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Comparison of Paravertebral Block with Spinal Anaesthesia in Unilateral Inguinal Hernia Repair

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Abstract: ***Aims: Comparison paravertebral block with subarachanoid block in unilateral inguinal hernia repair. Objective: Evaluation of efficacy of spinal anaesthesia & Paravertebral block in unilateral inguinal hernia repair with respect to postoperative analgesia, ambulation, perioperative and postoperative complication. Method: Sixty (ASA) I-II patients between 18-60 years with unilateral inguinal hernia were enrolled for study, and statistical analyses was done. Patients were randomly divided into two groups, with 30 patients in each: Group S, spinal anaesthesia and Group P, paravertebral block. Standard monitoring was done, and mean arterial pressure and heart rate were recorded during the procedure. Demographic variables, surgical data, patient satisfaction, the onset time to reach T10 dermatome to reach peak sensory level, & modified Bromage 3 motor block recorded. Postoperative nausea, vomiting and pain at postoperative hours 0-24 with visual analog scale measured. Results: Compared to pre- anaesthesia measurements, decrease in HR and MAP during 10th-90th minute was significant in Group S In Group P, sensory block duration time was higher, whereas motor block was higher in Group S. In Group P there was a need to supplement Inj. Propofol, due to partial or inadequate block. Bromage scores were significantly different between the groups. Time required and drug volume to achieve block was higher in Group P. Conclusion: Subarachnoid block is better than Paravertebral block for unilateral inguinal hernia surgery in terms of time required for performing the procedure, efficacy, patient comfort & surgeons satisfaction.***

Keywords: Spinal Aneasthesia

1. Introduction

Inguinal hernia is one of the most common diseases in the males. Treatment of this pathology is exclusively surgical. It can be performed using various anaesthetic methods like Subarachnoid block, General Anaesthesia, Epidural Anaesthesia, Hernia block alone or in combination & patient satisfaction can be provided.

Spinal anaesthesia has the benefits of suppressing the stress response to surgical intervention, decreasing morbidity in high-risk patients, and enabling maintenance of analgesia in the postoperative period, cardiovascular system-specific adverse events such as arterial vasodilation, peripheral reflex vasoconstriction, bradycardia and hypotension may pose a problem .(1,2)
Paravertebral block (PVB) provides analgesia equivalent to extensive peripheral nerve block for inguinal herniorrhaphy, offering an alternative method of postoperative pain management with fewer adverse events. PVB has been found to be more advantageous than conventional spinal anaesthesia for inguinal hernia repair, in terms of early ambulation and better postoperative pain scores.(3) Paravertebral block can also be used for surgical anesthesia in patients with serious co-morbidites like chest infection, bronchial asthma etc who could not tolerate general anesthesia or neuraxial blocks.(4). PVB can be performed at 2,4, and 5 segment technique. Four segment PVB can be a better alternative for SAB. Was judged by us comparing the time of ambulation, duration of postoperative analgesia and incidence of adverse events.

The versatility of spinal anesthesia is afforded by a wide range of local anesthetics and additives that allow control over the level, the time of onset and the duration of spinal anesthesia.

The distribution of local anesthetic solution within the subarachnoid space determines the extent of neural blockade produced by spinal anesthesia.

Hyperbaric Bupivacaine, an amide local anaesthetic, is most commonly used for spinal anaesthesia. A small dose of hyperbaric bupivacaine produces a short-lasting spinal anaesthesia, which may be clinically useful in ambulatory surgical procedures. However, for most of the lower abdominal surgeries long duration of postoperative analgesia on the operative side is needed

2. Method

After obtaining approval from IEC (dated 26.09.2015) of DMIMS (DU), the cases were selected for the study. The informed consent forms was taken for the procedure. A total of 60 American Society of Anesthesiologists physical status (ASA) class I-II patients aged between 18 and 60 years, who had been admitted to the general surgery ward to be operated for unilateral inguinal hernia, were randomly enrolled in the present study. Patients excluded were due to Patient refusal, ASA III & IV, Contraindication to spinal anaesthesia, Significant cardiovascular, respiratory, hepatitis, diabetes mallitus, metabolic disease, morbid obesity & coagulation disorder, Height less than 140 cm, Post spinal surgery & spinal deformity. The cases were informed about the scoring method that would be used.

The cases were divided into two groups by closed envelope method. : Group S (n=30), who received spinal anaesthesia, and Group P (n=30), who received paravertebral block.

In group S patient the patient were given spinal anaesthesia with 3.2 ml of 0.5% bupivacaine .In Group P (n=30) paravertebral block was given at 4 segment between T10 to L1,under all aseptic precautions, 1 mL of 2% lidocaine was injected on each level.. Thereafter, transverse processes at each level was found at 4-5 cm depth using 23 gauge

Quinckes spinal needle and then 5 mL of 0.5% Bupivacaine was injected . Pateint was made supine.The level of anaesthesia was verified by pin prick test for adequate analgesia and then the patient was handed over to the surgical team. Preloading was performed in all cases with 1000 cc of crystalloid. Premadication given with Inj Midazolam 1mg,Inj Ranitidine 150mg and Inj Ondonsetron 4 mg .In the operating room, the cases underwent routine monitoring including electrocardiography (ECG), SPO2 and non-invasive blood pressure until the end of the surgery. Both preoperative and intraoperative mean arterial pressures (MAP) and heart rate (HR) of the cases were recorded at 2-minute intervals for the first 10 minutes and then at 5 minutes interval for 30 mins and then every 15 mins until the end of surgery. Height, weight, gender, ASA class, duration of anaesthesia and surgery were recorded. Maximum level of motor block and sensory block, time to reach to T10 dermatome, time to reach to maximum block height, and time to complete recovery from sensory block and motor block were recorded. Degree of motor block was assessed by Bromage score (0=no paralysis, 1=able to move only knees and feet, 2=unable to flex the knee but moves the feet, 3=total paralysis) and postoperative pain score was assessed by visual analogue scale (VAS) with 0 is the lowest and 10 is the highest score.

Hypotension was lablled as mean arterial pressure <70 mmHg ,5 mg of ephedrine was kept ready and 0.5 mg IV atropine was kept ready for the event of bradycardia (HR <50/min).The data was recorded in the proforma. The cases in group S were shifted to recovery room for observation for two hours and then transferred to their respective wards. Whereas the patients in group P could be directly shifted to their respective wards. VAS scores as well as all adverse events encountered within 24 hours (e.g., nausea, vomiting, arrhythmia, pruritus, erythema, headache, and urinary retention) were recorded at postoperative 0, 2, 4, 6, 12, and 24 hours. In the event of a VAS score ≥3, diclofenac sodium at a dose of 75 mg I/M was given.

3. Statistical Analysis

Statistical analysis was done by using descriptive and inferential statistics using Chisquare test, student's paired t test and unpaired t test and software used in the analysis were SPSS17.0 version, EPI-INFO and GraphPad Prism 5.0 version and $p<0.05$ is considered as level of significance

4. Results

The study was carried out in a total of 60 cases; however, ten cases were excluded from analysis as the level of spinal block remained below T10 in five cases that underwent spinal anaesthesia. Level of anaesthesia could not be achieved in L1 dermatome in one, perioperative pain developed in two, and anxiety developed during block in two of five case .Block failure occurred in 5 cases that underwent paravertebral block .Hence total of 50 cases were included in the study, 25 in Group S and 25 in Group P.

There was significant difference in age among both the groups (p= 0.039,S) table no.1. The height (P= 0.75, NS), weight (p= 0.38, NS) , site of surgery (p= 0.30,NS) .were comparable in patients amongst both the groups. In our study table1 shows the bromage blokade characteristics in group S. Bromage score I mean was 0, Bromage II mean was 33.80, Bromage III mean was 55.40 and Bromage score IV mean was 76.92 and in group P there was no motor blockade, hence it was statistically significant. -- shows the block characteristics in group S.

Sensory level L1 achieved in 52% patients in 30 seconds, T12 achieved in 16% at 30 seconds and 52% at 1 minute, T8 achieved in 64% at 1 minute and in 32% at 5 minutes, T 6 achieved in 4% patients at 5 minutes T4 achieved in 8% patients at 10 minutes. Since paravertebral block is a segmental block so its sensory level height can not be mentioned and it takes 15-20 minutes to act the infiltrated local anaesthetic solution, so block duration was higher in group P

In our study graph no 1 we found that the base line mean arterial blood pressure (MAP) table 2 in group S is.92.24 mmhg and in group P was 92.08 mmhg. (p=0.0001).

Bradycardia was defined as decrease in heart rate to less than 50 bpm The significant difference in the heart rate table -- was observed at baseline and 2,4,and 6 minutes after the block. (p= 0.002, 0.002, 0.012, 0.041 resp.) This may be due to anxiety while performing the block and positioning the patient supine .The heart rate was not significant from 8 minutes to 45 minutes in both the groups.(p= 0.199 to 0.105). This may be due to patient have achieved the adequate analgesia. In our study we observed that intraop propofol infusion was required in group P to achieve proper relaxation of the patient as paravertebral block does not relieve pain arising from pulling the spermatic cord or manipulating the hernia sac.

- In our study table no.2 shows mean VAS at 6th hour was 1.28 (VAS 3 in 4 patients) and 0.00 in group S and group P respectively. At 12th hour it was 3.20 and 1.52 in group S and P respectively and at 24th hour it was 4.52 and 3.20 in group S and group P respectively. The difference was statistically significant (P-value 0.0001, S).In group S rescue analgesic were given before 6 hours whereas in group P the post op analgesia was prolonged upto 12 hours. (VAS 3 in 5 patients). And at 24 hours VAS 2 in 2 pateints, VAS 3 in 16 pateints, VAS 4 in 6 patients, VAS 5 in 1 patient. Prolonged duration of analgesia could be explained by the comparatively less vascularity of the paravertebral space and greater volume of LA. y ambulation was possible and no need to catheterize the patients in group P due to segmental nature of block. In group S patients could not be ambulated till regression of motor block effect later on.
- In this study, the demand for rescue analgesics was earlier or at 6 hours in group S. And more doses of rescue analgesics were required during 24 hours as compared to group P.
- In this study no side effects like itching,nausea ,vomiting, shivering and postop retension of urine observed in any group

Graph 1:Mean arterial pressure (MAP) in both the groups.

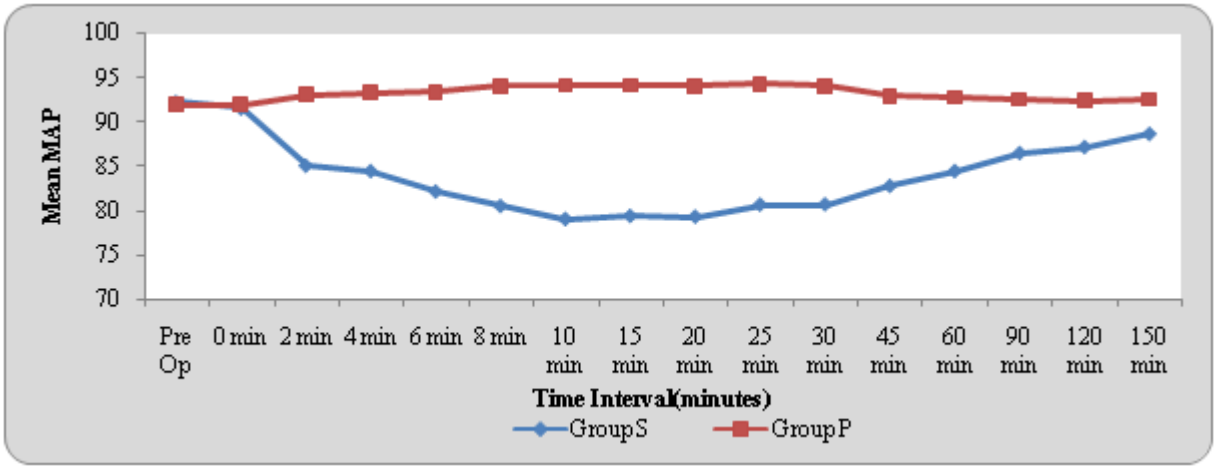

Table 1: Comparison of demographic characteristics and peri-operative variables of paravertebral block and spinal anaesthesia groups

	Group S	Group P	P value
	Mean	Mean	
Age	42.58+_10.54	48.96+_11.73	0.039,S
Height	169.04+_5.68	169.88+_6.49	0.75,NS
Body height	74.24+_12.11	77.68+_9.66	0.38,NS
Site of surgery	Rt 84%, Lt 4%	Rt18%,Lt 7%	0.30,NS
Bromage score	Score IV – 76.92(mean)	No paralysis	
Sensoy level	5 mins	>10 mins	

Table 2: Visual Analogue Scale (VAS) Scores at other measurement time points compared to baseline in the paravertebral block and spinal anaesthesia groups

Time Interval	*Group S*	*Group P*	*p-value*
	Mean	Mean	
0 min	0.00	0.00	-
2 Hr postoperatively	0.00	0.00	-
4 Hr postoperatively	0.00	0.00	-
6 Hr postoperatively	1.28	0.00	0.0001,**S**
12 Hr postoperatively	3.20	1.52	0.0001,**S**
24 Hr postoperatively	4.52	3.20	0.0001,**S**

5. Discussion

Mandal et al. (5) suggested that 2-segment paravertebral block at T10 and L1 could be an alternative to unilateral spinal anaesthesia owing to early mobilization and prolonged analgesic efficacy. These studies support the trials performed to adopt outpatient anaesthesia method in inguinal hernia surgeries and to shorten the duration of hospital stay, in general. Due to the unintended effects of general anaesthesia such as difficulty in recovery and airway suppression, and possibility of haemodynamic instability, high incidence of nausea and vomiting and postoperative headache by spinal anaesthesia, alternative anaesthesia methods are being investigated.In present study we also found that PVB was associated with early ambulation ,better postop analgesia and recovery room bypass. No side effects were noted in either groups.

Naja et al. (6) compared paravertebral block performed with the help of a nerve stimulator with ilio-inguinal nerve block in children that underwent herniorrhaphy.

The two methods were compared in terms of intraoperative haemodynamic stability, postoperative pain scores at rest and during activity, requirement for additional analgesics, and parent satisfaction and it was determined that paravertebral block was superior to ilio-inguinal nerve block. The cases first underwent general anaesthesia and then received regional anaesthesia. Paravertebral block was performed in the cases through three different levels as T12-L1, L1-L2 and L2-L3, and the local anaesthetic drug was injected after observing muscle movements at the related level by a nerve stimulator. In present study we found that PVB is superior to spinal anaesthesia in terms of hemodynamic stability, less postop pain scores and less requirement of analgesics.

Weltz et al. (7) started using lumbar paravertebral block for inguinal hernia surgeries. They thought that paravertebral block would be preferred due to prolonged sensory block characterized by minimal postoperative pain and lower use of narcotics, lower incidence of nausea and vomiting, and shorter hospital care requirement. In present study we also found that in PVB there was less postoperative pain, less requirement of analgesics and PACU bypass but no side effects was found in both the groups.

Aswin A.B. et al (8) conducted a study by giving 2 segment paravertebral block was given in inguinal hernia repair patients they concluded that Paravertebral block can be used as an alternative to spinal anaesthesia in unilateral inguinal hernia repair. Its efficacy can be seen in better hemodynamic control, prolonged postoperative analgesia, no residual motor blockade, early ambulation and decreased urinary retention. The efficiency of Paravertebral block can further be improved by using Peripheral nerve stimulator (PNS) as well as ultra sound guided block while we found that spinal anaesthesia is better than PVB in terms of efficacy, patient cooperation and relaxation, surgeons satisfaction ,time required to perform procedure. We also observed that PVB can be better performed using PNS and USG guided for time saving.

6. Conclusion

From this study we conclude that Spinal anaesthesia is better in terms of efficacy, patient cooperation relaxation, surgeons satisfaction and time required to perform procedure. Paravertebral block is a purely somatic block which does not

prevent the visceral pain during the inguinal hernia repair, arising from pulling the spermatic cord or manipulating the hernia sac. Paravertebral block is advantageous for providing segmental anaesthesia, early ambulation and prolonged pain relief so it can be a better choice for analgesia in high risk patients. Paravertebral block can be performed with the help of peripheral nerve stimulator or ultra sonography guided and should be used in day to day practice.

References

[1] Donati A, Mercuri G, Iuorio S, Sinkovetz L, Scarcella M,Trabucchi C, et al. Hemodynamic modifications after subarachnoid anaesthesia evaluated with tranthoracic echocardiyography. Minerva Anestesiologica 2005; 71: 75-81.
[2] Kopp S, Horlocker T, Warner ME, Hebl JR, Vachon CA, Schroeder DR, et al. Cardiac arrest during neuraxial anesthesia: frequency and predisposing factors associated with survival. Regional Anesthesia 2005; 100: 855-65
[3] Bhattacharya P, Mandal MC , Mukhopadhyay S, Das S, Pal PP, Basu SR. Unilateral paravertebral block : an alternative to conventional spinal anaesthesia for inguinal hernia repair.Acta Anaesthesiol Scand 2010;54:246-51.
[4] Beyaz SG, Ozocak H, Ergonenc T, Erdem AF. The thoracic paravertebral block performed for open cholecystectomy operation in order to anesthesia: Two cases. Anesth Essays Res 2014; 8: 239-42.
[5] Mandal M, Das S, Gupta S, Ghosh T, Basu S. Paravertebral block can be an alternative to unilateral spinal anaesthesia for inguinal hernia repair. Indian J Anaesth 2011; 55: 584-9.
[6] Naja ZM, Raf M, El-Rajab M, Daoud N, Ziade FM, Al-Tannir MA, et al. A comparison of nerve stimulator guided paravertebral block and ilio-inguinal nerve block for analgesia after inguinal herniorrhaphy in children Anaesthesia 2006; 61: 1064-8.
[7] Weltz CR, Klein SM, Arbo JE, Greengrass RA. Paravertebral block anesthesia for inguinal hernia repair. World J Surg 2003; 27: 425-9.
[8] Dr. Aswin A.B. comparision of paravertebral block, IJSRP 2015 fab;5:2