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A Comparative Study of Lichtenstein Tension Free Hernioplasty under Local Anesthesia and Spinal Anesthesia for Inguinal Hernia

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Abstract

Background: Inguinal hernia is one of the common surgical conditions, surgery being the absolute choice of treatment for cure. It is being done on inpatient basis since decades, because of the requirement of spinal or general anaesthesia. *Aims & Objectives:* 1. To compare the efficacy of Lichtenstein tension free hernioplasty under local versus spinal anaesthesia for inguinal hernia. 2. To assess the overall outcome of hernia surgeries including intraoperative and postoperative complications, duration of hospital stay & cost effectiveness. *Materials and Methods:* A prospective & comparative study was conducted on 60 patients presenting to Victoria Hospital, Bangalore with inguinal hernia during the period October 2013 to May 2015. Patients who fulfilled all criteria of inclusion were planned for surgery under 2 different groups. *Results:* Total of 60 patients were included in the study with all 60 being male patients. The commonest group of presentation was between 31-40 years (33.33%). Most of the patients presented with swelling in the groin alone about 60% and swelling with dragging type of pain of 40%. Indirect variety were common (76.66%) followed by direct (18.33%), recurrent (5%). Right sided hernia were common (63.33%) followed by left sided (36.33%). Risk factors associated with 43.33 % of increase intra abdominal pressure due to straining factors such as BPH, strenuous exercises, chronic constipation etc followed by smokers accounting for 40%. A comparative study of 30 cases each in group, SA group had more intra op and post op complications than LA group. Mean time taken for surgery under LA group was 36 +/- 9 minutes when compared to 51 +/-9 minutes, which is significant. LA group patients were ambulated early and there was a short hospital stay of 2-3 days in LA group when compared to SA group of 6-7 days. LA group was cost effective when compared to SA group. *Conclusion:* Commonest age group affected being third decade of which most were right sided indirect type of hernia presenting mainly with the swelling in the groin. Both spinal and local anaesthesia can be used for LTF hernioplasty but spinal anaesthesia had high complication rates compared to local anaesthesia, considering short stay in hospital causing less economic burden to the patients.

Keywords: Inguinal Hernia; LA (Local Anaesthesia); LTF (Lichtenstein Tension Free) Hernioplasty; SA (Spinal Anaesthesia).

Introduction

Hernia is the "protrusion of the viscus or part of through an abnormal opening in the walls of its containing cavity" [1]. Inguinal hernias presenting as abnormal bulge in the groin region, are commonest of all hernias and surgery being definitive treatment for it. The treatment of inguinal hernia has a history of more than 100 years since the initiation of modern hernia surgery by Bassini in 1887. Nowadays, no other medical condition in general surgery can be treated with so many optional procedures as inguinal hernia [2]. Adult inguinal herniorrhaphy accounts for 15% of the operations in general surgery. It can be done as both OP as well as IP. Earlier patient used to get admitted and was

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operated on elective basis and were discharged after short period of stay in hospital or after complete recovery. It had been customary over a century, to admit the all inguinal hernia patients for surgery, keep them in hospital till patient was ambulant and sutures were removed. All inguinal hernia surgeries as a routine were admitted and surgeries performed with the help of anaesthetist either under GA or SA, majorly by latter, however there is no common consensus among surgeons regarding the best choice of anaesthesia till date [3]. Admission to the hospital used to increase economic burden to the patient. This causes increase in the demand for hospital beds and increase in the waiting list for surgery. Hence there is a need for decrease the waiting list, quality of surgical care and it to be cost effectiveness, as living condition of most of the patients are poor. Majority of the patients are from rural areas where primary day care surgeries are up to the mark. So nowadays, discharging patients early from the hospital is being practice. This lead to introduction of hernia repair under LA. General and spinal anaesthesia has their own advantages and disadvantages, prerequisites being need for medical fitness, anaesthetic facility and post op care. Several randomized controlled trials have shown that a LA repair provides best clinical and economic benefits to the patient [4]. Local anaesthesia is economically sound and field block technique for hernia repair is within the capability of operating surgeon [5]. Complications and post anaesthesia care for LA is negligible as compared to traditional GA or SA [6]. With introduction of inguinal hernia repair under local anaesthesia, it has shown to reduce cost to patient with less stay in hospital there by reducing economic burden to both patient and hospital. It can be performed in remote areas where there is lack of trained personal and anaesthetic facilities. For many years before Lichtenstein began to use prosthetic mesh for primary inguinal repair, he had advocated the routine use of LA followed by immediate ambulation and 1 day hospital stay [4]. So this study is to perform LTF hernioplasty that can be performed under LA without trained anaesthetist, by operating surgeon and is to consider as an acceptable alternative for conventional methods of anaesthesia like GA, SA. This is also intended to know best suitable method to our hospital, which is safe and cost effective from patient and hospital point of view.

Objectives of the Study

1. To compare the efficacy of Lichtenstein tension free hernioplasty under local versus spinal anaesthesia for inguinal hernia.
2. To assess the overall outcome of hernia surgeries:-
   (i) Intra op and post op complications,
   (ii) Duration of hospital stay
   (iii) Cost effectiveness.

Materials and Methodology

A prospective and comparative study was conducted with Patients presenting with primary reducible inguinal hernia and admitted to Victoria Hospital during the period from October 2013 to May 2015.

Inclusion Criteria

1. Patients with primary reducible inguinal hernia being operated for Lichtenstein tension free hernioplasty on an elective basis.
2. Patients willing to give written informed consent.
3. Patients of either sex aged 18-60 years.
4. Patients of ASA-I and ASA-II status.

Exclusion Criteria

1. Patients refusal for the study.
2. Patients age less than 18 years and more than 60 years.
3. Patients with history of uncontrolled diabetes mellitus, hypertension any other co morbidities.
4. Patients with obstructive inguinal hernias where emergency surgery done.
5. Patients with complications like large complete inguinal hernias, pantaloons hernias.
6. Patients with psychiatric illness.

After obtaining clearance and approval from the institutional ethics committee and written informed consent, patients who satisfy the inclusion criteria and who consent to participate in the study are taken up for surgery after history taking, meticulous examination and basic pre-operative investigations as mentioned below. 60 patients, subjects will be randomly assigned into 2 groups of 30 patients each two groups were assigned as SA and LA groups. Preoperative investigations were performed routinely namely CBP, RBS, RFT, SE, Chest X-ray, ECG and Ultrasound Inguino-scrotal region done. For LA group, PAE done before on OP basis, asked to come in morning on day of performing surgery following admission patients walk into the operating room, where the operation site is shaved and prepared for surgery. For SA group, PAE was done a day prior to

surgery, patient admitted to ward and parts prepared on the previous day of surgery.

Operative Procedure

The surgical technique employed was Lichtenstein tension free repair. All patients are monitored by Pulse rate, NIBP, SPO2 was monitored intra operatively every 15 minutes recorded. An anaesthetist is present for all patients of SA group and was not mandatory for LA group. In SA group 0.5% inj.bupivacaine heavy was given by anaesthetist. For LA group 15ml of Inj. Bupivacaine 0.5% and 15 ml of Inj. Lignocaine 1% (without adrenaline) were taken and drug was given by operating surgeon at 10ml around ASIS, around pubic tubercle, superficial inguinal ring and deep rings as mentioned earlier and allowed to wait for 5 minutes. Following parameters were studied in both group (SA and LA group) and results were compared:

1. Total duration for surgery (includes anaesthesia time in SA group).
2. Intraoperative complications like bradycardia, hypotension and pain during surgery.
3. Immediate postoperative complications like nausea, vomiting, headache and post op pain.
4. Postoperative urinary retention.
5. Delayed postoperative complications like seroma, hematoma, post op severe pain, infection, recurrence and testicular atrophy.
6. Chronic groin pain or hyperesthesia.
7. Length of hospital stay.
8. Total cost is also calculated and noted.

Patients was reviewed on day 8, at the end of 1 month, 3 months and 1 year, to assess long term complications including infection, long term pain and recurrences.

Observation and Results

Totally 60 patients were studied for age, occupation, location and type, mode of presentation, risk factors, duration of symptoms, duration of surgery, intra op and post op observations, complications, duration of hospital stay and cost effectiveness were analyzed.

The results are as shown

In Table 1 & Graph 1, age of the patient varied from 18 – 60 years, with highest prevalence noted in the age group of 31 – 40 years.

Table 2 & Graph 2 shows majority of the cases were right sided hernias (63.33%) when compared to left side (36.66%). Out of 60 cases, indirect hernias were more (76.66%) when compared to direct hernia (18.33%).

Table 3 shows mean time taken for surgery for both groups: SA GROUP was 51 min +/- 3 min with a range of 51 minutes to 60 min. LA GROUP was 36 min +/- 3 min with a range of 36 to 45 min. In SA group, time consumed for LFT hernioplasty was in range of 51-60 minutes with majority (53.3) of surgery completed in or around 60 minutes, whereas in LA group majority (66.66%) of surgeries were completed by 45 minutes of time duration.

Table 4 & Graph 3 shows intraoperative patients responses for the below parameters. Bradycardia was noted in 16.66 % of patients, which was same in both groups. Hypotension developed in 40% of the patients i.e. 12 patients in SA group when compared to 3 patients (10%) in case of LA group. Intraoperative analgesia was adequate in both cases as shown.

Table 5 & Graph 4 shows post op nausea and vomiting and post op headache was more SA group i.e. 26.6% and 40% when compared to LA group which is negligible. 1 hour post surgery there were no ambulatory patients in SA group when compared to 76.6% in LA group. Postoperative pain was 20% in SA group when compared to 10% percent in LA group and urinary retention was not at all a concern in LA group which is significant in SA group, which needed catheterization postoperatively.

Table 6 & Graph 5 clearly show that complications had occurred after the two types of anaesthesia in our study. Seroma occurred equally in both the groups. Hematoma occurred more 13.33% in SA group when compared to 10% in LA group. Scrotal edema was more in SA group when compared to LA group.

As shown by Table 7, duration of hospital stay was more in SA group as compared to LA group with majority of patients being discharged on day 3, as compared to SA group. Graph 6 clearly shows that in the LA group patients stood in hospital for a maximum 4 days far less than the SA group patients who stood for up to 7days.

Discussion

In present study 76.6% patients had indirect inguinal hernia. Direct type of inguinal hernia was

Table 1: Age at presentation

Age Group	No. of Patient	Percentage (%)
18-30	10	16.66
31 -40	20	33.33
41-50	18	30
51-60	12	20

Table 2: Location and types of hernias

Location	Indirect	Direct	Recurrent	Total	Percentage (%)
RIGHT	30	06	02	38	63.33
LEFT	16	05	01	22	36.66
TOTAL	46(76.66%)	11(18.33)	03(5%)	60	100%

Table 3A: (SA group) duration of surgery

Time duration	No. of patients	Percentage (%)
30 Minutes	2	6.66
45 Minutes	12	40
60 Minutes	16	53.33

Table 3B: (LA group) duration of surgery

Time Duration	No. of Patients	Percentage (%)
30 Minutes	0	
45 Minutes	20	66.66
60 Minutes	10	33.33

Table 4: Intraoperative observations

Complications	SA		LA	%
	No.	%	No.	
Seroma	6	20	6	20
Hematoma	4	13.33	3	10
Scrotal Edema	5	16.66	2	6.66
Wound infection	3	10	2	6.66

Table 5: Postoperative observations

Complications	SA	GROUP	LA Group	
	No.	%	No.	%
Bradycardia	5	16.66	5	16.66
Hypotension	12	40	3	10
Pain during Surgery	1	3.33	2	6.66

Table 6: Postoperative complications

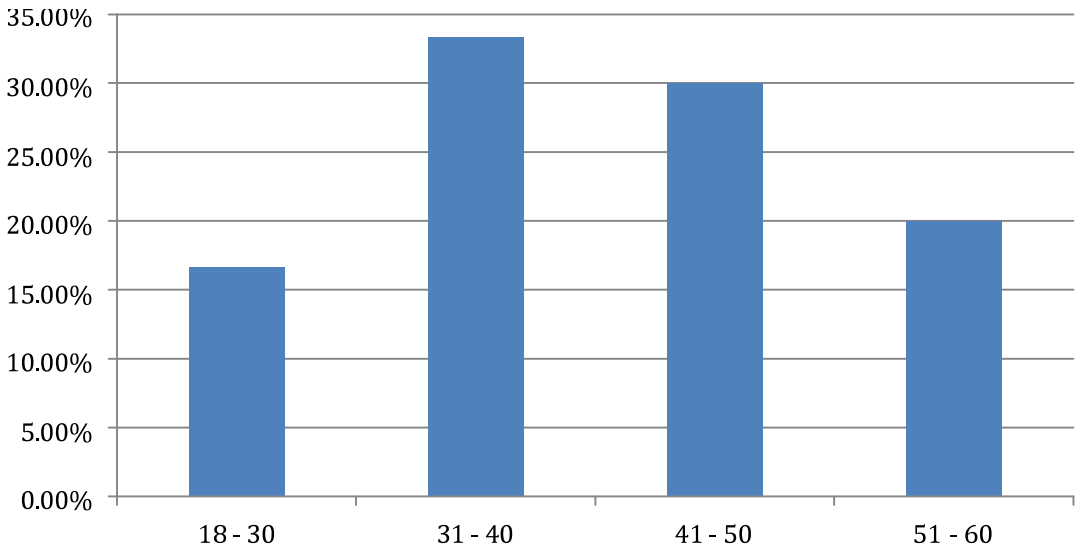
Observations	SAGR	OUP	LA Group	
	No.	%	No.	%
Nausea & Vomiting	8	26.66	1	3.33
Post op headache	12	40	1	3.33
Ambulation after 1 Hour	0		23	76.66
Post op pain(2 hrs)	6	20	3	10
Urinary retention	7	23.33	0	

Table 7: Duration of hospital stay

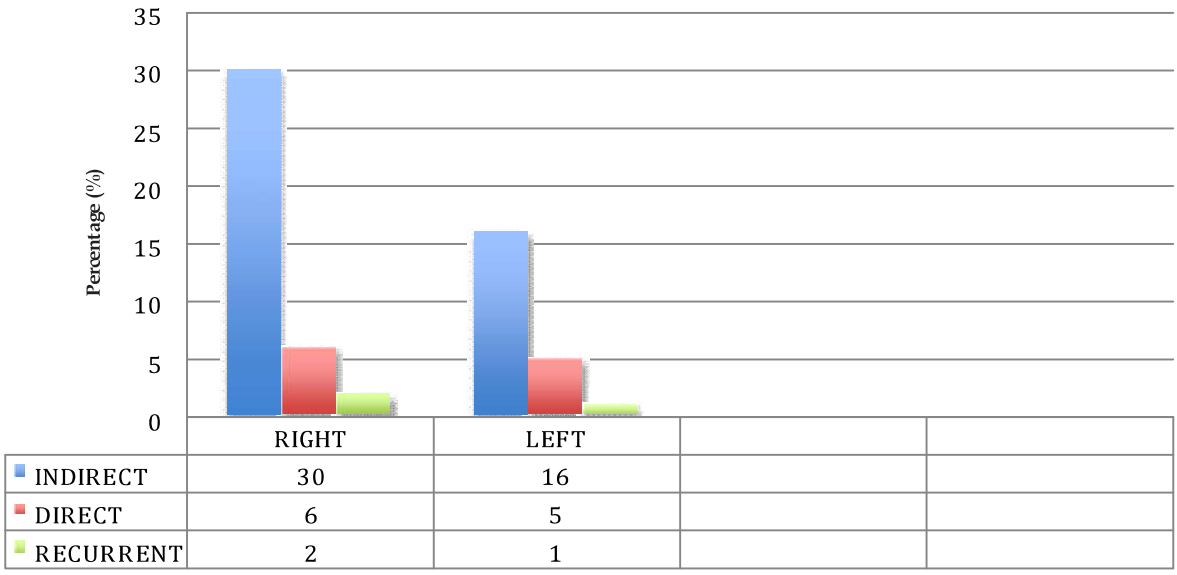
Discharge day	No. in LA Group (%)	No. in SA Group (%)
2	4(13.33)	-
3	20(66.66)	1(3.33)
4	6(20)	7(23.33)
5	-	5(16.66)
6	-	7(23.33)
7	-	10(33.33)

Table 8: Comparison of different parameters in sa & la groups

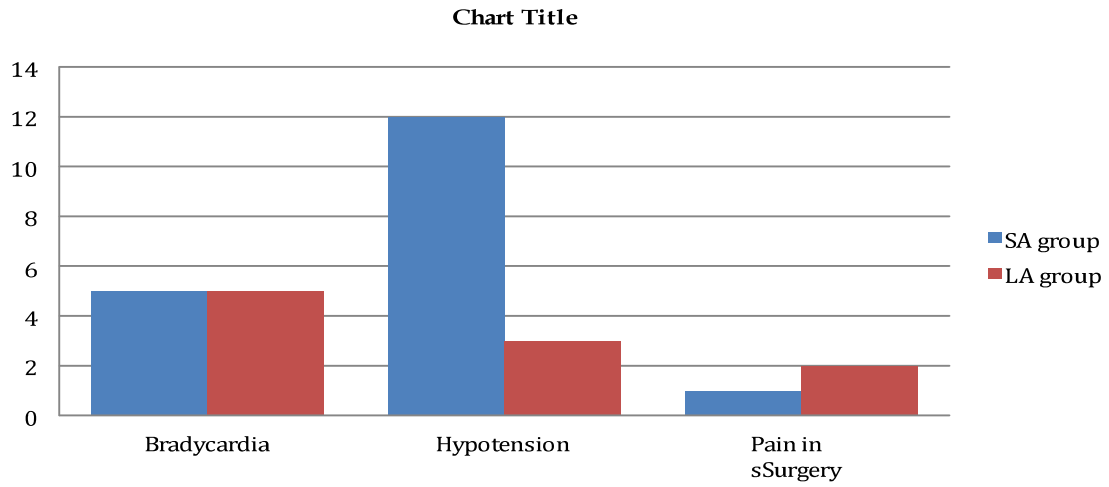
Parameters	S No.	A %	L No.	A %	Significant p value < 0.05
Bradycardia	5	16.66	5	16.66	p=1,Not significant
Hypotension	12	40	3	10	p=0.007,Significant
Pain during Surgery	1	3.33	2	6.66	p=0.5,Not significant
Nausea & Vomiting	8	26.66	1	3.33	p=0.01,Significant
Ambulation- 1 hr post Surgery	0		23	76.66	p =0,Significant
Post op headache	12	40	1	3.33	p= 0.0005,Significant
Post op pain(2 hrs)	6	20	3	10	p= 0.27,Not significant
Urinary retention	7	23.33	0		p=0.004,Significant
Seroma	6	20	6	20	p=1,Not significant
Hematoma	4	13.33	3	10	p=0.16,Not significant
Scrotal edema	5	16.66	2	6.66	p=0.22,Not significant
Wound infection	3	10	2	6.66	p=0.21,Not significant
Hospital stay (Mean 3days)	7		3		p=0, Significant
Cost effectiveness	410		1530		Significant



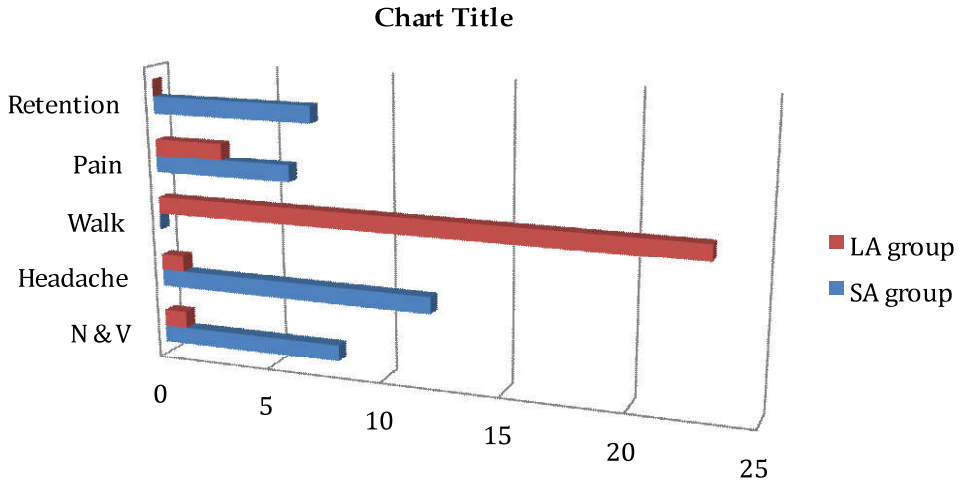
Graph 1: Age at presentation



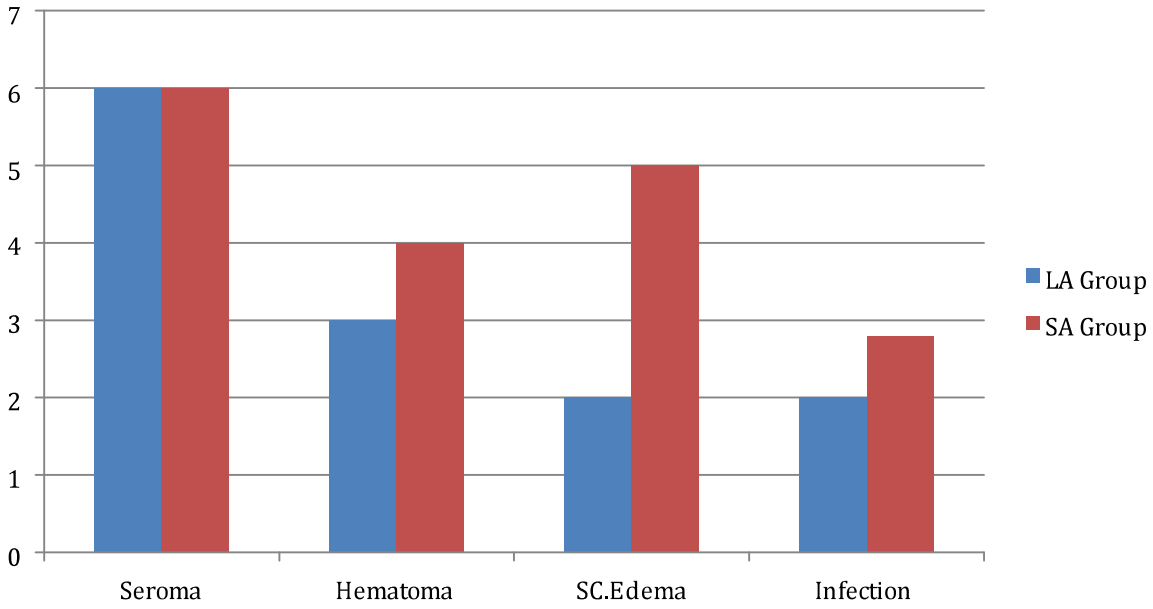
Graph 2: Location and types of hernias



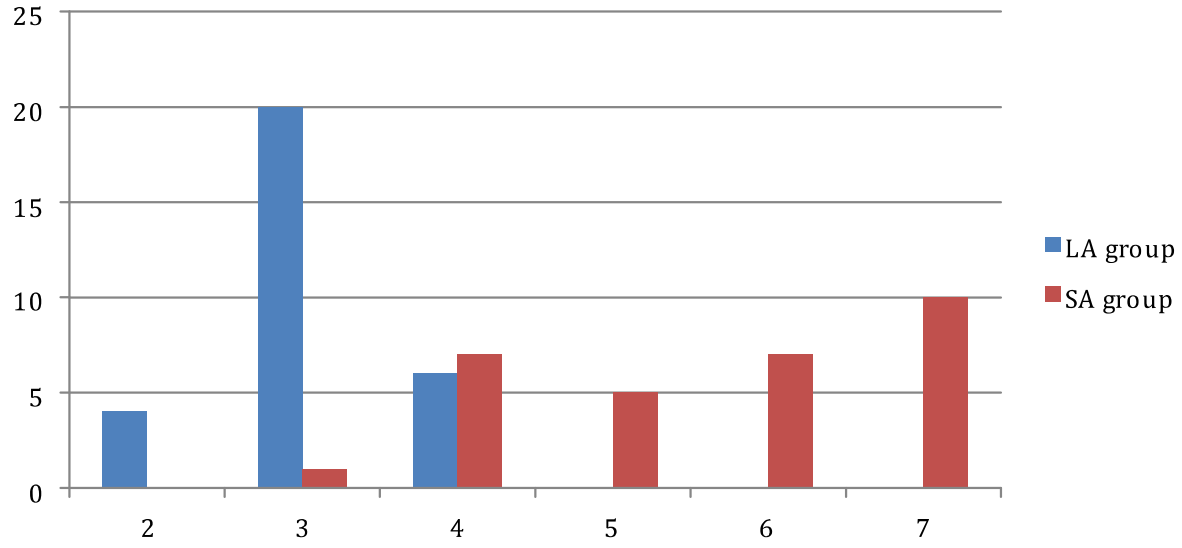
Graph 3: Intraoperative observations



Graph 4: Postoperative observations



Graph 5: Postoperative complications



Graph 6: Duration of hospital stay

present in 18.33%. The results of our study were almost similar to the other studies [7-11]. In present study 63.33% of the patients had right sided inguinal hernia. Left sided hernia was present in 36.6% patients. The results of present study were comparable to the studies [12,13] conducted by others. Right side of inguinal hernia is more common due to the later descent of right testis and high incidence of patent processus vaginalis on the right side [7]. In present study the mean operative time was 51 min +/- 3 min with a range of 51 minutes to 60 min in SA group and 36 min +/- 3 min with a range of 36 to 45 min in LA group. The results of our study were similar to the other studies conducted by Song et al (2000) [15] Job C et al (1979) [15] and Young DV (1987) [16]. Intra operatively pain during surgery was experienced by 3.3% under local and 6.6% in spinal group. The difference is statistically significant. The results of our study were comparable to other studies. The study conducted by Earle AS (1960) [17] on 46 patients showed 23 (50%) patients experienced slight pain and remaining 23 (50%) felt no pain during inguinal hernia repair under local anaesthesia. Study done by Baskerville PA et al (1983) [18] on 129 patients operated under local anaesthesia demonstrated that 93% patients felt no pain during operation and 7% said operation was painful. Pain during operation is felt in case of large hernia operated under local anaesthesia, if dissection is difficult due to adhesions of the sac. Post operative pain is due to traction on certain tissues particularly peritoneum, inadequate analgesia, urinary retention and wound infection [16]. It follows the known distribution of the regional nerves including ilio inguinal, ilio hypogastric and genital branch of genitofemoral nerve. It can be prevented by meticulously avoiding excess manipulation of the nerves [19]. Post operative pain was scored with visual analogue scale. Pain immediately after operation was assessed by dosage of analgesic consumption. The study done by Teasdale et al (1982) [20] on 103 patients found faster recovery after local anaesthesia as compared to general and spinal anaesthesia. The study conducted by Baskerville PA et al (1983) [18] showed that return to normal activity by 3rd post operative day in 49 (38%) patients, by end of 1 week in 78% patients and by end of 2 weeks in 98% patients. The study conducted by Song D et al (2000)[14] found that the time to discharge to be shorter after local anaesthesia (158 minutes) than after general (208 minutes) and spinal anaesthesia (308 minutes The decrease in time for return to work was explained by encouragement of patients to resume work as early as possible. The residual effects of general and spinal anaesthesia like nausea, vomiting, sedation and urinary retention results in increased hospital stay[16,21,22]. The lower incidence of major complications attributes to early mobility following local anaesthesia [23]. Clearly in our study also suggests early discharge of patients under spinal group. In present study wound sepsis was present in 10% in SA group and 6.6% in LA group. Hematoma occurred more 13.33% in SA group when compared to 10% in LA group. Scrotal edema was more in SA group when compared to LA group. The study conducted by Shulman AG et al (1994) [24] reported no cases of mesh infection in 3019 open tension-free mesh hernioplasty. The study done by Kark AE et al (1995)[22] reported no case of mortality, over all sepsis rate was 0.9%. The study conducted by Gianetta E et al (1997) [25] showed that inguinal

hernia repair in elderly under local anaesthesia had 3(1%) wound infections. They showed that general anaesthesia and spinal anaesthesia were associated with higher rates of serious postoperative complications and occasional post operative death. The results of our study were comparable to the other studies. In the present study there was no urinary retention in LA group patients whereas 23.3% patients of group SA had urinary retention after surgery. Accumulated data from other hernia literature suggest that incidence of urinary retention is lowest with local anaesthesia compared with both regional and spinal anaesthesia [12,22]. Results of present study were similar to the studies conducted by Teasdale et al (1982)[8] Young DV (1987) [16] Callesen et al (2001) [21] others. Although the exact cause of high frequency urinary retention in spinal anaesthesia group patients is not known, it is thought to be secondary to prolonged block of bladder autonomic innervations. It may be also related to age of the patient and volume of fluid received. Fluids restriction during operation can reduce the risk of urinary retention [14].

Conclusion

Commonest age group affected was 3rd decade i.e. age group between 31-40 years. Majority of them were right sided, indirect hernia presenting with predominantly swelling in the groin. Factors such as straining due to BPH, Chronic cough, Constipation etc are predisposing factors contribute to hernia. Both spinal and local anaesthesia were used in LTF hernioplasty and intra op and post op complications are high in SA group as compared to LA group. Patients who are operated in LA group was ambulated early and discharged early when compared to SA group. Patient operated under LA group were observed to be cost effective when compared to SA group.

References

1. Kings North A and David H Bonnett "Hernia umbilicus abdominal wall" Chapter 73 in Bailey and Love-Short practices of surgery. 2004; 1272-1281.
2. Sanjay. P, Shiakh. I, Woodward. A. Lichtenstein hernia repair under different anesthetic techniques with special emphasis on outcomes in older people. Australasian Journal on Ageing. 2011; 30(2):93–97.
3. Lichtenstein IL Hernia repair without disability. 1st edition. St. Louis, CV Mosby. 1970.
4. Sanjay. P and Woodward. A Inguinal Hernia Repair, Local or General Anesthesia. pmc articles 2048598.
5. Alon P. Winnie and Elmer "Anesthesia for Herniorrhaphy" chapter 35 "Hernia" Nyhus L M and Robert E.condon Phildelphia.JB, Lippincott Company 1995.p.487-520.
6. Baskarville P.A. Jarvett PEM, Day care inguinal hernia repair under local anesthesia "Annals of the Royal college of surgeons of the England 1983; 5:224-225.
7. Kark AE, Kurzer MN, Belsham PA. Three thousand one hundred seventy five primary inguinal hernia repairs ;advantages of ambulatory open mesh repair using local anaesthesia. Am J Coll Surg 1998; 186: 1541-7.
8. Ryan JA, Adye BA, Jolly PC, Murloy MF. Outpatient inguinal herniorrhaphy with both regional and local anaesthesia. Am J Surg 1984; 148:313-6.
9. Lichenstein IL. Hernia repair without disability. 2nd ed. St Louis, Tokyo. Ishiyaku Euroamercia, Inc; 1986.
10. Stobie B: Shouldice hospital dedicated to the repair of hernias. Can Oper Room Nurs J 1999 ;17:30-2.
11. Glassow F. Inguinal hernia repair using local anaesthesia. Ann R Coll Surg Engl 1984; 66:382.
12. O'Dwyer PJ, Serpell MG, Millar K, Paterson C, Young DV, Hair A, et al. Local or general anaesthesia for open tension-free hernioplasty: A randomized trial. Ann Surg 2002; 237:574-9.
13. Gilbert AI. Classification for diagnosis of inguinal hernias. Am J Surg 1959; 110:120-2.
14. Song D, Greilich NB, White PF, Wateha MF, Tongier WK. Recovery profiles and costs of anaesthesia for outpatient unilateral inguinal herniorrhaphy. Anesth Analg 2000; 91:76-81.
15. Job CA, Fernandez MA, Dorph DJ, Betcher AM. Inguinal hernia repair; Comparison of local, epidural, and general anesthesia.NY State J Med 1979; 79(11):1730-3.
16. Young DV. Comparision of local, spinal and general anaesthesia for inguinal hernia repair. Am J Surg 1987; 153:560-3.
17. Earle AS. Local anaesthesia in inguinal hernia repair. Am J Surg 1960; 100:782.
18. Baskerville PA, Jarrett PEM. Day care inguinal hernia repair under local anaesthesia. Ann R Coll Surg Engl 1983; 65:224-5.
19. Tverkay M, Cozacov C, Ayache M, Bradley EL, Kassin I. Postoperative pain after inguinal herniorrhaphy with different types of anaesthesia. Anaesth Analg 1990; 70:29-35.
20. Teasdale C, Mecrum A, William NB, Horton RE : A randomized controlled trial to compare local with general anaesthesia for short stay inguinal hernia repair. Ann R Coll Surg Engl 1982 ; 64:238–242.
21. Callesen T, Bech K, Kehlet H. One thousand

consecutive groin hernia repairs under unmonitored local anaesthesia. Anesth analg 2001; 93:1373-6.

22. Kark AE, Kurzer M, Waters KJ. Tension-free mesh hernia repair; review of 1098 using local anaesthesia in a day unit. Ann R Coll Engl 1995; 77:299-304.
23. Roder W, Weigel TF, Isemer FE. A concept for decreasing post operative pain after inguinal hernia operation. Langenbecks Arch Chir 1994; 379:80-3.
24. Amid PK, Shulman AG, Lichenstein IL. Local anaesthesia for inguinal hernia repair step by step procedure. Ann Surg 1994; 220:735-7.
25. Gianetta E, Decian F, Cuneo S, Friedman D, Vitale B, Marinari G et al. Hernia repair in elderly patients. Br J Surg 1997; 84:983-5.