



Anesthesiology

OBSERVATIONAL STUDY OF DEXMEDETOMIDINE 1µG/KG WITH 0.25% BUPIVACAINE VERSUS FENTANYL 1µG/KG WITH BUPIVACAINE IN SINGLE SHOT EPIDURAL IN BELOW UMBILICAL SURGERIES.

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ABSTRACT

INTRODUCTION: In the modern era, regional anaesthesia is replacing general anaesthesia in almost all the surgeries below umbilicus. Epidural anaesthesia is considered better in terms of duration of analgesia.

MATERIAL AND METHODS: 60 adult patients of ASA class I and II, posted for elective below umbilical surgeries were divided into two groups. Group D were given a single shot dose of epidural Bupivacaine 0.25% with Dexmedetomidine 1µg/kg in 20ml volume while Group F were given epidural Bupivacaine 0.25% with Fentanyl 1µg/kg in 20ml volume. Sensory and motor block characteristics with total duration of analgesia was compared.

RESULTS: There was no difference in the demographic profile between groups. Onset of motor block and duration of analgesia was prolonged in dexmedetomidine group.

CONCLUSION: 0.25% Bupivacaine with Dexmedetomidine 1µg/kg showed better clinical profile as compared to Fentanyl 1µg/kg in single shot epidural anaesthesia.

KEYWORDS : Bupivacaine 0.25%, Dexmedetomidine

INTRODUCTION

Pain is always a conscious, subjective perception that cannot be objectively defined satisfactorily. The aim of an anesthesiologist is to render the patient pain free during a surgical procedure. Recent trends suggests that regional anaesthesia is replacing general anaesthesia in almost all the surgeries below umbilicus mainly because its benefits such as avoidance of poly pharmacy, airway manipulation, misplacement of endotracheal tube, hypo or hyper ventilation, vomiting, pulmonary aspiration. When it comes to regional anaesthesia & pain relief, epidural anaesthesia is considered far better to spinal anaesthesia as the duration of anaesthesia can be achieved longer than with spinal anaesthesia. Opioids like fentanyl have been used traditionally as an adjunct for epidural administration in combination with a lower dose of local anaesthetic to achieve the desired anaesthetic effect. Dexmedetomidine is a new addition to the class of alpha-2 agonist which has got numerous beneficial effects when used through epidural route.

MATERIAL AND METHOD

This study was conducted in Dhiraj general hospital in Department of Anaesthesiology. In this prospective randomized study 60 patients were scheduled for elective Lower Abdominal surgery and lower limb surgeries ranging from 20-60 years of age and ASA grade I and II were included. Patients were subjected to pre-anaesthetic checkup and informed consent were obtained from all the patients.

Patients giving written and informed consent between age 20 and 60 years posted for elective lower limb and lower abdominal surgeries belonging to ASA class I and II were included in the study. Whereas patients not giving consent, belonging to ASA class III or higher, history of allergy to drugs, infection at local site and raised intracranial pressure were excluded from the study.

A routine pre-operative examination of all the patients which were included in the study were assessed on the previous day of surgery and baseline investigations were carried out.

Selected patients were divided into two groups of 30 each.

Group D (n = 30) received an epidural single shot dose of 20ml 0.25% bupivacaine + inj Dexmedetomidine 1µg/kg. Group F (n = 30) received an epidural single shot dose of 20ml 0.25% bupivacaine + inj Fentanyl 1µg/kg. patient were kept nil per oral for 8 hours. Patient were informed and explained about the epidural procedure in the language best known to them. In operating room, non invasive blood pressure, pulse-oximeter, ECG monitors were placed Baseline Spo2, heart rate, ECG was applied to all patients.

Epidural block was administered in sitting position at L2-L3 or L3-L4 epidural space using a 18G Touhy's Epidural needle, once the needle was in epidural space there was sudden loss of resistance, which assessed by Hanging drop technique (a drop of saline was placed on the hub which was sucked in due to negative pressure). After locating epidural space study drugs were injected and patient were placed in supine position. And the effect of the drug was assessed till it came to T10 level.

Sensory block was evaluated by pin prick and motor blockade by Bromage scale.

Grade Definition

- 0 No motor block
- 1 Inability to raise extended leg; able to move knees and feet
- 2 Inability to raise extended leg and move knee; able to move feet
- 3 Complete block of motor limb

Assessment was repeated every minute till T10 level achieved. Intra operatively, non-invasive blood pressure monitoring was done at 0, 1, 5 and 10 minutes thereafter for the 30 mins. Blood pressure monitoring after the first hour was done every 10 minutes, till completion. Continuous heart rate and SPO2 monitoring was performed.

Any fall in BP (fall in systolic blood pressure below 20% of baseline value or less than 90 mm Hg) was treated with bolus iv doses of (0.1mg/kg) of inj. mephenteramine. Bradycardia (heart rate less than 50 beats/min) was treated with inj. atropine (0.01 mg/kg) iv.

Patients in whom a sensory level of T-6 was not achieved even after 30 mins of loading dose or who complained of pain within 1 hour of surgery and failed to respond to rescue medication were excluded from the study. Any complication that occurred during anaesthesia was noted and treated promptly. inj. dexamethasone (4 mg) iv. was given to patients complaining of nausea and inj. tramadol (0.5 mg/kg) iv was given to patients who developed shivering.

At the end of surgery all patients were monitored in SICU for next 24 hrs, post operative analgesia was assessed by VAS score. When VAS score > 3 then rescue analgesia (inj diclofenac 75mg i.v.) was given.

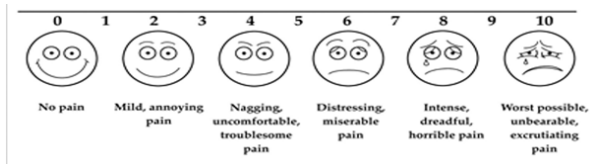
Parameters recorded:

- 1) **onset of sensory blockade** – Defined as the time interval between the completion of local anaesthetic solution the onset of complete loss of sensation to pin prick.
- 2) **onset of motor blockade** – Defined as the time interval between the completion of the injection of anaesthetic solution to the establishment of inability to move the lower limbs both knee and

ankle (Bromage scale 3)

- 3) **Intraoperative haemodynamic parameters:** Pulse, Systolic blood pressure, Diastolic blood pressure.
- 4) **Duration of Post operative analgesia :** Time interval between onset of sensory block to vas score >3.

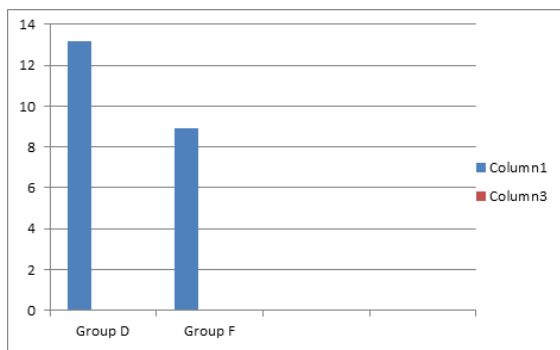
VISUAL ANALOGUE SCALE



OBSERVATION AND RESULTS

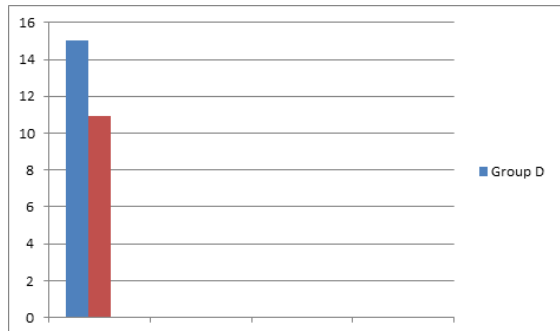
Both the groups were comparable with respect to demographic data.

Figure 1: onset of sensory block.



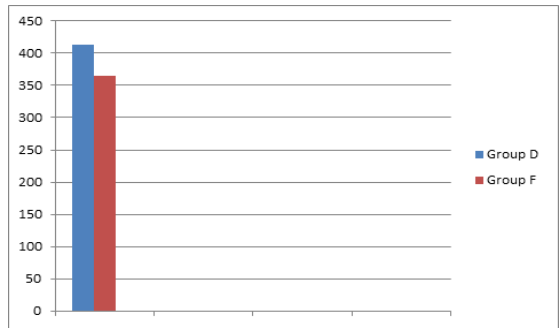
Onset of sensory block was significantly higher in group F compared to group D (p<0.001)

Figure 2: onset of motor block.



The onset of motor block was significantly higher in group D as compared to group F (p<0.001)

Figure 3: duration of analgesia.



Duration of analgesia was significantly longer in group D than in group F (p<0.001).

DISCUSSION

A proper and carefully managed epidural can provide outstanding

analgesia in the postoperative period which allows the patient to be pain free at rest and early mobilization. An epidural block also reduces the acute stress reaction for surgery. Along with this analgesic benefits, patients are less likely to suffer any cardiac, respiratory or gastrointestinal side-effects.

The use of opioids in conjunction with local anaesthetic for central neuraxial blockade has been associated with early onset, prolonged duration of sensory and motor block, decreased pain score and reduced analgesia requirement in post-operative period.(1)(2)-sham.k

Use of low concentration epidural anaesthesia helps in early ambulation of patients and thus reduces the hospital stay and overall cost of surgery.

Thus, In our study Group D- Dexmedetomidine 1µg/kg and Group F- Fentanyl 1µg/kg were used as adjuvants with 0.25% Bupivacaine in 20 ml of volume.

Similarly Ravi Prakash et al⁽³⁾ conducted a similar study and also used Dexmedetomidine 1µgm/kg and Fentanyl 1µgm/kg with Bupivacaine 0.25%.

In our study, we have used “ hanging drop “ technique over “loss of resistance” technique because substantiation is accumulating that saline is preferable to air, as it coupled with a superior quality of analgesia and lower occurrence of post-Dural-puncture headache.

Beilin et al.⁽⁴⁾ also observed superior quality of analgesia with saline over air.

Demographic Data in terms of age, sex, weight and height were comparable in both the groups of our study i.e. Group D (dexmedetomidine 1µgm/kg) and Group F (Fentanyl 1 µgm/kg) statistically not significant. Majority of patients were between 20 to 55 years in both groups with mean age of Group D (41 ± 7) years in Group F (39 ± 9) Years (P= 0.34)

Similarly Ravi Prakash et al conducted a similar study in terms of age, sex, weight and height and which was statistically non significant.

And similar to our study sukhminder jit singh Bajwa et al⁽⁵⁾ conducted a study having demographic profile of age, sex, weight and ASA which was statistically not significant.

SENSORY AND MOTOR BLOCKADE :

In our observational study the onset of sensory blockade was faster in Group-F(8.93 ± 1.14) Compared to Group-D (13.2 ± 1.52) min which was clinically and statistically significant (P < 0.0001) .

The onset of analgesia is depending upon the lipid solubility of opioid agent. Lipid soluble opioids like Fentanyl cross the dura and pierce the spinal cord rapidly producing a faster onset of action.

Dexmedetomidine have a slower onset of analgesia and is poor lipid solubility as compared to Fentanyl.

Similarly Ravi Prakash et al conducted a study on 75 patients and found longer duration of analgesia in Dexmedetomidine (135.40 ± 9.57) as compared to Fentanyl (120.00 ± 5.95) Along with Bupivacaine 0.25% in 20 ml volume .hence Dexmedetomidine was found to be more effective .which is similar to our study

Similarly EL-hennawy AM 2015⁽⁶⁾ conducted a study on 74 patients with Clonidine and Dexmedetomidine as an adjuvant with Bupivacaine and found that Dexmedetomidine with Bupivacaine gave longer duration of analgesia compared to Clonidine with Bupivacaine. This study is also similar to our study in which Dexmedetomidine gives longer duration of analgesia

In our study onset of Motor block was faster in Group-F (10.9 ± 1.06) min Compared To Group-D (15 ± 1.64) min clinically and statistically significant (P < 0.0001). And duration of analgesia was found to be more in Group-D (250 ± 9.38) compared to Group-F (227 ± 11.7).

Similarly Dr .K . Rajarajeshwaran et al conducted a study of 90 patients to compare fentanyl and clonidine as an adjunct to bupivacaine undergoing abdominal hysterectomy. The mean time of

onset of motor block in Fentanyl with Bupivacaine (15.96 ± 1.65) mins and was longer compared to clonidine with Bupivacaine (13.63 ± 1.49).

Similarly **Sukhminder JIT Singh Bajwa et al** conducted a study on 50 adult patients which underwent vaginal hysterectomy and found that onset of motor block was early with longer duration in dexmedetomidine+ Ropivacaine (8.52 ± 2.36) compared to Clonidine + Ropivacaine (9.72 ± 3.44).

Similarlty **Ravi Prakash et al** conducted a study of 75 patients of Dexmedetomidine $1\mu\text{g}/\text{kg}$ and Fentanyl $1\mu\text{g}/\text{kg}$ with Bupivacaine 0.25% and found that onset of motor block was early with Dexmedetomidine (13- 19) mins than Fentanyl (16-18) mins. With longer duration of analgesia. in our study too onset of motor block was early with Dexmedetomidine

Haemodynamic parameters were stable throughout in both the Group-D and Group-F

Similarly **Ravi Prakash et al** conducted a study of dexmedetomidine and Fentanyl with Bupivacaine and found haemodynamic stability throughout the study and no significant differences.

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