Original Research Article

Comparison of inguinal hernia repair: Spinal anaesthesia with conventional method of hernia block

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Abstract

Background: One of the most common surgical procedure performed today worldwide is inguinal hernia repair. With the introduction of day-care surgeries, now a days local anaesthesia is preferred more than general and regional anaesthesia. This study was done to compare the effectiveness, postoperative pain and complications, safety, satisfaction scores in hernia surgery done under local anaesthesia and spinal anaesthesia. **Methods**: Three groups were selected and randomly allocated 32 patients in each group of ASA grade I, II and III admitted for hernioplasty. Group A was given hernia block with bupivacaine 0.5% 15 to 20 ml with lignocaine adrenaline 10 ml and NS 10 ml and Group B was given bupivacaine 0.5% 15 to 20 ml with lignocaine adrenaline 10 ml and NS 10 ml with dexamethasone 8mg and Group C was given spinal anaesthesia with inj. Bupivacaine heavy 3.5 ml. **Results** : Even though the surgical relaxation was better with spinal anaesthesia, in hernia block the satisfaction score (patients, surgeons , anaesthesiologists) was higher owing to its advantages of prolonged duration of analgesia and sensory blockade ,less postoperative analgesic requirements , early mobilisation ,early discharge, less complications , better hemodynamic stability . Addition of Dexamethasone in hernia block as adjuvant prolongs duration of sensory blockade and duration of analgesia. **Conclusion**: The hernia block with local anaesthetics agents have prolonged the duration of sensory block and duration of analgesia and decreases requirement of rescue analgesics and less complications that leads to higher satisfaction score compared to patients who received spinal anaesthesia.

Key words: spinal anaesthesia, hernia block, hernioplasty, adjuvant.

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INTRODUCTION

Worldwide, one of the most common surgical procedure done is inguinal hernia repair. Most common hernia in both males and females are inguinal hernias. However, the number of males presenting with hernias is more compared to females for hernia repair surgery. Inguinal hernia repair can be performed using various anaesthesia techniques such as general anaesthesia, regional anaesthesia, and local anaesthesia depending upon multiple factors including safety, patient and surgeon satisfaction, early ambulation and discharge and pain. With the introduction of daycare surgeries, now a days local anaesthesia is preferred more than general and regional anaesthesia. Local anaesthetic adjuvant agents are used to improve the speed of onset and duration of the nerve blocks and analgesia and reduces the use of analgesics post operatively. Dexamethasone is a type of adjuvant which was used in this study for comparison.

MATERIALS AND METHODS

After obtaining approval of the Institutional Ethical Committee and written informed consent, we recruited 96 patients of age group >15 years of ASA grade of I,II andIII admitted for hernioplasty. Patients with cardiovascular,

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renal and respiratory co morbidities, patient's refusal, local infection, altered coagulation profile, patients with allergies to local anaesthetic drugs, sepsis were not included in this study. Standard monitors like ECG, NIBP, and pulse oximeter, were applied and patients' baseline parameters like pulse, blood pressure, respiratory rate, SpO2 were recorded. After taking IV line, patients were given pre-medications with Inj. Glycopyrolate (0.2mg), Inj. Ondansetron(4mg) iv, Inj. Ranitidine(50mg)iv, Inj. Midazolam (0.5mg)iv, Inj. Dexmeditomedine 1ug/kg (for hernia block patients) in 100 ml NS over 20 minutes.

Group allocation: 96 patients were randomly allocated in 3 groups (n=32)

GROUP A: Hernia block was given with inj.bupivacaine 0.5% 15 to 20 ml with lignocaine adrenaline 10 ml and NS 10 ml

GROUP B: Hernia block was given with Inj. Bupivacaine 0.5% 15 to 20 ml with lignocaine adrenaline 10 ml and NS 10 ml with inj. Dexamethasone 2ml(8mg).

GROUP C: Spinal anaesthesia with inj. Bupivacaine heavy 3.5 ml.

For hernia block, after proper explanation, patient in supine position and under all aseptic precautions 23 G 1.5-inch blunt block needle is inserted 2 cm medial and above to the ASIS through the external oblique aponeurosis and after feeling a slight 'click' ,10 to 15 ml of local anaesthetic is injected in a fanwise fashion. This is to block ilioinguinal and iliohypogastric nerves. To block genital branch of femoral nerves infiltrate 5-7ml local anaesthetic just lateral to the pubic tubercle below the inguinal ligament. Inject 5 ml more in to deep inguinal ring at 1-2 cm above the midpoint of the inguinal ligament. The intercostal nerves which run subcutaneously is blocked by infiltration of local anaesthetics from pubic symphysis towards umbilicus. Third group was given spinal anaesthesia. Paramètres recorded were time of onset of sensory block, HR, NIBP-systolic, diastolic and mean, SpO2, and ECG were monitored throughout the procedure, time to first analgesic request, postoperative diclofenac consumption over 24 hours, VAS (pain)score, and complications. Patients, anaesthesiologists and surgeon's satisfaction scores were also recorded. All the datas were recorded in Microsoft Excel. Mean as well as standard deviation (SD) were calculated. Statistical difference between groups were determined using ANOVA test. The results were considered significant if P-value is <0.05 and considered as highly significant if P-value is < 0.001.

OBSERVATIONS AND RESULTS

This study was a prospective, randomized controlled study conducted during the year 2018 to 2020. The groups were comparable with respect to age, sex, ASA grading and duration of surgery.

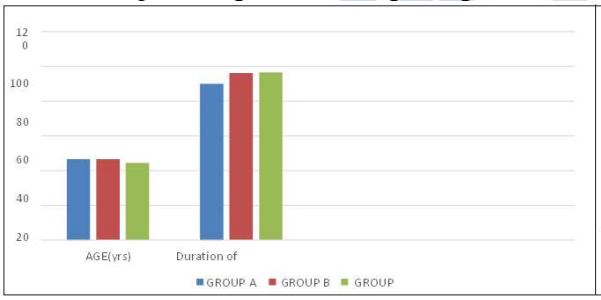

Figure 1: Demographic data

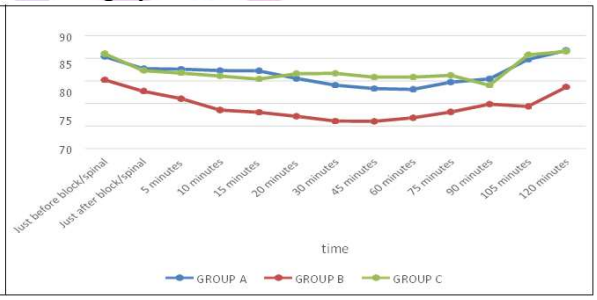

Figure 2: Intra-operative heart rate.

The heart rate decreased in Group A and Group B after 5 minutes of block where the both groups received dexmedetomidine injection along with premedication. After spinal anaesthesia in Group C also showe3d decrease in heart rate. These observations were statistically significant ($p<0.05$). The Mean blood pressure(MBP) decreased in Group C at 5 min and 10 minutes after induction as compared to Group A and Group B and was statistically significant ($p<0.05$). After 15 minutes onwards there was no statistically significant difference observed. In our study we compared and recorded various parameters which is shown in Table 1.

Table 1

Sl no.		Group A	Group B	Group C	P value
1	Duration of surgery (min)	90±14.75	96.09±13.1	96.56±12.01	0.095
2	Onset of sensory block (min)	11.96±2.32	9.90±1.63	1.70±0.19	<0.001
3	Duration of sensory block (min)	388.38±62.13	560.33±45.21	194.53±20.1	<0.001
4	Duration of analgesia(min)	516.29±53.4	689.16±6135	312.5±27.2	<0.001
5	VAS Score at 4 hours (cm)	0.45±0.6	0	3.93±0.25	<0.001
6	Time of first rescue analgesic (hrs)	7.09±0.77	9.86±1.0	3.56±0.41	<0.001
7	Ambulatory time (min)	25.31±9.99	24.84±7.12	226.25±18.96	<0.001

Table 1 showing comparison between three groups with respect to duration of surgery, onset of sensory block , duration of sensory block and analgesia , VAS score at 4 hours , time of first rescue analgesics and ambulatory time. The onset of sensory block was evaluated in percentage of effect of block after dividing the quadrant in 10 * 10. The mean onset of sensory block was Group A (11.96±2.32) minutes, Group B (9.90±1.63) minutes and Group C (1.70±0.19) minutes respectively, showing faster onset in group received spinal anaesthesia. The mean duration of sensory block in Group A (388.38±62.13) minutes, Group B (560.33±45.21) minutes and Group C (194.53±20.1) minutes which shows duration is significantly longer in Group B as compared to Group A and Group C. The mean duration of analgesia in Group A was (516.29±53.4) minutes, and in Group B was (689.16± 61.35) minutes and Group C was (312.5±27.23) minutes respectively.

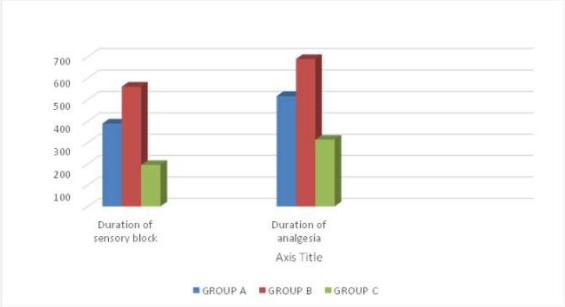

Figure 3: Duration of sensory block and duration of analgesia in three groups.

The mean VAS score at 4 hours for Group A (0.45±0.6) cm Group B (0) and Group C (3.93±0.25) cm. The observation was statically significant (p <0.001).

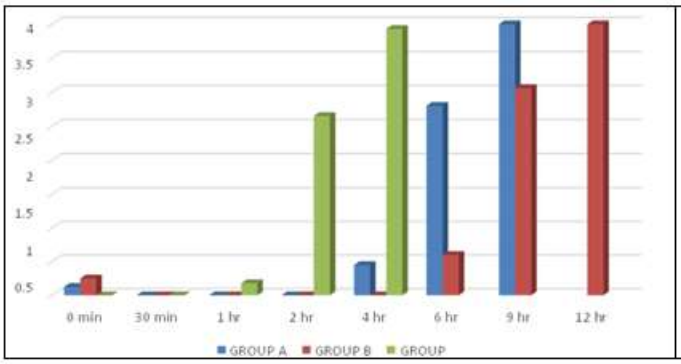

Figure 4: VAS SCORE

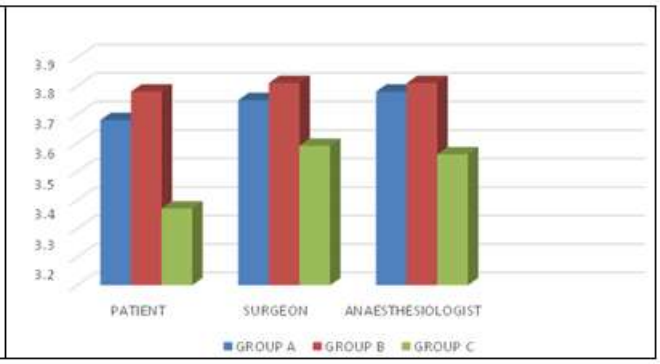

Figure 5: satisfaction scoring among patient, surgeons, and anaesthesiologist

For Group B the satisfaction score was higher than Group A and Group C Compared to Group A and Group B the satisfaction score was less for Group C. The observation was statistically significant (P value <0.05). Intraoperative hypotension, post-operative urine retention and post op headache complications were observed in spinal group. Whereas 2 patients in Group A and 1 patient in Group B had intraoperative mild pain which was manageable with counselling and additional infiltration of local anaesthetic. Total 3 block failure occurred (1 in Group A and 2 in Group B) and these cases were converted to general anaesthesia

DISCUSSION

The preferred choice of anaesthesia worldwide for all reducible adult inguinal hernia repairs is local block. (For this study we randomly allocated 32 patients each in three groups; Group A is (hernia block), Group B (hernia block with dexamethasone as adjuvant) and Group C (spinal anaesthesia).The groups were comparable with respect to age, sex, ASA grading and duration of surgery. The maximum number of cases were between 35 -55 years of age. In our study all patients were males which can be compared to the other studies were number of males were in higher number than females. A study by Liechenstein[2] 94% were male patients and 6% female patients. Occurring at any age males are more commonly affected then females. Van Veen RN *et al.*[3] in a study showed that the total operating time is significantly shorter in the local anaesthesia group (P < 0.001). However in our study there was no statistically significant change in the mean surgical duration among three groups. In our study we observed that the addition of dexamethasone perineurally to local anaesthetic mixture in inguinal hernia block hastens the onset of sensory block. we also observed that the pulse rate decreased in Group A and Group B after 5 minutes of block

where the both groups received dexmedetomidine injection along with premedication. This can be comparable with other studies which shows bradycardia following dexmedetomidine injection. Group C who received spinal anaesthesia also showed decrease in heart rate which can be comparable with other studies who also observed bradycardia following neuraxial anaesthesia. However, the hemodynamic stability was better with groups who received blocks than group who received spinal anaesthesia. Jonathan B. Lesser *et al.*[4] in a study about bradycardia during spinal anaesthesia concluded that moderate or severe bradycardia may occur at any time during neuraxial anaesthesia. The occasional fall in blood pressure after spinal anaesthesia was treated with adequate fluid therapy with crystalloids and fractionated intravenous doses of inj. Mephentermine 5 mg. No significant blood pressure changes noticed in groups received blocks. In our study we observed that the hemodynamic stability was better with groups who received block than group who received spinal anaesthesia. The mean duration of sensory block in Group A (388.38±62.13) minutes, Group B (560.33±45.21) minutes and Group C (194.53±20.1) minutes which shows duration is significantly longer in Group B (dexamethasone as adjuvant) as compared to Group A and Group C. Carolyne pehora *et al.*[5] studied Dexamethasone as an adjuvant to peripheral nerve blocks and observed that the duration of sensory block was significantly longer in the perineural dexamethasone group. The mean duration of analgesia in Group A was (516.29±53.4) minutes, and in Group B was (689.16± 61.35) minutes and Group C was (312.5±27.23) minutes. This difference was highly significant ($p < 0.001$). Compare to spinal anaesthesia group the conventional hernia block patients showed prolonged duration of analgesia post operatively which is comparable to the study by Van veen RN *et al.*[3] showed that patients operated under local anaesthesia had significant less pain shortly after surgery. The mean VAS score at 4 hours for group who received spinal anaesthesia was higher than hernia block groups and was statically significant ($p <0.001$). Addition of dexamethasone significantly prolongs duration of analgesia. A study by P.Sanjay *et al.*[6] concluded that the Patients operated under LA had lower postoperative analgesic requirements (p value <0.05). Dr.S.Seshaiah *et al.*[8] observed in a study that in LA group were ambulant at the end of 1hr and none in SAB group which was statically significant . Similarly early ambulation observed in hernia block groups in our study. In our study we observed that the satisfaction score for patients for hernia block was higher than spinal anaesthesia owing to its advantages of prolonged duration of analgesia, early mobilisation and early discharge. Even though surgical relaxation is well obtained with spinal anaesthesia, the surgeons satisfaction score was higher for hernia block as less post-operative analgesia requirement and hernia repair can be done as a day care surgery due to early ambulation, less complications and early discharge rate with hernia block. Hemodynamic stability was better with hernia block as significant hypotension was observed after giving spinal anaesthesia. This might be the reason for higher satisfaction score for hernia block patients among anaesthesiologists. A study by P.Sanjay *et al.*[6] observed in a postal questionnaire revealed higher satisfaction rates with local anaesthesia compared to general anaesthesia Intraoperative hypotension, post-operative urine retention and post op headache were the complications observed in spinal anaesthesia group. In a study by Uma Srivastva *et al.*[7] observed urinary retention requiring catheterization occurred in 7 (22%) patients in spinal anaesthesia group. In our study we performed landmark guided hernia block. So, three patients who received block had failure of block (1 in Group A and 2 in Group B) and these cases were converted to general anaesthesia. In a study Dr Amul bhedi *et al.*[1] observed that intra-operative discomfort was experienced by few patients in the LA group, but it was easily manageable.

CONCLUSION

From our study we conclude that the hernia block with local anaesthetic agents have prolonged the duration of sensory block and duration of analgesia and also significantly improves the quality and duration of postoperative analgesia and decreases requirement of rescue analgesics and less complications that leads to higher satisfaction score compared to patients who received spinal anaesthesia. Dexamethasone directly inhibits signal transmission in nociceptive C fibers, a local inflammatory effect, and locally induced vasoconstriction. This way addition of dexamethasone 8mg (GROUP B) hastens the onset of sensory block and duration of analgesia and sensory block in conventional hernia block technique.

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