesthesia. There are numerous studies recently on the use of epidural ropivacaine for lower abdominal surgeries. However the addition of adjuvants to epidural ropivacaine are studied to less extent. Though ropivacaine is slightly less potent when compared to bupivacaine, its pharmacological profile is almost comparable to the latter. Various studies and literary evidence have concluded that cardiotoxicity of ropivacaine is far less than that of bupivacaine.

Alpha adrenergic agonists produce pain relief through an opioid independent mechanism and may be alternatives to opioid for combination with local anaesthetics for analgesia during surgery. Based on the pharmacokinetic properties like molecular weight, lipid solubility and cerebrospinal fluid level, clonidine can be expected to exert similar onset of analgesia and duration of analgesia as compared to fentanyl.

Clonidine augments the action of local anaesthetics in regional blockade by interrupting the neural transmission of painful stimuli in Aδ and C fibres as well as augments the blockade of local anaesthetic agents by increasing the conductance of K+ ions in nerve fibres. It also exerts vasoconstricting effect on smooth muscles, which results in a decreased absorption of the local anaesthetic agent and eventually prolongs the duration of analgesia [1,2,3].

Keeping all these pharmacological interactions in mind we have used clonidine as an adjuvant not just covering the operative period, but also for post operative period as well. We did not include patients more than 55ys as it was shown in a study conducted by Mischa J. G. Simon and colleagues in their study on the effects of Age on neural blockade and hemodynamic changes after epidural anaesthesia with ropivacaine studied the influence of age on the neural blockade and hemodynamic changes after the epidural administration of ropivacaine 1.0% and concluded that age influences the clinical profile of ropivacaine 1.0%. The hemodynamic effects in older patients were caused by the high thoracic spread of analgesia, although a diminished hemodynamic homeostasis may contribute[5].

Onset of analgesia (T10): In our study the mean onset of analgesia in Group R was 11.47±2.18, in Group RF was 7.17±1.82 and in Group RC was 8.03±1.77. This shows that onset of anaesthesia was faster in group RF and Group RC when compared to Group R($p<0.001$), with no statistically significant variation in between Group RF and Group RC($p=0.197$). Cherng CH, Yang CP, Wong CS6, 2005 examined the onset times of sensory and motor block during epidural ropivacaine anesthesia with and without the addition of fentanyl to the epidural solution. The onset time of sensory block to the T10 dermatome was significantly more rapid in the Epidural Fentanyl group (13.0 +/- 3.0 min) than in the IV Fentanyl group (16.2 +/-3.5 min, $P <0.05$) or Control group (17.7 +/-3.6 min, $P <0.05$), it was concluded that epidural administration of the mixture of 100mcg fentanyl and1% ropivacaine solution accelerated the onset of sensory block during epidural ropivacaine anesthesia without significant fentanyl-related side effects.

Bajwa et al used epidural ropivacaine and clonidine for LSCS[7]. They found that onset of analgesia was shorter in RC group along with prolonged duration of analgesia when compared to R group with mean onset in R group was at 11.36+/-3.30 and in RC group was 8.64+/- 2.56.This is in comparison with studies conducted by Bajwa et al8, 2010 clonidine and fentanyl in epidural anaesthesia with mean onset in RF group was at 7.74+/-2.98 and in RC group was 8.24+/- 3.56.

This shows that addition of fentanyl or clonidine fastens the onset of action. Time to attain maximum sensory level (min).In our study the mean time to attain T6-T7 was 15.80±1.88 in Group R, 12.40±1.98 in Group RF and 13.80±2.31 in Group RC. This shows that time to attain maximum sensory level of T6-T7 was faster in Group RF when compared to Group R($p<0.001$) and Group RC($p<0.027$). However once the sensory level to T6-T7 was established, there was no noticeable difference in sensory anaesthesia in any of the three groups throughout the surgical procedure.

Similar results were obtained in studies Bajwa et al , clonidine and fentanyl in epidural anaesthesia with mean time to onset being 13.28±3.22 in RC group and 12.16±3.94 in RF group[8].

In a study conducted by Cherng CH, Yang CP, Wong CS examined the onset times of sensory and motor block during epidural ropivacaine anesthesia with and without the addition of fentanyl to the epidural solution [6].The onset times of motor block up to Bromage scale 1 and 2 were significantly more rapid in the EF group (11.9+/-4.6 and 24.4+/-5.9 min) than in the IF group (16.9_4.7 and 30.8_5.6 min, $P<0.05$) or C group (18.3+/-4.9 and 32.7+/-5.7 min, $P<0.05$) and concluded that epidural administration of the mixture of 100mcg

fentanyl and1% ropivacaine solution accelerated the onset of motor block during epidural ropivacaine anesthesia without significant fentanyl-related side effects. Bajwa et al, 2010, epidural ropivacaine and clonidine for LSCS. Similar results were shown, mean being 15.12±4.36 in R group and 12.26±3.18 in RC group.

Time to complete motor blockade: In our study mean time to complete motor blockade in Group R was 21.57±2.14. In group RF was 15.67±2.12 and in Group RC was 17.97±2.04. It was found that establishment of complete motor blockade was faster in Group RF when compared to Group R($p<0.001$) and Group RC($p<0.001$).

Our study can be correlated with other two studies, Bajwa et al, where mean duration to complete motor block was 21.70±4.20 in R group and 17.34±4.48 in RC group, where ropivacaine and clonidine was studied for epidural in LSCS. This shows that addition of clonidine hastens the maximum motor block. In a similar study by Bajwa et al, 2010, clonidine and fentanyl in epidural anaesthesia, mean time to complete block was 20.58±4.96 in RC group and 16.92±3.84 in RF group, thus indicating faster onset in fentanyl group in comparision to clonidine group.

Heart Rate: In our study the fall in heart rate was statistically significant in Group RC when compared to Group R between 10 min and 60 min(p being significant) and to group RF at 15 min and 30 min(p value being Significant).It was observed that there was bradycardia(PR<50) in 5 patients in Group RC, which required a single dose of Inj Atropine 0.6mg IV, and further no doses of atropine were required. None of the patients in Group R or Group RF had bradycardia.

Systolic blood pressure:In our study the systolic blood pressure showed statistically significant difference($p<0.001$) in between Group R and Group RC and also between Group RC and RF(p being significant). With hypotension commoner in Group RC. This is due to hypotensive action of clonidine in group RC.

Diastolic blood pressure:In our study incidence of diastolic hypotension was more in Group RC when compared to Group R($p<0.001$) from 15 min to 180 min and also Group RF(p being significant) from 15 min to 180 min.

Mean blood pressure:In our study statistically significant difference in mean arterial blood pressure between Group R and Group RC was observed and also between Group RC and Group RF from 15 min to 180 min. The hypotension was treated with incremental doses of mephenteramine 3mg bolus doses, but the total dose did not cross 18mg. The least requirement was in Group R followed by Group RF and lastly Group RC.

SpO2:In our study similarly pulse oximetry trends did not show any significant variation in patient saturation in patients of all the three groups.

In an another study conducted by Bajwa et al, epidural ropivacaine and clonidine in LSCS, it was observed that there was statistically significant difference in heart rate in both groups from 20 min to 120min($p<0.05$). It was also found that there was statistically significant difference in systolic, diastolic and mean arterial blood pressures from 15 min to 120 min with more diastolic hypotension requiring mephenteramine 3mg boluses. But the hemodynamic stability was maintained in both groups. This was attributed to clonidine usage at 75micrograms [7].

It was also seen in a study conducted by Topcu I et al comparision of efficiency of ropivacaine and addition of fentanyl or clonidine in PCEA in labour where mean arterial blood pressure was monitored in patients and it was significantly low in clonidine group(0.75 microgram/ml of local anaesthetic) when compared to other two groups($p<0.05$). Concluded that strict monitoring of pregnant women for hypotension when clonidine is used [9].

Another study by Bajwa et al, clonidine and fentanyl in epidural anaesthesia, there was no significant variation in hemodynamic variables in between the groups. And mephenteramine boluses required were 3mg at each time not more than 18mg in total in any of the groups. Clonidine used was 75microgram with fentanyl 75 micrograms with 0.75%ropivacaine 20ml [8].

In our study mean time to two segment regression(in min) was 88.40±8.74 in Group R, 116.83±12.64 in Group RF and 95.60±5.23 in Group RC. This shows that two segment regression was prolonged in Group RF when compared to other two groups with statistically significant difference. Lytle SA et al did a retrospective analysis with fentanyl (50µg) and showed that epidural fentanyl provides good to excellent pain relief [10].

However in our study mean Duration of analgesia (in min) was299.10±22.35 in Group R, 338.07±7.71 in Group RF and 446.57±12.35in Group RC. This shows that duration of analgesia was significantly longer in Group RC when compared to Group R($p<0.001$), also there was significantly longer duration in Group RF when compared to Group R($p<0.001$), and also significant difference was observed between Group RC and Group RF($p<0.001$). Thus denoting that addition of additives like fentanyl and clonidine prolongs the duration of analgesia which is more in clonidine group.

In our study mean time to complete motor recovery (in min) was 229.30±13.79 in Group R, 261.20±10.33 in Group RF and 240.0±10.48 in Group RC. This shows that time to complete motor recovery was significantly longer in Group RF when compared to Group R($P<0.001$) and Group RC($p<0.001$). While

mild significance was observed between Group RC and Group R(P=0.002). However from this it is observed that addition of fentanyl intensifies the motor blockade, while clonidine has no much influence on duration of motor blockade.

Our results are in correlation with studies conducted by Bajwa et al , Landau R et , Forster JG, Topcu I et al where it is seen that addition of clonidine increases the duration of analgesia, has dose sparing effect when added to ropivacaine [10,11,12].

Sedation:Sedation score of 1 was observed in 13.3% patients in Group R, whereas similarly 13.3% patients in Group RF also showed score of 1. In Group RC 46.7% patients showed a score of 1 and 53.3% patients showed score of 2. It is clear that sedation was more in Group RC in comparison to other two groups.

Sedation represents an α2 adrenergic effect, because sedation from epidural clonidine can be reversed by the specific antagonist yohimbine in postoperative patients .The sedative-hypnotic effect of α2-adrenergic agonists is caused by actions on the locus caeruleus . Our results are in agreement with studies by Filos and his colleagues, in which dose-dependent sedation was observed[13]

Side effects:In our study Bradycardia was observed in 16.7% of patients in Group RC whereas none of the patients in Group R and Group RF had bradycardia. The incidence of dry mouth was 13.33 % in Group RC which is again statistically significant. Nausea, vomiting and pruritis and urinary retention was observed in Group RF which were statistically significant. None of the patients in any group had respiratory depression.

In a study conducted by Bajwa et al, fentanyl and clonidine in epidural anaesthesia, side effect profile showed that in RF group 40% patients had experienced nausea, vomiting in comparision to RC group in which 15% had nausea and vomiting. Similarly sedation was observed in 30% patients in RF group compared to 10% in clonidine group. Incidence of dry mouth was only found in RC group. Incidence of other side effects were similar in all groups. In a study by Lytle SA et al., using fentanyl 50µg reported that 4% of patients had pruritis.

VI. Conclusion

The present study concludes that, Onset of anaesthesia was faster when additives like fentanyl and clonidine are added to ropivacaine;Time to attain maximum sensory level of T6-T7 and maximum motor blockade was faster with fentanyl ; Two segment regression, recovery of motor blockade were prolonged with fentanyl and duration of analgesia was prolonged with clonidine delaying the need for rescue analgesia; Mild sedation was associated with clonidine .

References

[1] Maze M, Tranquilli W. Alpha 2 adrenoceptor agonists- defining the role in clinical anaesthesia. Anesthesiology 1991;74:581-605.
[2] Kuthiala G, Chaudhary G. Ropivacaine: A review of its pharmacology and clinical use. Indian J Anaesth 2011;55(2):104-110
[3] Agarwal A, Verma RK, Srivastava S. Ropivacaine- the latest local anaesthetic in Indian market. J AnaesthClinPharmacol 2010;26(2):223-228.
[4] Loeser JD, Butler SH, Chapman SR, Turk DC. Bonica's Management Of Pain, 3rd edition, Lippincott Williams and Wilkins 2001; 310-326.
[5] Simon MJG, Veering BT, Stienstra R, Jack W, Kleef V, Burm AGL. The effects of age on neural blockade and hemodynamic changes after epidural anesthesia with ropivacaine. J ClinAnesth 2000;18(2):137-42.
[6] Cherng CH, Yang CP, Wong CS. Epidural fentanyl speeds the onset of sensory and motor blocks during epidural ropivacaine anesthesia. AnesthAnalg 2005;101:1834-7.
[7] Bajwa SJ, Bajwa SK, Kaur J.Comparison of epidural ropivacaine and ropivacaine- clonidine combination for elective cesarean sections**.** Saudi J Anaesth 2010;4:47-54
[8] Bajwa SJ, Bajwa SK, Kaur J, Singh A, Bakshi G, Singh K, Panda A. Admixture of clonidine and fentanyl to ropivacaine in epidural anesthesia for lower abdominal surgery. Anesth Essays Res 2010;4:9-14.
[9] Topcu I, Erincler T, tekin S, Karear O, Isik, Sakarya M. The comparision of ropivacaine and addition of fentanyl or clonidine in patient controlled epidural analgesia for labour. The Internet Journal of Anesthesiology 2007;11(2)
[10] Lytle SA, Goldsmith DM, Neuendorf TL, Lowry ME. Postoperative analgesia with epidural fentanyl. J Am Osteopath Assoc 1991;91(6):547-50.
[11] Landau R, Schiffer E, Morales M, Savoldelli G, Kern C. The dose-sparing effect of clonidine added to ropivacaine for labour epidural analgesia. AnesthAnalg 2002;95:729-34.
[12] Forster JG, Rosenberg PH. Small dose of clonidine mixed with low-dose ropivacaine and fentanyl for epidural analgesia after total knee arthroplasty. Br J Anaesth 2004;93:670-7
[13] Filos KS, Goudas LC, Patroni O, Polyzou V. Intrathecal clonidine as a sole analgesic for pain relief after caesarean section. Anesthesiology 1992;77:267-74.