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COMPARING THE EFFICACY OF DEXMEDETOMIDINE AND CLONIDINE WITH 0.75% ROPIVACAINE BY EPIDURAL ROUTE IN PATIENTS UNDERGOING LOWER ABDOMINAL SURGERIES

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ABSTRACT **BACKGROUND-** A clinical study was undertaken in 50 patients belonging to ASA 1 and 2 scheduled for lower abdominal surgeries to evaluate the efficacy of dexmedetomidine with 0.75%ropivacaine compared to clonidine with 0.75% ropivacaine by epidural route to compare sensory and motor block in view of onset, analgesia , duration and hemodynamic changes.
METHODOLOGY- They are randomly allocated into 2 groups RD and RC,25 members each to compare effectiveness of 0.75%ropivacaine with clonidine and dexmeditomidine. In Group RC 25 patients received epidural 0.75% Ropivacaine 20 ml with clonidine(2µg/kg). In Group RD, 25 patients received epidural 0.75% ropivacaine 20ml with dexmeditomidine(1.5µg/kg).
RESULT: The onset of sensory blockade was faster in Group RD than compared to Group RC. Duration of sensory block and analgesia was significantly prolonged in Group RD. Haemodynamic parameters were comparatively more stable in Group RD.
CONCLUSION: Dexmeditomidine 1.5µg/kg with 0.75% ropivacaine when given intrathecally hastened sensory onset and improved the quality of analgesia in the early postoperative period.

KEYWORDS : Epidural anesthesia, local anesthetics, α-2 adrenergic agonist

INTRODUCTION

The International Association for the Study of Pain "IASP" defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage".

Regional anesthesia is currently the most effective method of reducing the stress response especially in surgical procedures involving the lower part of the body. In view of the wider application of regional anesthetic procedure, there is a need for local anesthetic with desirable properties like longer duration of sensory blockade and lesser duration of motor paralysis.

Adjuvants are pharmacological drugs , when co-administered with local anaesthetics, may improve the speed of onset, the quality and/ or duration of analgesia with desirable sedation Ropivacaine, a long-acting amide local anesthetic, produces less cardiac as well as central nervous system toxic effects and lesser motor block.

Clonidine, α-2 adrenergic agonist, acts on inhibitory α-2 adrenergic receptors to reduce central neural transmission in the spinal neurons.The coadministration of clonidine and local anesthetic produces better analgesia than either drug alone.

Dexmedetomidine a second generation α 2 adrenergic receptor agonist, induces sedation resembling physiological sleep maintaining arousability without causing respiratory depression. It produces analgesia by central, spinal and peripheral mechanisms.

AIM AND OBJECTIVES

"To evaluate the efficacy of Dexmedetomidine (1.5µg/kg) with 0.75% Ropivacaine by Epidural route compared to Clonidine (2µg/kg) with 0.75% Ropivacaine by epidural route in patients undergoing Lower abdominal surgeries"

MATERIALS AND METHODS

The study was undertaken in Alluri Sitarama Raju Academy of Medical Sciences during 2017 to 2019 after obtaining ethical committee clearance as well as informed consent from all patients.

In this study 50 patients undergoing elective lower abdominal surgeries, aged between 18-45 years of either gender , belonging to ASA grade I and II were randomly divided into two groups of 25 each.
Group RC (Clonidine group):comprises of patients in whom, a total volume of 20ml of 0.75% Ropivacaine with Inj. clonidine 2µg/kg administered[59] epidurally.

Group RD (Dexmedetomidine group):comprises of patients in whom a total volume of 20ml of 0.75% Ropivacaine with Inj. Dexmedetomidine 1.5µg/kg administered epidurally.

Inclusion criteria:
ASA grade I and II physical status, aged between 18-45 years, belonging to both the sexes undergoing lower abdominal surgeries.

Exclusion criteria:
- Patients not willing to participate in the study
- Those with known sensitivity to local anaesthetics
- Patients with local infection at the site of injection
- Uncooperative patients

STATISTICAL DATA: At the end of the study all the data is compiled and statistically analyzed using
- Diagrammatic representation
- Descriptive data presented as mean ±SD.
- Continuous data analyzed by paired or unpaired "t" test.
- Chi – square test to analyze statistical difference between the two groups.

PROCEDURE

detailed history, general ,physical and systemic examination were carried out. Informed consent was obtained

The pulse rate, respiratory rate, blood pressure and SpO2 were recorded cannulation was done with 18G IV cannula preloaded with 10ml/kg Ringer Lactate solution

The patients were placed in left lateral position and under strict aseptic precautions, the epidural space was identified with a 18G Tuohy needle at L3-L4 interspace, by "loss of resistance" technique. 20G epidural catheter was threaded through the needle and secured with adhesive tapes to the back. After negative aspiration for blood and CSF, 3ml of 2% Lignocaine with 15µgm of adrenaline test dose given and the patient was turned to supine position.

Group RC, n=25, were given 20ml of 0.75% Ropivacaine with Inj. clonidine 2µg/kg epidurally. Group RD, n=25, were given 20 ml of 0.75% Ropivacaine with inj. Dexmedetomidine 1.5 µg/kg epidurally.

PARAMETERS OBSERVED:

1. Vital parameters
2. Onset of sensory blockade
3. onset of motor blockade
4. Duration of analgesia
5. Side effects

OBSERVATIONS

The demographic data with respect to age, gender and statistical data with respect to onset, duration and analgesia significantly fast and prolonged in group RD. Haemodynamic parameters were comparatively more stable in group RD.

Table : Onset of sensory blockade

GROUP	MEAN	STANDARD DEVIATION
RC	9.5	1.69
RD	7.92	1.63

($p < 0.05$)

The mean time of onset of sensory block to T10 level in group RC is 9.5± 1.69 min, and in group RD is 7.92±1.63 min The statistical analysis by unpaired t test showed statistically significant difference (p=0.0015) between the two groups.

Table : Time taken for onset of motor blockade

GROUP	MEAN	STANDARD DEVIATION
RC	20.76	2.89
RD	18.68	2.56

($p < 0.05$)

The mean duration of onset of motor blockade in group RC is 20.76± 2.89 mins, in group RD is 18.68±2.56 mins. The statistical analysis by unpaired t test showed that there is a statistically significant difference ($p = 0.0097$) in the two groups .

RECOVERY PARAMETERS-

Table : TWO SEGMENT REGRESSION TIME

	MEAN	STANDARD DEVIATION
GROUP RC	124	10.61
GROUP RD	142.8	10.32

($p < 0.05$)

The two segment regression time in group RD is 142.8± 10.32mins , in group RC is 124 ± 10.61 mins. The statistical analysis by unpaired t test showed that there is statistically significant difference ($p < 0.0001$) between the two groups.

Table 13: Mean duration of analgesia

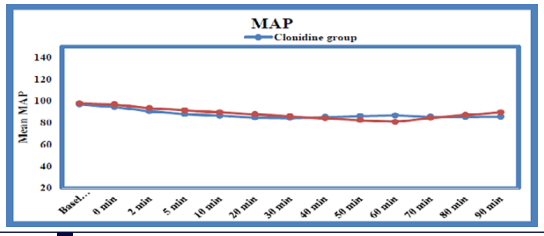
	MEAN	STANDARD DEVIATION
GROUP RC	308.8	40.01
GROUP RD	395.6	58.12

($p < 0.05$)

The mean duration of analgesia in group RC is 308.8±40.01mins, in group RD is 395.6±58.12 mins. The statistical analysis by unpaired t test showed that there is a significant difference ($p < 0.0001$) between the two groups.

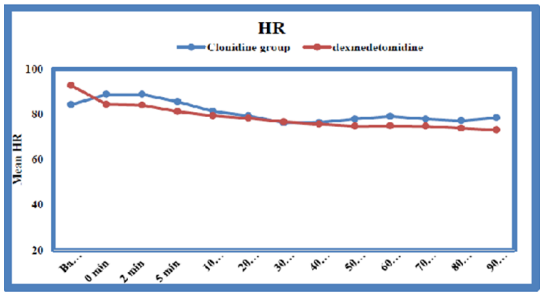
INTRA OPERATIVE HAEMODYNAMICS:

Mean MAP at various intervals in mm Hg



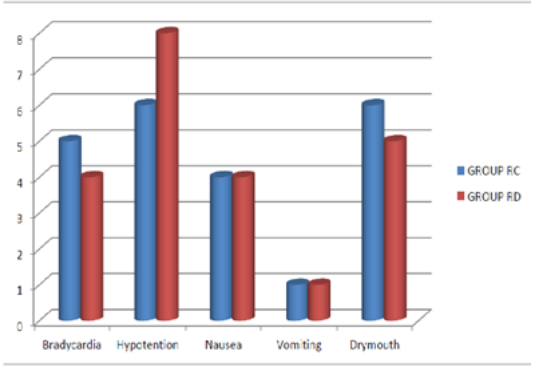
In the group RC the basal value of mean arterial pressure is 96.91±7.93 mmHg and we observed a maximum fall of 12.48 mmHg from basal mean arterial pressure at 30th min (12.87% fall from basal MAP). In the group RD the basal value of mean arterial pressure is 97.77±9.78 mmHg and we observed a maximum fall of 17.06 mmHg from mean basal mean arterial pressure at 60th min (17.44% fall from basal MAP). The fall in the mean arterial pressure from basal to 90th minute recording is statistically not significant between group RC and group RD except at 60thminute . ($P > 0.05$)

Mean heart rate at various interval in bpm



In the group RC (clonidine group) the basal value of mean heart rate is 84.26 ± 15.37bpm and we observed the maximum fall in heart rate of 8.06 bpm from basal value at 30th minute(10.98% decrease from basal value). In the group RD (dexmedetomidine group) the basal value of mean heart rate is 82.66 ± 11.22bpm and we observed the maximum fall in heart rate of 9.63 bpm from basal value at 40th minute(10.97% decrease from basal value). The mean heart rate from basal to 90th minute recording is statistically not significant in clonidine group, where as there is statistically significant change in heart rate observed in dexmedetomidine group

various side effects



In group RC, 6 out of 25 patients and in group RD, 8 out of 25 patients developed hypotension, which is statistically not significant ($p > 0.05$). All the patients who developed hypotension could be easily treated with intravenous fluids and vasopressor. 5 in group RC (clonidine group), 4 out of 25 patients in group RD developed bradycardia, which is statistically not significant ($p < 0.05$). All the patients who developed bradycardia were treated by single doseof 0.6 mg of atropine. 4 out of 25 patients in both the groups RC and RD developed nausea. 1 out of 25 patients in both the groups RC and RD developed vomiting. 6 out of 25 patients in group RC and 5 out of 25 in RD had dry mouth. None of the patients in both the groups had respiratory depression.

DISCUSSION

Epidural analgesia offers superior pain relief and early mobilization. Alpha 2 – agonists have several advantages. Epidural administration of these drugs is associated with sedation ,analgesia ,anxiolysis ,hypnosis and sympatholysis.

The demographic profile of our patients is comparable with respect to mean age, body weight, height, sex distribution, and types of surgeries. In our study, the mean time for onset of sensory blockade at T 10 is 7.92±1.63 min in the dexmedetomidine group and 9.5±1.69 min in the clonidine group. There is a statistically highly significant early onset of sensory blockade in dexmedetomidine group compared to clonidine group (P< 0.05). Sukhminder Jit Singh bajwa et al , found that the addition of dexmedetomidine to ropivacaine as an adjuvant resulted in

an earlier onset (8.52 ± 2.36 min) of sensory analgesia at T10 as compared to the addition of clonidine (9.72 ± 3.44 min). Thus the study mentioned above correlate with the findings of our study showing that, dexmedetomidine attains faster onset of sensory level

In our study, the mean time to onset of motor blockade in group RD is significantly less compared to group RC (18.68±2.56 min in group RD, 20.76± 2.89 min in group RC). There is a statistically highly significant early onset of motor blockade in dexmedetomidine group compared to clonidine group (P< 0.05). Safiya I Shaikh et al ,observed that time to attain complete motor block was earlier in Dexmedetomidine group (19.30 ±1.62 mins) than clonidine group (24.87±1.55) . The findings of the above study correlate with the findings of our study showing that dexmedetomidine attains faster onset of motor blockade compared to clonidine.

In our study the two segment regression time in Group RD (142.8± 10.32min)is significantly higher than Group RC (124 ± 10.61min) . There is a significant prolongation in two segment regression in dexmedetomidine group compared to clonidine group (P< 0.05). In the study conducted by Sukhminder Jit Singh bajwa et al observed that time taken for two segmental dermatomal regression was prolonged in dexmedetomidine group 140.32±10.21mins than fentanyl group 110.84±9.48mins.

Duration of analgesia in group RD is 395.6±58.12 mins,(6.58 hrs) compared to group RC 308.8±40.01 mins (5.13 hrs). There is a significant prolongation in duration of analgesia in dexmedetomidine group compared to clonidine group (P< 0.05). In the study conducted by Sunil Chiruvella et al ,observed that the duration of analgesia was prolonged in dexmedetomidine group (405.6 ± 20.32 min) compared to clonidine group (347.9 ± 15.05). These results correlate with our study results.

CONCLUSION

We conclude that dexmedetomidine is a better adjuvant than clonidine in epidural anaesthesia as far as patient comfort, stable cardio-respiratory parameters, intra-operative and post-operative analgesia are concerned. Overall the experience with dexmedetomidine was quite satisfactory as compared to clonidine because of its superior sedative and anxiolytic properties during the surgical procedure under regional anaesthesia.

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