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Original Research Paper

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COMPARATIVE STUDY OF EFFECT OF ISOBARIC 0.75%ROPIVACAINE WITH DEXMEDETOMIDINE AND ISOBARIC 0.75% ROPIVACAINE WITH CLONIDINE AS AN ADJUVANT IN SPINAL ANAESTHESIA IN LOWER LIMB AND LOWER ABDOMINAL SURGERIES.

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ABSTRACT

Background: Pain management is the key aspect of intra & postoperative care because acute pain has many other consequences,such as respiratory depression,adverse circulatory and metabolic stress responses,leading to increased morbidity and mortality.1Spinal anaesthesia is a popular method for lower abdominal and lower limb surgery,but its disadvantage is the shorter duration of anaesthesia.2 So,present study was aimed to evaluate and compare efficacy between intrathecal administration of Inj.Clonidine 30μgm and Inj.Dexmedetomidine 5μgm as adjuvant with Inj. Ropivacaine Isobaric 0.75% for lower limb and lower abdominal surgeries under spinal anaesthesia. **Material and Methods:** This was a comparative study,conducted in 70 patients of age 18-70 years,either gender,ASA Grade I/II,scheduled for lower limb and lower abdominal surgeries under spinal anaesthesia.Patients were randomised in group C (n=35) who received Inj. Ropivacaine Isobaric 0.75% 3 ml + Inj.Clonidine 30μgm intrathecally & group D(n=35) who received Inj. Ropivacaine Isobaric 0.75% 3 ml + Inj.Dexmedetomidine 5μgm intrathecally. **Results:** Mean onset of sensory block of the patients from Group C and Group D was 11.71 ± 1.13 min and 11.20 ± 0.90minutes.Mean onset of motor block of the patients from Group C and Group D was 11.78±1.49 and 11.81 ± 1.33 minutes.Total duration of analgesia in Group C and Group D was 372.00 ± 3.73 min and 412.26 ± 5.23min respectively,these differences were statistically significant.We observed that there was no statistically significant difference between two groups in terms of mean age,pulse rate,systolic blood pressure,diastolic blood pressure,SpO2,VAS score (P>0.05),at different time intervals. **Conclusion:** Dexmedetomidine as an adjuvant to ropivacaine spinal anesthesia provided excellent quality of postoperative analgesia with minimal side effects in prolonged surgeries compared to clonidine.

KEYWORDS : Ropivacaine, Dexmedetomidine, Clonidine, Spinal anaesthesia

INTRODUCTION

Pain is an inhospitable sensory and sensitive practice associated with actual or potential tissue damage.[1] Bupivacaine is a widely used amide local anaesthetic.Its long duration of action and tendency to provide more sensory than motor block has made it a popular drug for providing prolonged analgesia. However,the main disadvantage of bupivacaine is its cardiotoxic effects.[3] Ropivacaine is a long-acting amide local anaesthetic structurally related to bupivacaine.Ropivacaine has consistently demonstrated a higher safety profile than bupivacaine,with reduced central nervous system (CNS)-toxic and cardiotoxic potential.[2,3]The concept of using adjuvants with local anesthetics has progressed through the practice of administering α2 agonists such as clonidine; and a more selective α2 agonist, dexmedetomidine. α2 agonists do not have side effects such as nausea,vomiting,urinary retention or respiratory depression,which are all commonly associated with opioids.[4,5] Clonidine,a partial agonist of the α2 adrenoreceptor,acts as an analgesic,sedative and as a sympatholytic with potent antinociceptive properties. Dexmedetomidine is the d-enantiomer of medetomidine,a substance that provides sedation, anxiolysis, hypnosis, analgesia and sympatholysis. It has analgesic effect if it is injected intrathecally.It shows a high ratio of specificity for the α2 receptor (α2/α1 1600:1) compared with clonidine (α2/α1 200:1), making it a complete α2 agonist.[6,7,8]

MATERIAL AND METHODS

Present study was single-center,comparative study,conducted in department of XXX,at XXX medical college & hospital, XXX,India.Study duration was of 2 years(January 2021 to December 2022).Study approval was obtained from institutional ethical committee.

Inclusion Criteria-

Patients of age 18-70 years,either gender,ASA Grade I/II,scheduled for Lower limb and lower abdominal surgeries under spinal anaesthesia,willing to participate in present study.

Exclusion Criteria-

Age < 18 & >70 years,ASA Grade III and IV,Patients with bleeding disorders,spinal deformity,Drug allergy,patient refusal.

Details were explained to patients in local language & written consent was taken.70 patients aged 18-70 years of either sex,height,weight,ASA grade I and II scheduled for elective Lower limb and lower abdominal surgeries under spinal anesthesia were enrolled in this study.All the patients were subjected to detailed pre-anaesthetic evaluation with clinical history,General and Systemic examination of RS, CVS, CNS. Routine investigations like Haemogram,Random Blood Sugar, Renal Profile,X ray chest and ECG were done.Nil per oral status was confirmed.The procedure of spinal anaesthesia was explained.Peripheral venous access was secured on hand with 20G cannula and pre-loading with Inj.Ringer Lactate 10-15 ml/kg was initiated.All patients were premedicated with Inj.Glycopyrrolate 0.2mg,ondensetron 4mg IV.in operation theatre.Patient were randomised in group C(n=35) who received Inj.Ropivacaine Isobaric 0.75% 3ml+ Inj.Clonidine 30μgm intrathecally &group D(n=35) who received Inj.Ropivacaine Isobaric 0.75% 3 ml+Inj. Dexmedetomidine 5μgm intrathecally.

GROUP C=received Inj.Ropivacaine Isobaric 0.75% 3 ml+Inj.Clonidine 30μgm intrathecally

GROUP D=received Inj.Ropivacaine Isobaric 0.75% 3ml+Inj.Dexmedetomidine 5μgm intrathecally.

Under strict aseptic precautions,subarachnoid block was performed.Various parameters such as Onset of sensory and motor block , hemodynamic changes after giving block & time required to perform spinal/epidural anaesthesia.After

performing the spinal anaesthesia,quantitative relief of pain using VAS scale was assessed after giving drug at interval of 2 min, 5 min, 10 min and during positioning.

Data was collected and compiled by Microsoft Excel,analysed by SPSS 23.0version.Frequency,percentage,means and standard deviations(SD)was calculated for the continuous variables,while ratios and proportions were calculated for the categorical variables.Difference of proportions between qualitative variables were tested using chi- square test or Fisher exact test as applicable.P value less than 0.05 was considered as statistically significant.

RESULTS

35 patients in each group i.e. Group C (Ropivacaine+ Clonidine) and Group D (Ropivacaine+Dexmedetomidine) were studied.The results are as follows:

- Mean onset of sensory block of the patients from Group C and Group D was 4.49 ± 0.51 and 4.95 ± 1.10 minutes.Mean onset of motor block of the patients from Group C and Group D was 11.78 ± 1.49 and 11.20 ± 0.90 minutes,differences were statistically significant.

Table 1 – Inter-group comparison of mean onset of sensory & motor block.

	Group C (n=35)	Group D (n=35)	p value
Onset of sensory block in minutes	4.49 ± 0.51	4.95 ± 1.10	0.034
Onset of motor block in minutes	11.78 ± 1.49	11.20 ± 0.90	0.039

Mean duration of sensory block in Group D and Group C was 349.43 ± 7.77 min and 287.51 ± 6.39 min respectively.The mean duration of motor block in Group D and Group C was 293.40 ± 7.78 min and 264.37 ± 5.59 min respectively.

Table 2 – Inter-group comparison of mean duration of sensory & motor block.

	Group D (n=35)		Group C (n=35)		P-value
Duration (min)	Mean	SD	Mean	SD	
Sensory block	349.43	7.77	287.51	6.39	0.001*
Motor block	293.40	7.78	264.37	5.59	0.001*
P-value<0.05 is considered to be statistically significant.*P-value<0.001.					

The mean ± SD of total duration of analgesia in Group D and Group C was 412.26 ± 5.23 min and 372.00 ± 3.73 min respectively.Mean total duration of analgesia is significantly higher in Group D compared to Group C (P-value<0.05). Duration of analgesia was considered from time of SAB till VAS > 3.Rescue analgesia was given when VAS > 3.

Table 3 :Inter-group comparison of mean total duration of analgesia.

Duration of analgesia (min)	Group D (n=35)		Group C (n=35)		P-value
	Mean	SD	Mean	SD	
Duration of analgesia (min)	412.26	5.23	372.00	3.73	0.001***
Values are mean and SD, P-value by independent sample t test. P-value<0.05 is considered to be statistically significant.***P-value<0.001.					

We observed that there was no statistically significant difference between two groups in terms of pulse rate,mean systolic and diastolic blood pressure,SPO2.(P>0.05)

DISCUSSION

Dexmedetomidine hydrochloride, a newer agent having class of alpha-2 receptor agonist,has an ability to eliminate or reduce the need for other analgesic medications.Because of its selective alpha2 receptor activity[9].The present study was done to investigate if intrathecal Dexmedetomidine is better than intrathecal Clonidine as an adjuvant with intrathecal isobaric 0.75%Ropivacaine in terms of safety and efficacy in patients undergoing lower limb and lower abdominal surgeries.

Clonidine,an α-2 adrenergic agonist potentiates the effect of local anaesthetics and helps to decrease in the required doses with effective prolongation of both motor and sensory spinal blockade.[10,11]

In our study,Patients aged between 18 to 70 years were randomized in both the groups and the mean onset time of sensory blockade in group D was 4.49±0.51 minutes compared to 4.86±0.88 minutes in Group C.Mean onset time of motor blockade in group D was 11.20 ± 0.90 minutes compared to 11.71 ± 1.13 minutes in Group C.Our results were in agreement with majority of the authors showed that the mean onset of sensory analgesia in group C was 6.1 min and in Group D 3.68 min, the difference being statistically significant (P-value<0.05).

Results of studies of **Swati Srivastava et al.[12],Rajni Gupta et al.[13],Yaksh et al.[14]** were comparable with our study.

CONCLUSION

Dexmedetomidine as an adjuvant to ropivacaine in spinal anesthesia,shortend the time of onset and prolonged the duration of sensory and motor blockade and provided excellent quality of postoperative analgesia with minimal side effects in prolonged surgeries compared to clonidine.

Conflict of Interest: None to declare

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