

A COMPARATIVE STUDY OF FIELD BLOCK AND SPINAL ANAESTHESIA FOR INGUINAL HERNIA REPAIR

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Abstract

Background : Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Postoperative pain is an adverse outcome that distresses the patient, prolongs the hospital stay and increases the incidence of admission after surgery .

Aim : To compare the effects of spinal anaesthesia and inguinal field block for inguinal hernia repair

Materials and methods : This is a prospective randomized control study done in 60 patients scheduled for elective inguinal hernia repair who were divided into 2 groups . Group A (n=30) were given spinal anaesthesia and Group B (n = 30) were given inguinal field block . time of onset of block, duration of analgesia , hemodynamic parameters (pulse rate , mean arterial pressure , systolic blood pressure , diastolic blood pressure) were studied . The complications associated with the procedure were studied

Results : The onset of analgesia was 4.27 ± 1.437 minutes in group A (spinal group) and 14.87 ± 6.152 minutes in group B (inguinal block group) . The mean duration of analgesia was 235.47 ± 71.619 minutes in group A whereas in group B , it was 346.97 ± 124.506 minutes . In our present study, in group A, 1 patient (3.3%) felt mild pain, and 1 patient (3.3%) felt moderate pain. However, in group B, 6 patients (20.0%) felt mild pain, and 20 patients (66.7%) felt moderate pain. A significant decrease in mean arterial blood pressure, systolic blood pressure, and diastolic blood pressure was observed in spinal anaesthesia group . There was no significant decrease in heart rate in our present study .

Conclusion : We conclude that the onset of analgesia is quicker in spinal anaesthesia group but the duration of analgesia is prolonged with inguinal field block . Field block is associated with better intraoperative hemodynamic stability and fewer postoperative complications.

Keywords : Inguinal Field Block , hemodynamic stability , postoperative analgesia , VAS score

INTRODUCTION : Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Postoperative pain is an adverse outcome that distresses the patient, prolongs the hospital stay and increases the incidence of admission after surgery. The hernia is defined by Sir Astley Cooper (1804) as "protrusion of any viscus or part of the viscus through an abnormal opening in the walls of its containing cavity. [1]

Inguinal hernia repair is one of the most frequent procedure performed. General, spinal, epidural, local anaesthetic techniques can be used, each having its advantages and disadvantages. General anaesthesia carries risks of possible airway complications, post-operative deterioration of cognitive function, sore throat, nausea, vomiting and a prolonged period of immobilization with an associated risk of deep vein thrombosis and more extended hospital stay. Spinal or continuous epidural anaesthesia allows the surgeon greater freedom to manoeuvre within the operative field since the anaesthetized region is more significant than local anaesthesia. However, these modes of anaesthesia carry their infrequent risks such as urinary retention, prolonged anaesthetic effect, spinal headache. [2]

Local anaesthesia with appropriate analgesia appears to be safe for most of the unilateral open inguinal hernia repair with less post anaesthetic side effects although spinal anaesthesia is more commonly performed .So, we planned a comparative study for inguinal hernia repair under spinal anaesthesia and local anaesthesia with inguinal field block .

AIMS AND OBJECTIVES :

The aim was to compare the effects of spinal anaesthesia and inguinal field block for inguinal herniarepair .

The objectives of the study are

- To study the onset of analgesia , duration of analgesia and quality of analgesia during the intraoperative and postoperative period in the two groups
- To analyze the effects of anaesthesia technique on hemodynamic parameters .
- To study the sideeffects associated with the two techniques.

MATERIALS AND METHODS :

This study was conducted in the Department of Anaesthesiology , Sri Venkateswara Medical College

– Tirupathi . A total of 60 patients undergoing elective unilateral open inguinal hernia repair were included in the study after obtaining informed written consent and ethical committee approval.

STUDY DESIGN : The study was a Prospective, Randomized, comparative study. Sixty patients with ASA grade I & II presenting for elective open inguinal hernia repair were randomly assigned to two groups (30 each) . Only patients meeting the selection criteria were included in the study.

Group A (n= 30) : Patients were administered spinal anaesthesia
Group-B (n = 30) : Patients were given inguinal field block

INCLUSION CRITERIA :

- 1) Patients in the age group of 20-60 years
- 2) ASA category I and II posted for elective inguinal hernia repair
- 3) Patients with a primary uncomplicated hernia
- 4) Patients with a unilateral hernia

5) No known history of allergy, sensitivity or other forms of reaction to anaesthetic drugs

EXCLUSION CRITERIA :

1. Obesity
2. Patients with psychiatric problems
3. Patients with complicated hernias like irreducibility, obstruction, gangrene.

The thorough pre-anaesthetic evaluation was done a day before the elective surgery. History of present complaints, duration of swelling and any coexisting disease, previous surgery etc. were noted. A thorough physical examination , systemic examination and airway assessment was done . Height , weight and vital signs of the patient were recorded . The following investigations were carried out in all the patients : Hemoglobin , bleeding time, clotting time, blood urea, serum creatinine, random blood sugar, ECG. On the day of surgery, an intravenous line was secured with 18 G cannula. Standard monitors such as NIBP, ECG, Pulse oximeter monitors were connected, and baseline pulse rate, blood pressure, ECG, respiratory rate and SpO₂ were recorded. Patients were given respective anaesthesia techniques. Group A received Spinal anaesthesia in sitting or lateral position with 25 gauge Quincke spinal needle in L3-L4 intervertebral space with 3 ml of 0.5% bupivacaine . Group B received field block technique . The skin was prepared using strict aseptic technique. The local anaesthetic (0.25% Bupivacaine) was prepared . A skin wheal was raised 2 cm medial and 2 cm superior to anterior superior iliac spine. The spinal needle was inserted through the skin puncture site perpendicular to the skin. Increased resistance is appreciated as the needle encounters the external oblique aponeurosis, and the first loss of resistance was felt as the needle passes through the muscle lie between it and internal oblique. After the initial loss of resistance and negative aspiration for blood, 7-8 ml of local anaesthesia was injected. The needle

was further advanced down to appreciate the second loss of resistance as it crosses the internal oblique and lies between the internal oblique and transversus abdominis muscle. Another 7-8 ml of local anaesthesia was injected. The needle then was withdrawn till the skin and redirected at an angle of 45 degrees towards the inguinal ligament's midpoint to pierce the external oblique and internal oblique muscles. After each loss of resistance, 7-8 ml of local anaesthesia was administered. The remaining amount prepared was preserved for further supplementation during sac dissection if required.

PARAMETERS STUDIED : The following parameters were studied

1. Time of onset of block and duration of block
2. Pulse rate(PR), systolic blood pressure (SBP), diastolic blood pressure (DBP), Mean arterial pressure (MAP), Oxygen saturation (SPO2) were monitored intraoperatively and postoperatively
3. Quality of analgesia using Visual Analog score (VAS score)

STATISTICAL ANALYSIS : Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean \pm SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5% level of significance. Paired sample t-test has been used to find the significance of study parameters between two groups of patients. Chi-square /Fisher exact test has been used to find the significance of study parameters on categorical scale between two groups. P value less than 0.05 was taken as statistically significant .The Statistical software namely SPSS 21.0, MedCalc 9.0.1, were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS :

A total of 60 patients undergoing hernia surgery were randomly allocated into two groups as follows: Group A : Patients received spinal anaesthesia Group B : Patients received field block.

The mean age of the patients in group A was 42.63 ± 10.519 years while in group B was 47.07 ± 10.636 . The results was not statistically significant ($p=0.343$) . The mean onset of block in Group A was 4.27 ± 1.437 minutes where as in Group B was 14.87 ± 6.152 minutes which was statistically significant ($p<0.001$). The mean duration of analgesia was 235.47 ± 71.619 minutes in group A whereas in group B , the mean duration of analgesia was 346.97 ± 124.506 minutes which was statistically significant ($p=0.000$).

TABLE 1 : ONSET OF BLOCK

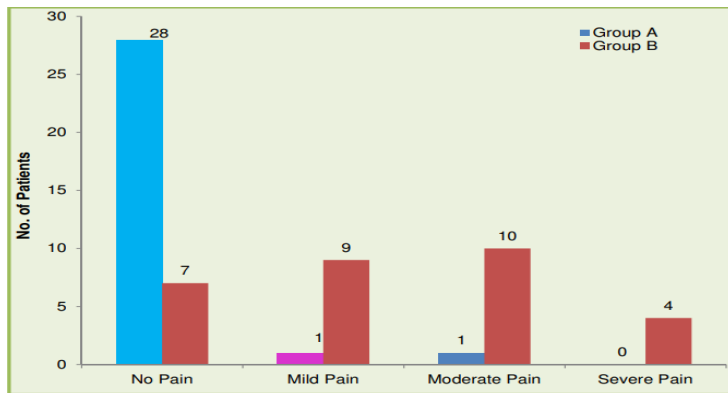
Onset of Block (in mts)	Group					
	Group A		Group B		Total	
	No. of Patient	%	No. of Patient	%	No. of Patient	%
2 - 3	8	26.7	2	6.7	10	16.7
4 - 5	21	70.0	1	3.3	22	36.7
Above 5	1	3.3	27	90.0	28	46.7
Total	30	100.0	30	100.0	60	100.0
Mean block	4.27± 1.437		14.87± 6.152		9.57± 6.941	
Chi-square	X ² Value =45.925 df = 2; p=0.000 (Highly significant) (p<0.001)					

TABLE 2 : DURATION OF BLOCK

	Group A(n=30) Mean± SD	Group B (n=30) Mean± SD	Mean Difference	P-value	Sig.
Duration of analgesia (in min)	235.47 ± 71.619	346.97 ± 124.506	-111.50	0.000**	Significant

Out Of 30 patients in group A, 28 patients complained of no pain, 1 patient had mild pain and 1 patient had moderate pain whereas in group B, 7 patients had no pain, 9 patients had mild pain, 10 patients had moderate pain, 4 patients had severe pain which was statistically highly significant (p=0.000).

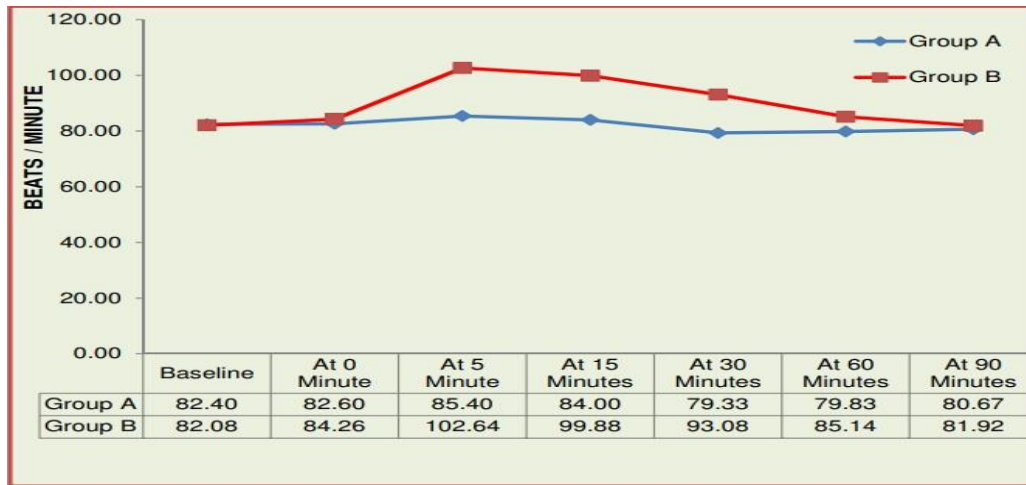
GRAPH 1 : VAS SCORE



HEMODYNAMIC PARAMETERS :

In Group A, the mean heart rate was 82.40±14.369 per minute which was increased to 84.00±19.412 at 15 minutes .in Group B, the mean heart rate was 79.30±10.083 per minute which was decreased to 77.23±11.116 minutes at 15 minutes. However, there was no statistically significant difference in the heart rate difference between the two groups at any time interval (p>0.05).

GRAPH 2 : HEART RATE



graph 3 shows the comparison of mean arterial pressure at 0,5,15,30,60,90 minutes among the group A and Group B .The difference between the mean arterial pressure between the two groups were statistically significant.

TABLE 3 : DIFFERENCE IN MAP

Time Interval (min)	Group A (n=30) Mean±SD	Group B (n=30) Mean±SD	Mean Difference	P-value	Sig.
Baseline	91.74±9.436	94.55±6.054	-2.81	0.214	Not Significant
0 Min	93.78±8.342	94.60±6.062	-0.82	0.696	Not Significant
5 Min	86.73±6.777	92.32±6.457	-5.59	0.007	Significant
15 Min	86.33±6.738	92.80±6.150	-6.47	0.000	Significant
30 Min	88.38±7.187	93.44±6.447	-5.06	0.003	Significant
60 Min	89.41±7.308	95.65±7.604	-6.24	0.001	Significant
90 Min	90.64±7.472	97.56±8.101	-6.92	0.002	Significant

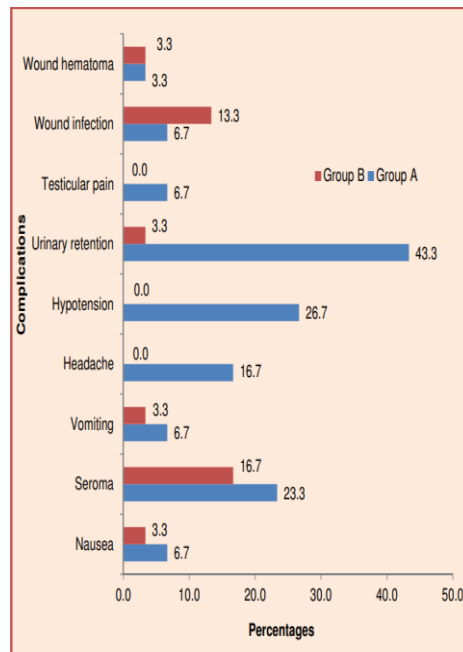
COMPLICATIONS :

Complications like nausea, vomiting, headache, hypotension, urinary retention, testicular pain were more in group A whereas local complications like wound infections were more in group B

TABLE 4 : COMPLICATIONS

GRAPH 3 : COMPLICATIONS

Complications	Group	
	Group A (n=30)	Group B (n=30)
	No. of Patients	No. of Patients
Nausea	2 (6.7)	1(3.3)
Seroma	7(23.3)	5(16.7)
Vomiting	2(6.7)	1(3.3)
Headache	5(16.7)	0(0.0)
Hypotension	8(26.7)	0(0.0)
Urinary retention	13(43.3)	1(3.3)
Testicular pain	2(6.7)	0(0.0)
Wound infection	2(6.7)	4(13.3)
Wound hematoma	1(3.3)	1(3.3)



DISCUSSION :

Inguinal hernia repair, which is the commonest surgery, has been performed under general, spinal, epidural, and local anaesthesia techniques. According to recent European Hernia society guidelines,

in an open hernia repair, the local anaesthetic should be considered for all adult primary reducible unilateral inguinal hernia. [3] There is a level of inertia in adopting this technique among anaesthesiologists.

Initially, the surgeon used to give local anaesthesia at the operation site but this did not provide complete anaesthesia. Ilioinguinal and iliohypogastric nerve block provides somatic block over the lower abdomen, and visceral pain is often relieved by giving supplemental local anaesthetic at the time of sac dissection. This study evaluated the efficacy, safety, feasibility, advantages, and complications of ilioinguinal and iliohypogastric nerve block by a single puncture technique combined with wound infiltration through the same puncture compared to spinal anaesthesia. We chose the modification of Dalen's technique used in children. It was described by P Carre et al., [4] The advantage of using a single puncture technique is less discomfort to the patient by avoiding multiple punctures as described in classical technique. Multiple puncture techniques of inguinal field block were associated with transient femoral nerve palsy causing weakness of knee extensors, cord hematoma, thrombosis of the dorsal vein of the penis, wound

hematoma, and wound infection

The present study is a hospital-based randomized clinical study in 60 patients scheduled to undergo elective hernia repair. In the present study, the mean age was 42.63 ± 10.519 in group A and 47.07 ± 10.638 in group B and all the patients were males. Age and sex incidence of patients in our study were similar to other studies. [5 , 6]

The time of onset of analgesia was taken from completion of the study drugs injection until the patient did not feel pinprick at the incision site. The present study compared ilioinguinal, iliohypogastric nerve block with spinal anaesthesia for inguinal hernia repair for the onset of analgesia and found 4.27 ± 1.437 minutes in group A (spinal group) and 14.87 ± 6.152 minutes in group B (inguinal block group) (p-value < 0.001). Our study results are inconsistent with Pramod et al. [7] and Khedkar et al.[8] , The results of our study are inconsistent with chatrapati et al.,[9] in a spinal group. Still, in the ilioinguinal and iliohypogastric nerve block group, our study results are not inconsistent with chatrapati et al., the reason being in our study, we used Bupivacaine alone. In contrast, Chatrapati et al., used bupivacaine 0.5% + 2% lignocaine with adrenaline. So the onset of analgesia was faster in Chatrapati et al. than in our study. Our study's result is not consistent with Fekrey et al., [10] in a spinal group because we used Bupivacaine alone. In contrast, Fekrey et al., used 0.5% bupivacaine + 25 microgram fentanyl as an adjuvant. So the onset of analgesia was faster in study done by Fekrey et al.,

Pain is the most common concerning factor for the patient undergoing surgery. Although pain is typically regarded as a primary indicator of tissue damage, it does not always correlate with an identifiable causative injury. The perception of pain is supported by sensory neurons (nociceptors) and neural afferent pathways. Both spinal and local anaesthesia involves limited body areas and does not interfere with other organs and ventilation. Spinal anaesthesia can produce complete sensory and motor blockade. The local anaesthetic technique's success, consisting of a blockade of the ilioinguinal and iliohypogastric nerves, depends on a thorough understanding of nerves' anatomy. In our present study, in group A, 1 patient (3.3%) felt mild pain, and 1 patient (3.3%) felt moderate pain. However, in group B, 6 patients (20.0%) felt mild pain, and 20 patients (66.7%) felt moderate pain. The difference is statistically significant (p=0.00). The results of our study were comparable to other studies. [7,8,9,10]

The present study compared ilioinguinal and iliohypogastric nerve block with spinal anaesthesia for inguinal hernia repair and found a statistically significant decrease in mean arterial blood pressure, systolic blood pressure, and diastolic blood pressure of spinal anaesthesia as compared to preoperative values in the first 30 minutes. There was a statistically significant difference in mean arterial blood pressure, systolic blood pressure, and diastolic blood pressure between both groups. The study conducted by Nehme et al., [11] found that hypotension incidence was highest in spinal anaesthesia cases (19 %). Our results are consistent with other studies. The significant decrease is due to the sympathetic blockade caused by spinal anaesthesia, leading to vasodilation, Peripheral venous pooling, and decreased cardiac output. The intraoperative fluid requirement was higher in spinal anaesthesia to expand the intravascular compartment and maintain good intravascular volume and blood pressure. Therefore, ilioinguinal and iliohypogastric nerve block can be a choice technique in patients with low ejection fraction.

There was no significant decrease in heart rate in our present study, and none of the patients in either group, especially group B, where spinal anaesthesia was given developed bradycardia.

It is observed that local anaesthesia for inguinal hernia repair causes a minimal physiological disturbance. This may be particularly useful for patients with cardiovascular and respiratory diseases and geriatric patients with compromised cardiorespiratory reserve.

The inguinal hernia repair is a common surgery with almost no mortality. The emphasis is on low recurrence rates and other complications like nausea and vomiting, urinary retention, hypotension, wound hematoma, wound sepsis, testicular pain/swelling, headache, and respiratory complications. The choice of anaesthesia depends on low complication rates.

Postoperative nausea and vomiting (PONV) still is the most troublesome adverse event encountered in the recovery room, despite advances in prevention and treatment. The present study compared ilioinguinal, iliohypogastric nerve block with spinal anaesthesia for inguinal hernia repair, and found a 6.7 % incidence in the spinal anaesthesia group. In contrast, its incidence was 3.3 % of the local anaesthesia group. Our results are consistent with Parmod Kumar et al., [7] Chatrapati et al., [9] Anurag Jain et al., [12] Natasha et al., [13] S. Sesaiah et al., [14] in the spinal anaesthesia group and are consistent with Anurag Jain et al., Natasha et al., S.Sesaiah et al., in the local anaesthesia group.

Postoperative urinary retention is common after anaesthesia and surgery. The incidence of postoperative urinary retention is also affected by the anaesthesia technique. Urinary retention is thought to be secondary to the prolonged block of bladder autonomic innervations. It may also be related to the age of the patient and

the volume of the fluid received. In the present study, 1 patient (3.3%) complained of urinary retention in the local anaesthesia group, whereas 13 patients (43.3%) complained of urinary retention in the spinal anaesthesia group.

Our present study showed a 26 % incidence of hypotension whereas 0% incidence in the local anaesthesia group. The difference was statistically significant.. The results of the present study was comparable to Chatrapati et al., [9]

In the present study, wound sepsis was present in 2 patients (6.7%) in group A (spinal anaesthesia) and 4 patients (13.3%) in group B (local anaesthesia). The study conducted by Pradeep Goel et al., [6]

found that wound infection was present in 1 patient (4%) of group A (Local anaesthesia) and 3 patients (12%) patients of group B (spinal anaesthesia).

In the present study, 5 patients (16.7%) complained of headaches, whereas in group B (local anaesthesia group), none complained of headaches. Headache was probably due to dural puncture in the spinal anaesthesia group.

LIMITATIONS :

Since the study did not include the pediatric population, so could not access opinions regarding local anaesthesia's feasibility in this age group.

CONCLUSION :

The conclusion of our study is as that -

1. Field block provides prolonged postoperative analgesia, although the onset of anesthesia is earlier in spinal anaesthesia. Thus our study concluded that local anaesthesia is superior to spinal anaesthesia for postoperative analgesia.
2. Field block is associated with better intraoperative hemodynamic stability and fewer postoperative complications.
3. Field block can be an alternative technique for patients with complex medical conditions who are unsuitable for spinal and general anaesthesia .

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