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A Prospective comparative study of Local anaesthesia & Spinal anaesthesia for Lichtenstein hernioplasty in a tertiary care hospital

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Abstract:

Background*: Lichtenstein hernioplasty, a tension-free inguinal hernia repair using polypropylene mesh under local anesthesia has become the "gold standard" in the treatment of uncomplicated inguinal hernia repair.Ourstudy is a prospective study to compare effectiveness of local and spinal anaesthesia for Lichtenstein hernioplasty.*

Material & Methods*:74 patients admitted to the hospital with the diagnosis of uncomplicated inguinal hernia were included in the study.36 patients underwent surgery under local anaesthesia and 38 under spinal anaesthesia. Both groups were compared for intraoperative, immediate post-operative, & delayed postoperative complication.*

Place of study*: Kasturba Medical College & Hospital, Manipal, Karnataka, India.*

Results*: It was observed that Lichtenstein hernioplasty done under local anaesthesia offers following advantages over spinal anaesthesia: Shorter time in operating room, less incidence of intra operative hypotension, post operative nausea & vomiting, headache, urinary retention and need for catheterization, less postop pain, early ambulation, faster recovery and early return to normal work.*

Conclusion*: Our study concluded that local anaesthesia may be considered as the anaesthesia of choice for Lichtenstein hernioplasty for an uncomplicated, primary, inguinal hernia*

Keywords*: Inguinal hernia, Lichtenstein hernioplasty, Local anaesthesia, Spinal anaesthesia, complications*

I. Introduction

Inguinal hernia presenting as bulge in the groin is one of the oldest disease known in man and the evidence can be traced back to ancient civilizations of Egypt and Greece[1]. Inguinal hernias are the commonest of all hernias and it occurs in about 15% of adult men. Hernioplasty is one of the most commonly performed operations world-wide by the general surgeons[2]

Lichtenstein hernioplasty -a tension-free inguinal hernia repair using polypropylene mesh has become the "gold standard" during the past decade. The aim of hernioplasty is to reduce recurrence, postoperative pain and cost, and studies on hernia surgery are focused on finding the most appropriate method to reduce all three.

The choice of anesthesia is as important as the choice of repair method. In the past, general and spinal anesthesia were used for hernia surgery, but in recent times local anesthesia has become the popular method of anesthesia for hernioplasty, especially in outpatient clinics[3.]

The advantages of local anesthesia are simplicity, safety, extended postoperative analgesia, early mobilization, without post anesthesia side effects and low cost. It is claimed that the long-term outcome of hernia repair is not affected by the method of anaesthesia[4.] Our study is a prospective study to compare effectiveness of local and spinal anaesthesia for Lichtenstein hernioplasty.

II. Aims and objectives

The aim of this study was to compare the effectiveness of local and spinal anesthesia for Lichtenstein hernioplasty with respect to the duration of surgery, time in operating room, intraoperative and post-operative complications, duration of stay in the hospital, return to normal activity and long term complications.

III. Materials and methods

This prospective comparative study was conducted at Kasturba Medical College & Hospital, Manipal for a period of 14 months from December 2011 to February 2013. Institutional ethical clearance was obtained.

A total of 74 patients admitted to the hospital with the diagnosis of uncomplicated inguinal hernia were included in the study. A detailed history was taken and clinical examination was done after the admission. Routine preoperative investigations were done as per the standard protocol including sensitivity test for the local anesthetic agent.

On the eve of surgery the selected patients were explained about the options of local and spinal anesthesia for Lichtenstein hernioplasty. Advantages and disadvantages of each type of anesthesia were explained, following which the choice of technique of anesthesia was decided by the patient.

Group of patients who underwent Lichtenstein hernioplasty under local anesthesia were designated as Group A and those who underwent surgery under Spinal anesthesia were called as group B.

First generation cephalosporin was given intravenously 30 minutes prior to skin incision for all cases.
In group A patients the following technique was used for local anesthesia. A 50:50 mixture of 2% lignocaine with

1:200000adrenalineand 0.5% Bupivacaine was used. Approximately 5 ml of the mixture was infiltrated sub dermally along the line of incision, following which the needle was slowly withdrawn until the tip of needle reached the intradermic level, at that point without extracting the needle completely, the intradermic infiltration and making of a skin wheal was performed by very slow injection of approximately 3ml of the mixture along the line of the incision. Following this 10ml of the mixture was injected deep into the subcutaneous adipose tissue by vertical insertions of the needle 2cms apart. Following this approximately 8-10 ml of the anesthetic mixture was injected under the aponeurosis of the External oblique at the lateral corner of the incision.

Following exposure of the inguinal canal, infiltration of few ml of the mixture at the level of pubic tubercle, around the neck and inside the hernia sac was done and complete local anesthesia was achieved. Further prolongation of effect of local anesthesia was achieved by splashing 10 ml of the mixture into the inguinal canal before closure of the external oblique aponeurosis and into subcutaneous space before skin closure.

In group B patients, Spinal anesthesia was administered by the anaesthesiologist at L3-4 intervertebral midline approach to subarachnoid space using a 26 gauge spinal needle and 2.5cc of 0.5% Bupivacaine.

The following cases were excluded from the study:

1. Patients less than 18 years of age
2. Complicated and Recurrent inguinal hernias
3. Patients in whom there was contraindication for use of local anesthetics
4. Bilateral hernias and femoral hernias.
5. Patients who required intraoperative conversion of anaesthesia technique to general or spinal.

All patients were operated by the standard technique of Lichtenstein tension free hernioplasty using Polypropylene mesh of size 15x7.5cm.Following parameters were recorded:

- Duration of surgery,
- Time in operating room,
- Intraoperative complications including pain during surgery, bradycardia, hypotension etc
- Post-operative complications like pain, urinary retention, need for catheterization, scrotal edema, seroma, hematoma and surgical site infections etc
- Ambulation of patient
- Duration of hospital stay,
- Return to normal work and
- Long term complications like chronic groin pain, recurrence, testicular atrophy.

Post-operative pain was measured with the visual analogue score at 4, 8, 12 and 24 hours after surgery. During immediate post-operative period all patients were given injectable analgesics at the standard dose required, first dose being given 3 hours after surgery. From first post-operative day patients were given oral analgesics at standard dosage, from post-operative day 2 patients were given oral analgesics as and when required.
Patients were followed up at 1 month and 6 months for pain/ recurrence.

IV. Results

In the present study, the age of the patients varied between 20-80 years with highest prevalence noted in the age group of 41–60 years.Mean age at presentation was 51.3 years. All patients operated in this study were males. 44 (60.9%)patients had indirect inguinal hernia, 22 (36.9%) had direct inguinal hernia, 7 (6.5%) had Pantaloon type and 1 (2.2%) had Ogilvie's hernia. 46 (62.1%) patients had right sided inguinal hernia and 28 (37.8%) had left sided inguinal hernia.

Duration of surgery and time spent in operating room were noted. Mean time taken for surgery in Group A was 58.8±6.02 minutes and in Group B was 56.6±6.74 minutes. Mean time spent in operating room in Group A was 68.1±6.35 minutes, which was significantly less in comparison with Group B which was 76.4±6.52 minutes with a P value of < 0.01.

Table 1: Duration of surgery and time spent in Operating room

Time	Group A	Group B	P value
Duration of surgery	58.8±6.02	56.6±6.74	0.246
Time spent in operating room	68.1±6.35	76.4±6.52	<0.01

Intraoperative observations were made with respect to bradycardia, hypotension and pain during surgery.

Bradycardia was noted in 1 (2.8%) patient in Group A and 3 (7.9%) patients in Group B. These patients were treated with injection Atropine 1mg intravenously. The comparative incidence of bradycardia in both the groups was not significant statistically. (P value 0.615)

11 (28.9 %) patients developed hypotension in Group B and were treated with crystalloids and vasopressors. None in Group A had hypotension which was significant with P value <0.001.

In Group A, 4 (11.1%) patients experienced severe pain and required sedation and analgesia during surgery, whereas none of the patients in Group B experienced pain.On comparison the P value was 0.05 which was significant.

Table 2: Intraoperative observations

	Group A	Group B	Total	P value
Bradycardia (Heart rate <60/min)	1 (2.8%)	3 (7.9%)	4 (5.4%)	0.615
Hypotension (Systolic blood pressure <90mm of Hg)	0	11 (28.9%)	11(15%)	<0.001
Pain during surgery	4(11.1%)	0	4 (5.4%)	0.05

Immediate postoperative observations were recorded as follows.

5 (13.9%) patients in Group A and 19 (50%) in Group B experienced retention of urine which was a statistically significant observation (P value=0.001). Post-operative nausea and vomiting was experienced by 2 (5.6%) patients in Group A and 8 (21.1%) in Group B which was statistically insignificant(P value=0.087).

35 (97.2%) in Group A were ambulant at end of 1 hour and none in the Group B (P value< 0.001).Post-operative headache was complained by 1 (2.8%) in Group A and 7 (18.4%) in Group B with a significant value of P=0.05.

Table 3: Immediate postoperative observations

Observations	Group A	Group B	P value
Ambulation at 1hour	35 (97.2%)	0	<0.001
Urinary retention	5 (13.9%)	19 (50%)	0.001
Postoperative nausea and vomiting	2 (5.6%)	8 (21.1%)	0.087
Head ache	1 (2.8%)	7 (18.4%)	0.05

The mean visual analogue score at 4, 8, 12 and 24 hours for Group A was low when compared to Group B. The maximum score was observed at 8 hours in both the groups, however it was lesser in Group A when compared to Group B and it was statistically significant.

Table 4: Postop pain measurement using visual analogue score

Visual analogue score	Group	Mean score ± SD	P value
@ 4^{th} hour	Group A	2.33 ± 0.63	0.556
	Group B	2.42 ± 0.64	
@ 8^{th} hour	Group A	3.13 ± 1.26	0.001
	Group B	4.31 ± 1.66	
@ 12^{th} hour	Group A	1.97 ± 1.02	0.001
	Group B	3.15 ± 1.88	
@ 24^{th} hour	Group A	1.19 ± 0.74	0.025
	Group B	1.63 ± 0.88	

10 (26%) patients among 19 patients who developed urinary retention in Group B required catheterization whereas none in Group A required catheterization with a statistically significant P value of 0.001.

Table 5: Need for catheterization

Catheterization	Group A	Group B	P value
Done	0	10 (26.3%)	0.001
Not done	36	28 (73.7%)	

There was no statistically significant difference in the post-operative complications in both groups.

Table 6: Post-op complications

Post-op complications	Group A	Group B	P value
Scrotal edema	8 (22%)	9 (23.7%)	0.78
Seroma	7 (19.4%)	7 (18.4%)	1.00
Hematoma	0	1 (2.6%)	1.00
Surgical site infections	0	1 (2.6%)	1.00

The mean duration of hospital stayin Group A was 3.61 ± 2.24 days and in Group B it was 4.55 ± 2 days, P value of 0.061 is not significant.
The mean duration taken for return to normal work in Group A was 6.58 ± 1.74 days whereas in Group B it was 9.86 ± 5.10 days with a significant P value of 0.001.

Table 7: Duration of hospital stay and return to normal work

	Group A	Group B	P value
Duration of hospital stay	3.61 ± 2.24	4.55 ± 2.00	0.061
Return to normal work	6.58 ± 1.74	9.86 ± 5.10	0.01

The incidence of pain, recurrence and patient satisfaction at 1st and 6th month of follow up of the patients was notstatistically significant in either groups. None of them had recurrence of hernia.

V. Discussion

The age at presentation of inguinal hernia in our study was maximum between 41-60 years and was comparable to other studies including Delvin et al [5], Bholla Singh Sidhu et al[6]. Males are more frequently affected than females, and although ours being a tertiary referral hospital, we did not come across a single female patient with inguinal hernia.As compared to other studies, our study also showed that Right sided hernias weremore common than left sided, with indirect hernia being the commonest.

The difference in the mean duration of surgery in both groups were not statistically significant, however the difference in the mean time spent in the operating room was statistically significant as compared to study by Gultekin et al[7]. This is due to the increased time spent in the procedure of spinal anesthesia as compared to local anesthesia which is administered concomitantly along with the procedure.

The major disadvantage of spinal anesthesia found in our study was hypotension which occurs secondary to the sympathetic blockade[8] and the major disadvantage of local anesthesia in our study was pain during surgery, which occurred in 4 (11.1 %) patients. Unlike our study, several series including P Sanjay et al[9] have reported the need to add general anesthesia in about 3% of patients during local anaesthesia because of intraoperative pain and anxiety.

When post-operative pain values were evaluated with regard to visual analogue score at 4,8,12 and 24 hours, the mean values in Group A were found to be lower than in patients in Group B and was statistically significant except for the score at the 4th hour. Reason for low score at 4 hours may be due to the fact that all patients received the dose of analgesics at 3 hours following surgery. In both groups the peak mean score was maximum at 8th hour which was probably due to the reduced analgesic effect at that point of time in both groups. Overall Group A suffered from less pain when compared to Group B and it was statistically significant, these results were entirely different from other studies.

All the immediate post-operative complications were significantly lower in Group A when compared to Group B. Incidence of nausea and headache was more common in Group B, probably related to hypovolemia, intrathecal injection of anesthetic and epinephrine induced serotonin release. All patients in Group A were ambulated at 1hour as compared to none in Group B.

Prolonged blockade of bladder autonomic innervation is considered as an important cause of high frequency of urinary retention in patients undergoing spinal anesthesia[10], the effect of this is synergistic with increasing age of patient and increase in fluid received during surgery. In our study out of 50 % who developed urinary retention in Group B, 26.3% of patients required urinary catheterization. In group A 13.9% of patients had urinary retention, however none of them required catheterization. The incidence of urinary retention in Group B was significant in our study as compared to a similar study by Ruben N van Veel et al[11]. Although in our study it was not present, urinary catheterization always bears a high risk of urinary tract infection. This can result in an increase in both the period of hospitalization and overall cost.

As compared with other studies including Gultekin et al[7], Ruben N van Veel et al[11], delayed post-operative complications like scrotal edema, hematoma, seroma and surgical site infections were not statistically significant between the two groups.

Although the mean duration of stay in hospital was lesser in Group A, it was not statistically significant as compared to a study by Young D V et al[12]. However it was noticed that the mean time taken to return to normal work was significantly less in Group A.

To summarize, from our study it was observed that Lichtenstein hernioplasty done under local anaesthesia offers following advantages over spinal anaesthesia:

- Shorter time in operating room
- Less incidence of intra operative hypotension
- Less incidence of postoperative nausea & vomiting, headache, urinary retention and need for catheterization
- Early ambulation
- Less postoperative pain
- Faster recovery
- Early return to normal work.

VI. Conclusion

The Lichtenstein hernioplasty under local anesthesia is an extremely safe procedure for an uncomplicated inguinal hernia. The morbidity is significantly lower when compared to Spinal anesthesia and there is early return to normal activity. With expertise in technique of administration of local anesthesia, the complications of pain during surgery may further be minimized. It should always to be considered as a preferred technique for inguinal hernioplasty.

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