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Comparison of Ilio-inguinal Ilio-hypogastric nerve block with spinal anesthesia for inguinal hernia repair

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Abstract
Introduction: spinal anaesthesia is most widely employed form of regional anaesthesia for lower abdominal and lower limb surgery. Hernioplasty under local anaesthesia is an acceptable alternative to spinal anaesthesia especially with regard to operative condition, patient's satisfaction, surgeon's satisfaction, post-operative pain relief, complications and cost effectiveness. The aim of our study was to compare the efficacy and safety of ilioinguinal iliohypogastric nerve block with spinal anaesthesia for inguinal hernia surgery.
Material and Methods: The study was a prospective randomized double blind study conducted in 80 patients of ASA Grade I, II and III of age group 30-70 years undergone unilateral open inguinal hernia repair. Patients were randomly divided into two groups with 40 patients in each group. Group I patients received 3 ml (15 mg) of 0.5% hyperbaric bupivacaine intrathecally in lateral decubitus position at L4-L5 lumbar interspace and will be immediately turned supine (spinal anaesthesia group). Group II patients received Ilioinguinal Iliohypogastric nerve block with 0. 5% ropivacaine combined with dexmedetomidine 1µg/kg at 2 cm medial and 2 cm above the anterior superior iliac spine (IHNB group). Time of onset of analgesia, duration of surgery and duration of post-operative analgesia were monitored. Haemodynamic parameters, Sedation score, Intra-operative complications, time to ambulation were noted. Patient satisfaction, Surgeon satisfaction were assessed. Postoperatively, VAS score was recorded hourly for six hours.
Results: Mean blood pressure showed statistically significant reduction in first 25 minutes Group I patients, there was significant difference between both the groups (p value<0.05). The duration of analgesia in group I was 194. 60±35. 7 minutes and in group II was 413.90±13.2 minutes. It was statistically highly significant as the p value was <0.05. The duration of postoperative analgesia was longer in Group II (p<0.05). The time to ambulation in group I and group II was 291.25±32.24 mins and 119.90±26.98 mins respectively. Duration of ambulation was significantly shorter in Group II (p<0.05).
Conclusion: Our study concluded that iIlioinguinal iliohypogastric nerve block provides better intra-operative hemodynamic stability, prolonged the duration of postoperative anaesthesia although onset of analgesia is earlier with spinal anaesthesia. Patients with ilioinguinal iliohypogastric nerve block ambulate earlier and have short hospital stay than patients with spinal anaesthesia Thus our study demonstrated that ilioinguinal iliohypogastric nerve block is superior to spinal anaesthesia for post-operative analgesia.

Keywords: Ilioinguinal/iliohypogastric nerve block, spinal anaesthesia, inguinal hernia repair

Introduction

Inguinal hernia is one of the commonest type of hernia found in any age group especially in elderly age group. General, regional and local anaesthesia can be used for patients undergoing hernia repair surgery [1]. The choice of the anaesthesia not only depends on the physical status of patient but also on patient's acceptance, surgeon's requirements, safety, feasibility and cost etc. The choice of spinal anaesthesia may be due to surgical consideration, anaesthetic benefits and the patient's request [2]. General anaesthesia with short acting agents may be a valid alternative but it unnecessarily puts patients at higher risk of other metabolic and systemic derangements particularly pulmonary and cardiovascular complications [3]. Local inguinal field block which includes the blockade of ilioinguinal and iliohypogastric nerves may be an ideal technique as it blocks the surgical stress, provides better hemodynamic stability, extended analgesia, early ambulation and is associated with low risk of complications [4]. The local nerve block can be easily given to these patients due to their higher pain tolerance and higher co-operation. And as the local nerve block gives rise to least physiological disturbance in patient's internal milieu, local anaesthesia offers many advantages like safety, less cost, prolonged postoperative analgesia, reduced incidence of nausea and vomiting, shorter hospital stay, rapid return to normal activity and more patient acceptability [5]. Hernioplasty under local anaesthesia is an acceptable alternative to spinal anaesthesia especially with regard to operative condition, patient's satisfaction, surgeon's satisfaction, post-operative pain relief, complications and cost effectiveness [6]. Illioinguinal illiohypogastric nerve block provides longer postoperative analgesia and earlier discharge, although takes more time to perform and to produce maximum effect, for single sided inguinal hernia repair [7]. Bupivacaine is the first agent which shows a relative specificity for sensory fibres such that adequate sensory analgesia without profound inhibition of motor

fibres could be achieved [8]. Ropivacaine is a well tolerated regional anaesthetic effective for surgical anaesthesia as well as the relief of postoperative pain. The efficacy of ropivacaine is similar to that of bupivacaine and levobupivacaine for peripheral nerve blocks and, although it may be slightly less potent than bupivacaine when administered epidurally or intrathecally, equieffective doses have been established [9]. Dexmedetomidine; a highly selective, α2-adrenergic agonist; has analgesic, sedative, anesthetic sparing effects when used in systemic route [10]. Use of dexmedetomidine as an adjuvant mixed with local anesthetics has been performed with neuraxial anesthesia in both adult and pediatric patients [11, 12].

Therefore we designed a prospective randomized and controlled clinical study to compare the efficacy and safety of ilioinguinal iliohypogastric nerve block with spinal anaesthesia for inguinal hernia surgery.

Methods

The study was a prospective randomized double blind study conducted in 80 patients of ASA Grade I, II and III of age group 30-70 years undergone unilateral open inguinal hernia repair in Rajindra Hospital, Government Medical College, Patiala after obtaining the approval from Institute's Ethical Committee. Exclusion criteria included patient's refusal, any spine abnormality, altered coagulation profile, allergy to local anaesthetic, recent myocardial infarction, significant aortic stenosis, patients with neurological disorders, cardiac or respiratory system failure, any major hepatic or renal problem.

After taking a written informed consent, patients were randomly divided into two groups with 40 patients in each group:

Group I: Patients received 3 ml (15 mg) of 0.5% hyperbaric bupivacaine intrathecally in lateral decubitus position at L4-L5 lumbar interspace and will be immediately turned supine (spinal anaesthesia group).

Group II: Patients received Ilioinguinal Iliohypogastric nerve block with 0.5% ropivacaine combined with dexmedetomidine 1µg/kg at 2 cm medial and 2 cm above the anterior superior iliac spine (IHNB group).

Patients were familiarized with the visual analogue scale (VAS) (0 – No pain, 10 – Worst pain) a day before surgery.

Visual analogue scale (VAS) [13].

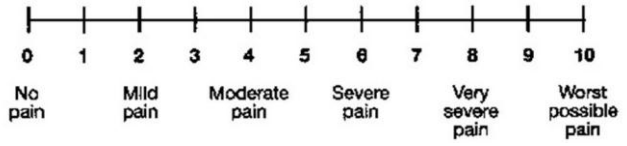

Fig 1

Procedure

Patients were advised 8 hours of fasting and were given tab alprazolam (0.25mg) HS and 6 am on day of surgery. In the operating room, after attaching routine monitors (electrocardiograph, noninvasive blood pressure, pulse oximeter), baseline BP (systolic, diastolic and mean), heart rate, respiratory rate and peripheral oxygen saturation (SpO2) were recorded before the procedure. Intravenous access was secured with 18G cannula. Group I patients were preloaded with 10ml/kg of Ringer's lactate solution. The patient were positioned in lateral decubitus position. Under all aseptic precautions parts was cleaned & draped and L4-L5 space was identified and 2ml of 2% lignocaine was infiltrated locally. Subarachnoid block was given at the L4-L5 interspace with a 25G Quinke's spinal needle and 3 mL of 0.5% hyperbaric bupivacaine was injected intrathecally at rate of 0.2ml/sec. The patients were immediately turned supine. Oxygen was provided via venturi mask at the rate of 4 L/min. Group II patients received Ilioinguinal/ Iliohypogastric nerve block. Under all aseptic condition solution was prepared with 30ml 0.5% ropivacaine combined with dexmedetomidine 1µg/kg. Max dose of ropivacaine was calculated according to the weight of the patient. A skin wheal was raised 2cm medial and 2cm superior to the anterior superior iliac spine. At this point 23 gauze 3 inch needle with attached syringe filled with local anesthetic solution, was inserted perpendicular to the skin. Two resistances were felt suggestive of external oblique aponeurosis and internal oblique muscle respectively. Needle was inserted through the skin and increased resistance was appreciated as needle encounters the external oblique aponeurosis and first loss of resistance was felt as the needle passes through the muscle to lie between it and the internal oblique. After the initial loss of resistance and negative aspiration for blood, 5-6 ml of local anaesthetic was injected. The needle then further moved down to appreciate second loss of resistance as it crosses the internal oblique and lie between it and transversus abdominis muscle. Another 5-6 ml of local anaesthetic was injected. Then needle was withdrawn 1-2 mm, 2-3 ml also injected in fan shape manner in subcutaneous tissue. At this point ilioinguinal, iliohypogastric and lower thoracic nerves were blocked. A point 1 cm above the pubic tubercle on the side to be operated was marked. With 23 gauze 1.5 inch needle with attached syringe inserted towards anterior superior iliac spine and 5-6 ml of local anesthetic solution was injected in subcutaneous tissue. At this point ilioinguinal nerves from same and opposite side are blocked. 5-6 ml of local anesthetic solution was injected with 23 gauze 1.5 inch needle subcutaneously along the proposed incision line and a stripe of 2 cm was raised. This blocks the subcutaneous nerves. Oxygen was provided via venturi mask at the rate of 4 L/min in all the patients.

Observation and Monitoring

Following observations was made after giving block.

Hemodynamics parameters, Heart Rate, SBP, DBP, MAP, Respiratory Rate and SpO2 was recorded after every 5 minutes for 30 minutes after block and thereafter every 15 minutes till end of surgery. Heart rate less than 60 per minute was taken as bradycardia and treated with intravenous injection atropine 0.3mg. Fall in systolic blood pressure less than 90mmHg or more than 20 percent of fall from baseline value was taken as hypotension. It was treated with intravenous bolus dose of mephentermine 5 mg.

Clinically the time of onset of analgesia, duration of surgery and duration of post-operative analgesia were monitored. Time of onset of analgesia was taken from completion of injection of study drugs till patient didn't felt pin prick at incision site. In the circumstances of inadequate or patchy action of block, the block was supplemented with inj fentanyl 1-2µg /kg or general anaesthesia.

Intra-operative complications like spinal/block failure, nausea, vomiting, hypotension, bradycardia were noted. Duration of post-operative analgesia was taken as time from

end of surgery till the time of giving first rescue analgesic. Sedation Score was assessed by as:- 0-arousable, 1-arousable to voice, 2-arousable to pain and 3-unarousable. Time to ambulation was noted.
Patient satisfaction, Surgeon satisfaction were assessed using a 3-point scale (0 = unsatisfied; 1 = somewhat unsatisfied, 2 = satisfied).
Postoperatively, VAS score was recorded hourly for six hours. In patients with a VAS score of ≥4, intramuscular Diclofenac (75 mg) will be administered as rescue analgesic and the duration of analgesia was noted.
All the data was analysed statistically.

Statistical Analysis
Analysis was conducted using IBMM SPSS statistics (version 22.0). Numerical data was expressed as mean and standard deviation and statistically analysis was done using the independent t test to compare the two groups. For skewed data/scores Mann-Whitney U-test was used. The p value of <0.05 was considered statistically significant and the p value of <0.001 was considered statistically highly significant.
Sample size was estimated based on pilot study, we see that mean difference in duration of analgesia in 2 groups was 150.26 minutes with SD of 195.85. With this our sample size n=36 per group at a power of 90% and confidence interval 95%. For possible dropouts, it was decided to include 40 patients per group.

$$N=(Z_{\alpha/2}+Z_{\beta})^2 *2*\sigma^2 / d^2,$$

Where $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$, Z_{β} is the critical value of the Normal distribution at β, σ^2 is the population variance and d is difference between 2 means.

Results
Demographic data were comparable in both the groups (Table 1 and 2). Mean blood pressure showed statistically significant reduction in first 25 minutes ($p<0.05$) (Fig. 1). None of the patients in either group developed bradycardia and required vasopressors. Onset of analgesia was comparable in both the groups (5.20±1.69 in Group I vs 14.67±0.97 min in Group II p-<0.001) (Table 3). The duration of postoperative analgesia was longer in Group II (194.60±35.70 vs 413.90±13.22 mins) ($p<0.001$) (Table 4). 12.5 % patients had failure of inguinal field block where as spinal anaesthesia failed in 0% patients (Table 5). Duration of ambulation was significantly shorter in Group II as compared to Group I (291.25±32.24 vs 119.90±26.98 mins) ($p<0.001$) (Table 6).

Table 1: Age

Years	Group I		Group II	
	Number	Percentage	Number	Percentage
31-40	6	15.0	2	5.0
41-50	11	27.5	14	35.0
51-60	16	40.0	17	42.5
61-70	7	17.5	7	17.5
Total	40	100.0	40	100.0
Chi Square	2.390			
P value	0.495			
Significance	NS			

Table 2: Weight and Height

	Groups	Mean	S.D	P value	Significance
Weight (kg)	Group I	78.7500	5.55047	0.142	NS
	Group II	80.6750	6.04423		
Height (cms.)	Group I	174.05	4.25441	0.877	NS
	Group II	173.90	4.36066		

Table 3: Time of onset of analgesia

Groups	Mean (minutes)	S.D (minutes)	P value	Significance
I	5.2000	1.69766	<0.001	HS
II	14.6750	0.97106		

Table 4: Duration of analgesia

Groups	Mean (minutes)	S.D (minutes)	P value	Significance
I	194.60	35.70305	<0.001	HS
II	413.90	13.22740		

Table 5: Complications

Complication	Group I	Group II	P value
Hypotension	0%	0%	-
Nausea and Vomiting	7.5%	0%	0.077
Spinal and Block Failure	0%	12.5%	-
Urinary Retention	15%	0%	0.011

Table 6: Time to ambulation

Groups	Mean(minutes)	S.D(minutes)	P value	Significance
I	291.25	32.24486	<0.001	HS
II	119.90	26.98224		

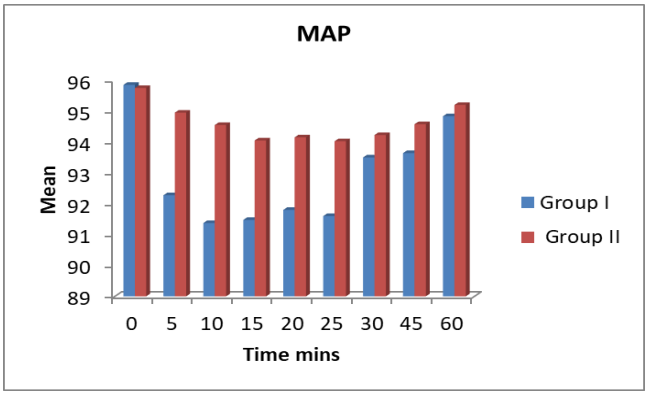

Fig 1

Discussion
Inguinal hernia repair which is the commonest surgery has been performed under general, spinal, epidural and local anaesthesia techniques with varying success. According to recent guidelines of European Hernia Society, in the case of an open repair, local anaesthetic should be considered for all adult patients with a primary reducible unilateral inguinal hernia [14]. Inspite of this, there is great level of inertia in adopting this technique among anaesthesiologists. Inguinal field block is one of the oldest techniques in practice since decades [4].
The two groups were comparable in terms of age, height and weight distribution. Both the groups had comparable preoperative hemodynamics parameters as well as duration of surgery.

Onset of Analgesia
Time of onset of analgesia was taken from completion of

injection of study drugs till patient didn't felt pin prick at incision site. From where you are here.

The present study compared ilioinguinal iliohypogastric nerve block with spinal anaesthesia for inguinal hernia repair for onset of analgesia and found 5.20±1.69 minutes in group I(spinal group) and14.67±0.97 minutes in group II(inguinal block group) (p value <0.001).

Khedkar *et al*. (2015) compared the onset and duration of motor and sensory nerve block, the drug volume required and time to rescue analgesic between ultrasound- guided nerve block and conventional technique and found that the onset of sensory block in conventional technique(group A)15.57 ± 1.522 minutes and 14.033 ± 2.822 minutes in ultrasonographic technique (group B) which is significant (p = 0.047) [15].

Chhatrapati *et al*. (2016) compared efficacy, feasibility and safety of ilioinguinal and iliohypogastric nerve block for inguinal hernia repair with spinal anaesthesia and found that the onset of action was 6.2244 ±1.04 minutes in spinal group (group II) and 6.567±0.4037 minutes in block group (group I) which was not significant (p>0.05) [16].

Fekry*et al*. (2017) evaluated the effectiveness, safety and complications of ultrasonography guided ilioinguinal and iliohypogastric nerve block and genital branch of genitofemoral nerve (GF) block in comparison with spinal anaesthesia for inguinal hernia repair surgeries and found that the onset of sensory block was 3.10±0.70 minutes in spinal group (group 2) and 9.19±2.54minutes in block group (group 1) and the difference was statistically significant with P value < 0.001 [17].

Result of our study are in consistent with the study of Khedkar *et al*. The result of our study are in consistent with study of Chhatrapati *et al*. in spinal group (table no. 22) but in ilioinguinal iliohypogastric nerve block group result of our study are not inconsistent with Chhatrapati *et al*. reason being in our study we used ropivacaine 0.5% + dexmedetomidine 1 µg/kg body weight while Chhatrapati el al used bupivacaine 0.5% plain+ lignocaine 2% with adrenaline so onset of analgesia is faster in Chhatrapati *et al*. than our study.

The result of our study are not consistent with the study of Fekry *et al*. in spinal group because we used bupivacaine alone while Fekry *et al*. used 0.5% bupivacaine + 25 µg fentanyl as adjuvant. So onset of analgesia was faster in Fekry *et al*. Result of our study are also not consistent in block group because we used ropivacaine 0.5% + dexmedetomidine 1 µg/kg body weight, while Fekry *et al*. used 25ml bupivacaine 0.5% + genital branch of genitofemoral nerve block so onset of analgesia was faster in Fekry *et al*. group.

Duration of analgesia

Duration of analgesia was taken as time from the administration of the block till the administration of first rescue analgesic or VAS score ≥ 4.

The Present study compared ilioinguinal iliohypogastric nerve block with spinal anesthesia for inguinal hernia repair and found that VAS score reaches≥ 4 earlier in group I (spinal group) as compared to group II (IHNB). So duration of analgesia was 194.60±35.70minutes in group I and 413.90±13.22 minutes in group II.

Khedkar *et al*. (2015) compared the onset and duration of motor and sensory nerve block, the drug volume required and time to rescue analgesic between ultrasound guided and conventional technique and found that the duration of analgesia was 6.8±0.70hours in conventional technique (group I) and 7.22±0.97hours in ultrasound guided technique(group II). The difference being statistically insignificant (p>0.05) [15].

Ninave *et al*. (2015) compared 2mg/kg of 0.5% Inj bupivacaine and 2 mg/ kg of 1% Injropivacaine for intraoperative and postoperative analgesia by Ilioinguinal nerve blocks in paediatric herniotomy and found that the average duration of analgesia was 390.2±35.16 minutes in bupivacaine (group A) and 377.0±34.41 minutes in ropivacaine(group B), the difference being statistically insignificant [18].

Chhatrapati *et al*. (2016) compared efficacy feasibility and safety of ilioinguinal and iliohypogastric nerve block for inguinal hernia repair with spinal anaesthesia and found that duration of analgesia was3.87 + 0.482 hours in spinal group (group I) and5.16 + 0.45hours in block group, the result being statistically significant as p value <0.05 [16].

Fekry *et al*. (2017) evaluated the effectiveness, safety, and complications of ultrasound guided ilioinguinal iliohypogastric nerve block and genital branch of genitofemoral nerve (GF) block in comparison with SA for inguinal hernia repair surgeries and found that the duration of sensory block was3.71 + 0.64 hours in spinal group (group 2)and 4.49 + 0.47 in IHNB group (group 1). Thus the demand for first rescue analgesia was significantly earlier in group II (spinal group) (p<0.001) [17].

Thus the result of our study are in consistent with the studies of Khedkar *et al*. and Ninave *et al*. Result of our study are inconsistent with the result of Chhatrapati *et al*. in spinal group while the result of our study are not consistent with the study of Chhatrapati *et al*. in block group, because we used ropivacaine 0.5% + dexmedetomidine 1 µg/kg body weight while Chhatrapati *et al*. used 0.5% bupivacaine +2% lignocaine with adrenaline in block group. So our study had longer duration of analgesia in block group.

The result of our study in spinal group are in consistent with the study of Fekry *et al*. but in block group our result are not in consistent with study of Fekry *et al*. reason being we used 0.5% ropivacaine + dexmedetomidine 1 µg/kg body weight in block group while Fekry *et al*. used 0.5% bupivacaine + genital branch of genitofemoral nerve block in block group, showing that duration of analgesia was longer in our study then Fekry *et al*.

Complications

Nausea and vomiting 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 anesthesia for inguinal hernia repair and found 7.5% incidence of nausea and vomiting in spinal group (group I)and no case reported in IHNB group(group II).

Dhanashree *et al*. (2014) compared the ilioinguinal iliohypogastric nerve block and spinal anaesthesia for hernia repair as day care surgery and found the 3.3% incidence of nausea and vomiting in spinal group and 3.4% in IHNB group(p>0.05) [20].

Chhatrapati *et al*. (2016) compared the efficacy, feasibility and safety of ilioinguinal and iliohypogastric nerve block for inguinal hernia repair with spinal anaesthesia and found

3.3% incidence of nausea and vomiting in spinal group and no case was reported in IHNB group(p>0.309) [16].
Hiquemat *et al*. (2017) compared the outcome of hernia repair done under spinal and local anaesthesia in relation to intra operative and postoperative events and found the incidence of nausea and vomiting inspinal anaesthesia group was 10% and local anaesthesia group was 6.67% (p>0.64) [20].
In agreement with the present study Chhatrapati *et al*., Dhanashree *et al*. and Hiquemat *et al*. showed statistically insignificant difference in incidence of nausea and vomiting.

Urinary retention
Postoperative urinary retention is common after anaesthesia and surgery. The incidence of postoperative urinary retention is also affected by anaesthetic technique.
In the present study none of the patients who underwent hernioplasty under ilioinguinal iliohypogastric nerve block had postoperative urinary retention, while 6 (15%) of patients operated under spinal anaesthesia had postoperative retention and required catheterisation. This was statistically significant (p=0.011). Dhanashree *et al*. (2014) compared the ilioinguinal iliohypogastric nerve block and spinal anaesthesia for hernia repair as day care surgery and reported that 10%patients had urinary retention following administration of spinal anaesthesia and no patients in the IHNB group required catheterization for postoperative urinary problems [20]. Chhatrapati *et al*. (2016) reported that 16.67% patients operated under spinal anaesthesia had urinary retention after surgery and no patients in the IHNB group had postoperative urinary retention (p value = 0.014) [16]. Hiquemat *et al*. compared the outcome of hernia repair done under spinal and local anaesthesia in relation to intra operative and postoperative events and found the incidence urinary retention in spinal anaesthesia group was 20% and in local anaesthesia group was 0% which was significant (p value 0.0098) [20].
Thus the result of present study are in consistent with above studies of Chhatrapati *et al*., Dhanashree *et al*. and Hiquemat *et al*.

Spinal and block failure
In the present study there was no spinal anaesthesia failure in Group I. In Group II, 5 patients (12.5%) experienced discomfort during dissection of hernia sac because of inadequate block, the pain subsided after 4-5 ml of local anaesthetic infiltration at the neck of sac. In similar studies done by Chhatrapati *et al*. (2016) there was one spinal anaesthesia failure (3.3%) in spinal group (Group II) and in IHNB group(Group I) three patients (10%) had to be given general anaesthesia because of inadequate block [16].
Thus the result of present study are in consistent with above studies of Chhatrapati *et al*.

Intraoperative hypotension
In our study incidence of hypotension was 0% in both spinal group and IHNB group. Dhanashree *et al*. (2014) also did not experience any case of hypotension in SA group as well as IHNB [19]. However Chhatrapati *et al*. (2016) reported a 16.67% incidence of hypotension in the SA Group and none in the IHNB Group, the difference was statistically significant (p value 0.014) [16].
Thus the result of present study is comparable to Dhanashree *et al*., but different from Chhatrapati *et al*. in which signicant variation was found.

Post-op ambulation
The present study compared ilioinguinal iliohypogastric nerve block with spinal anesthesia for inguinal hernia repair and observed that the mean duration of postoperative ambulation was 291.25±32.24minutes in spinal group(group I)and 119.90±26.98 minutes in ilioinguinal iliohypogastric nerve block and difference was statistically highly significant(p value<0.001)(group II). Dhanashree *et al*. (2014) also found that the mean duration of post-operative ambulation 298.6 ±27.9 minutes in spinal group and 120.1 ±15.8 minutes in IHNB group [19]. Chhatrapati *et al*. (2016) found that the time to ambulation in ilioinguinal iliohypogastric group was shortest (3.95±2.557 hours) as compared to SA group (9.58±0.87 hours) and the difference was statistically significant [16]. Hiquemat *et al*. (2017) reported that 25 patients (83.33%) in local anaesthesia group were ambulant after 1 hr of the surgery but none of the patients were ambulant in spinal anaesthesia group after 1 hour. The difference was statistically significant(p=0.001) [20].
Similar to above study Chhatrapati *et al*., Dhanashree *et al*. and Hiquemat *et al*. the result of present study also found that the post-operative ambulation was earlier in ilioinguinal iliohypogastric nerve block as compared to spinal anaesthesia group.

Intraoperative hemodynamics
Intraoperative Mean Arterial Pressure (MAP)
Present study compared ilio-inguinal ilio-hypogastric nerve block with spinal anesthesia for inguinal hernia repair and found a statistically significant decrease in MAP in the first 25 minutes of spinal anaesthesia as compared to preoperative values and there was significant difference in MAP between both the groups in first 25 minutes(p value<0.001).
Chhatrapati *et al*. (2016) compared the efficacy, feasibility and safety of ilioinguinal and iliohypogastric nerve block for inguinal hernia repair with spinal anaesthesia and found that the spinal group had a statistically significant decrease in MAP in the first 30 minutes of spinal anaesthesia as compared to preoperative values and there was significant difference in MAP between both the groups. Intraoperative fluid requirement was statistically higher in spinal group [16].
Thus the result of present study is consistent with Chhatrapati *et al*. in terms of MAP.

Heart Rate
The present study compared ilioinguinaliliohypogastric nerve block with spinal anesthesia for inguinal hernia repair and did not experience any significant changes in heart rate and none of the patients in either group, especially Group II where spinal anaesthesia was given, developed bradycardia(p value>0.05).
Chhatrapati *et al*. compared efficacy, feasibility and safety of ilioinguinal and iliohypogastric nerve block for inguinal hernia repair with spinal anaesthesia and did not experience any significant changes in heart rate and none of the patients in either group, especially spinal group developed bradycardia (p value>0.05) [16].
Similar to our study Chhatrapati *et al*. had not found any significant changes in heart rate in ilioinguinal iliohypogastric nerve block group and spinal group.

Spo2 and respiratory rate measured in both groups intra-operatively and there was no significant difference in both the groups. At the end, patient and surgeon satisfaction score were noted in both groups and there was no significant difference in the both groups.

Conclusion

The conclusion of our study (Comparison of ilio-inguinal ilio-hypogastric nerve block with spinal anesthesia for inguinal hernia repair) is as follows:

1. Ilioinguinal iliohypogastric nerve block provides prolonged the duration of postoperative anaesthesia although onset of analgesia is earlier with spinal anaesthesia. Thus our study demonstrated that ilioinguinal iliohypogastric nerve block is superior to spinal anaesthesia for post-operative analgesia.
2. Iliohypogastric nerve block is associated with better intra-operative hemodynamic stability and less postoperative complications. With skill and better anaesthetic techniques failure rate of ilioinguinal iliohypogastric nerve block can be minimized.
3. Patients with ilioinguinal iliohypogastric nerve block ambulate earlier than patients with spinal anaesthesia. Thus patients operated under ilioinguinal iliohypogastric nerve block have short Hospital stay and cost effectiveness.

References

1. Amado WJ. Anesthesia for hernia surgery. SurgClin North Am. 1993; 73:427-38.
2. Ninave S, Tendulkar M. Prospective comparison of inj bupivacaine vs inj ropivacaine in ilioinguinal nerve blocks for paedeatric herniotomies. International Journal of Science and Research. 2017; 6(4):1820-22.
3. Corning JL. Spinal anesthesia and local medications of the cord. N Y Med, J. 1885; 42:483.
4. Stoelting RK, Hillier SC. Local Anaesthesia. In Pharmacology & physiology in anaesthetic practice 4thedn. Lippincott William & Wilkins. 2006; 199.
5. Daabiss M. American Society of Anaesthesiologists physical status classification. Indian J Anaesth. 2011; 55:111-5.
6. Callesen T, Bech K, Kehlet H. Feasibility of local infiltration anaesthesia for recurrent groin hernia repair. Anaesthesia. 1998; 53(1):31-5.
7. Young DV. Comparison of local, spinal, and general anesthesia for inguinal herniorrhaphy. Am J Surg. 1987; 153:560-3.
8. Sodha N. A prospective comparative study of local anesthesia versus spinal anesthesia for hernioplasty: A hospital based study. J Adv Med Dent Scie Res. 2016; 4(3):88-91.
9. Yilmazlar A, Bilgel H, Donmez C, Guney A, Yilmazlar T, Tokat O. Comparison of ilioinguinal-iliohypogastric nerve block versus spinal anesthesia for inguinal herniorrhaphy. South Med J. 2006; 99:48-51.
10. Stoelting RK, Hillier SC. Local Anaesthesia. In: Pharmacology &Physiology in Anaesthetic Practice (4th edn.) Lippincott William & Wilkins 2006; 199.
11. Kuthiala G, Chaudhary G. Ropivacaine: A review of its pharmacology and clinical use. Indian J Anaesth. 2011; 55:104-10.
12. Al-Ghanem SM, Massad IM, Al-Mustafa MM, Al-Zaben KR, Qudaisat IY, Qatawneh AM, *et al*. Effect of adding dexmedetomidine versus fentanyl to intrathecal bupivacaine on spinal block characteristics in gynaecological procedures: A double blind controlled study. Am J Appl Sci. 2009; 6:882-7.
13. El-Hennawy AM, Abd-Elwahab AM, Abd-Elmaksoud AM, El-Ozairy HS, Boulis SR. Addition of clonidine or dexmedetomidine to bupivacaine prolongs caudal analgesia in children. Br J Anaesth. 2009; 103:268-74.
14. Dongare DH, Dongare HC. Comparison of ilio-inguinal ilio-hypogastric nerve block versus spinal anesthesia for hernia repair as day care surgery. Perspectives in medical research. 2014; 2:7-12.
15. Khedkar SM, Bhalerao PM, Yemul-Golhar SR, Kelkar KV. Ultrasound-guided ilioinguinal and iliohypogastric nerve block, a comparison with the conventional technique. An observational study. Saudi J Anaesth. 2015; 9:293-7.
16. Chhatrapati S, Sahu A, Patil S. Comparative Evaluation of Ilioinguinal/ Iliohypogastric Nerve Block with Spinal Anaesthesia for Unilateral Open Inguinal Hernia Repair. International Journal of Contemporary Medical Research. 2016; 3:1177-81.
17. Fekry DM, Megahed NA, EL-Lakany MH, Yakout MM. Ultrasound-guided ilioinguinal, iliohypogastric, and genitofemoral nerve block versus spinal subarachnoid blockade for inguinal hernia repair. Res Opin AnesthIntensive Care. 2017; 4:29-34.
18. Ninave S, Tendulkar M. Prospective comparison of inj bupivacaine vs inj ropivacaine in ilioinguinal nerve blocks for paedeatric herniotomies. International Journal of Science and Research. 2017; 6(4):1820-22.
19. Dongare DH, Dongare HC. Comparison of ilio-inguinal ilio-hypogastric nerve block versus spinal anesthesia for hernia repair as day care surgery. Perspectives in medical research. 2014; 2:7-12.
20. Hiquemat *et al*. A comparative study of hernioplasty done under local and spinal anaesthesia in a tertiary care centre. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). 2017; 16(4):18-24.