Volume : 5 | Issue : 12 | December-2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 78.46

Original Research Paper

Comparative Study of Outcomes of Inguinal Hernia Repair under Local and Spinal Anaesthesia

Surgery

KEYWORDS:

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ABSTRACT

Background: Inguinal hernias are the commonest of all hernias and adult inguinal herniorrhaphy accounts for 15% of operation in general surgery. Local anaesthesia can be considered for hernia repair operations, in the areas where lack of trained personal and anaesthesia facilities are not available as well as to minimize the hospital stay and reduce economic burden, provided its effectiveness is found. Aim of the study was to look at the effectiveness of local anaesthesia in comparison to spinal anaesthesia in primary uncomplicated inguinal hernia repair surgery by measuring intra operative and postoperative pain and post-operative complication. And also to check the feasibility of using local anaesthesia for short stays surgery. Material &Methods : Sixty patients with primary uncomplicated inguinal hernia admitted in department of general surgery, SDM College Of Medical Sciences and Hospital, Dharwad during the study period from November 2012 to October 2014 were randomized to group A and group B. In group A local anaesthesia was used and in group B spinal anaesthesiawas used to do hernioplasty. Both groups are compared for intra operative and postoperative pain and intra operative and postoperative complication. Results: Both local & spinal anaesthesia can be used for hernia repair on short stay basis, but spinal anaesthesia has higher complication rates compared to local anaesthesia. There is significant increase in general complications like hypotension, urinary retention, bradycardia, nausea/vomiting and headache in spinal anaesthesia. Local complications like seroma, hematoma and wound infection were similar in both groups. Conclusion: Local anaesthesia has less immediate post-operative complication, with significant number of patients being ambulant at 2hrs post-surgery, best suitable for short stay surgery when compared to spinal anaesthesia. There is less post-op hospital stay and lesser complication with high patient acceptability. When short stay service is implemented there will be considerable savings to hospital service and to the patients.

INTRODUCTION

"No disease of the human body, belonging to the province of the surgeon, requires in its treatment a better combination of accurate anatomical knowledge with surgical skill than HERNIA in all its varieties." Sir AstleyPaston Cooper, 1804.

Hernia is the "protrusion of the viscous or part of the viscous through an abnormal opening in the walls of its containing cavity"[1]. Inguinal hernias are the commonest of all hernias and adult inguinal herniorrhaphy accounts for 15% of operation in general surgery[2]. Surgery is the definitive treatment for the hernia. If hernias left untreated they go for complications and increase the morbidity and mortality.

Inguinal hernias are operated both as an out-patient procedure and in the traditional way with the patient hospitalized and operated on elective basis. Although they can be discharged after a short period or after complete recovery. For more than a century it has been customary to admit patients for all surgeries and keep them in hospital until they are ambulant and till the sutures are removed. This causes increasing demand for hospital beds and increased waiting list for hernia surgery. It increases the economic burden for the hospital and to patient. Prolonged rest in hospital often leads to complication. Hence short stay surgery and out-patient repair of groin hernia's has proved to be cost effective and enhances the quality of surgical care and decreases the waiting list.

Now a days discharging the patient early from the hospital is being practiced since most of our patients are from rural places where facilities for day care surgery for follow up is not feasible. The introduction of short stay surgery not only relieves the hospital waiting lists but also represents an economic advantage and has certain social benefits for the patient. As hernia repair can be done under local, spinal and general anaesthesia. General anaesthesia and spinal anaesthesia have their own complications. Prerequisites such as medical fitness, post-operative care, trained personal and field block technique for hernia repair is within the capability of operating surgeon. Complications and post anaesthesia care for local anaesthesia is negligible compared to spinal or general anaesthesia.
Inguinal hernia repair under local anaesthesia has its role in short stay surgery as it reduces the cost and duration of hospital observation. Local anaesthesia can be considered for hernia repair operations, in the areas where lack of trained personal and anaesthesia facilities are not available. There is a long waiting list for hernia repair surgeries and it is found from the studies that local anaesthesia reduced the hospital stay and cost with fewer complications. This was a prospective comparative study to evaluate that hernioplasty under local anaesthesia is an acceptable alternative to conventional hernioplasty using spinal anaesthesia through identification of complications likebradycardia, hypotension, pain during surgery. To study the post-operative complications like urinary retention, post- operative pain, headache, seroma, haematoma, scrotal oedema, infection, recurrence, time at ambulation & post-operative hospital stay. And to study the safety and cost -effectiveness in both patient and hospitals point of view.

Methodology

This study was prospective randomized study conducted in tertiary hospital overstudy period of two years on 60 patients admitted with primary uncomplicated inguinal hernia.30 patients were operated under local anesthesia and 30 were operated under spinal anesthesia. Patients with primary uncomplicated inguinal hernia who aged above 18 years and unilateral hernia were included in the study.Patients with preoperative chronic painful conditions, psychiatric problems, pregnancy, bleeding disorders and on anticoagulant treatment, complicated hernias like- irreducibility, obstruction, strangulation were excluded from the study After taking details ofPatient proforma,history, clinical details,clinicalexamination,and investigations all the patients fulfilling selection criteria were explained about the purpose of study and an informed consent was obtained before enrollment. Following investigations was done as routine for diagnosis and to test the sensitivity to the local anesthetic-Routine blood and urine tests, RBS, Blood Urea, Serum Creatinine, Chest X-ray.(when age of patient is >35yrs or if Necessary),USG if required, routine test dose of local anesthesia.Patients were randomized to group A (operated under local anesthesia) and group B (operated under regional anesthesia) by lottery method.All eligible patients were operated for Lichtenstein s tension free hernioplasty irrespective of type of anaesthesia. Patients were explained about type of anesthesia & surgery, advantage & disadvantage of each type of anesthesia. They were explained about benefits from early mobilization, early discharge & socio economic benefits of short stay surgery. Patients were shaved in night before surgery. One gram of inj. cefotaxime I.V

Volume : 5 | Issue : 12 | December-2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 78.46

was given 30 min before surgery. After this local anesthetic was given by surgeon himself & spinal by anesthesiologist

Technique of administration of local anaesthesia in group A

Step 1: A skin wheal was raised 2 cm medial to the anterior superior iliac spine. Before the needle was extracted, approximately 10 ml of solution was injected, the needle traverses the parietal muscles, first in the direction of the iliac spine to block the iliohypogastric and ilioinguinal nerves, and then toward the umbilicus to block the last two intercostals nerves.

Step 2: Approximately 5 ml of solution was used to infiltrate the epidermis at the exact site of the incision

Step 3: An additional 5 ml of solution was utilized to inject the subcutaneous tissue beneath the incision before the surgery was begun. This serves to block the overlapping branches of the external femoral cutaneous and the femoral branch of the genitor femoral nerves. This step was essential or the patient will feel discomfort as the superficial vessels and nerves are divided.

Step 4: After the skin incision, dissection is carried out down through Scarpa s fascia. A small window was dissected in the lateral aspect of the incision, through the deep subcutaneous fat, until the classic transverse fibers of the external oblique aponeurosis are visualized. 5 ml of solution was deposited in the subaponeurotic space prior to clearing this layer. This is a key step if pain is to be avoided, since the aponeurosis is sensitive on its external surface. When the external oblique was incised down to include external ring the entire cord and its sensory nerves will be surrounded by the anaesthetic solution.

Step 5: Several milliliters of solution was deposited beneath the transversalis fascia near the public tubercle and the internal abdominal ring. This blocks the sympathetic fibers in the cord and the genital branch of the genitor femoral nerve. This step was essential if a deep ache is to be avoided when traction is applied to the cord.

Step 6: If the hernia was indirect, 1-2ml of solution was injected about the neck of the hernial sac before it is opened. If the hernia was direct, 1-2ml of solution was placed in the rectus fascia at the site of relaxing incision since this is invariably supplied by a sensory nerve twig.

GROUP B: 3 ml of 0.5% Bupivacaine heavy was used for spinal anaesthesia (done in L3-L4 space).

The following parameters were studied in both local anaesthesia& spinal anaesthesia group

1) Time taken for the procedure: this included time taken from giving anaesthesia to completion of surgery.

2) Complications during time of surgery

a) Bradycardia: In our study heart rate of <60 b/min

b) Hypotension: If systolic BP falls less than 90 mm of Hg in supine position

c) Pain during surgery: Patient complaining of intolerable pain needing sedation & analgesic after the initial anesthesia

3) Immediate post-operative ambulation

4) Post-operative immediate complications like Nausea & vomiting, urinary retention, headache, post-operative pain (assessed using visual analogue scale)

5) Length of post-operative stay in hospital & complications like Seroma, Hematoma, Scrotal, edema, Ischemic orchitis, wound infection, recurrence, testicular atrophy, chronic groin pain &paraesthesia or hyperesthesia if any.

Early discharge option was given to the patients & encouraged keeping in mind the Socio-economic condition & convenience of the patient. Stitches were removed on 14th post-operative day. All patients were followed up for 6 months to study late complications.

Statistical Analysis

The data obtained was tabulated; categorical data was expressed as rates, ratios and percentages. The data was analyzed by using SPSS version. Continuous data was expressed as mean ± standard deviation and comparison was done using Mann Whitney U test, p value less than or equal to 0.05 was considered as statistically significant.

RESULTS

Table No: 1 Age Distribution

Age (years)	No. of Patients	Percentage
20 – 30	9	15
31 – 40	15	25
41 – 50	14	23.3
51 – 60	9	15
61 - 70	13	21.7
Total	**60**	**100**

In the present study age of the patient varied from 20 to 70 years with the highestprevalence noted in the age group of 31-50 years.

Table No 2: Location &Types of Hernia

Type and location	Indirect	Direct	Total
Right	26	8	34
Left	19	7	26
Total	45	15	60

The above table (table 2) shows that 75% of inguinal hernia in this study was indirect type and the remaining 25% was direct type. Out of 60 patients 56.7% had right sided inguinal hernia compared to left side which accounted for 43.3%.

The local anaesthetic group (A) and spinal anaesthesia group (B) compared using parameters such as time taken for surgery,observations of complications during operation,post-operative complication and post-operative hospital stay

Time taken for Surgery (minutes)	No of Patients In LA	No of Patients In SA
40	7 (23.3%)	5(16.7%)
45	13(43.3%)	9(30%)
50	5(16.7%)	10(33.3%)
55	3(10%)	2(6.7%)
60	2(6.7%)	4(13,3%)

In the LA group the time taken for procedure was in the range of 40-55 min, with maximum number of patients(43.33%) requiring 45 min.In the SA group the time taken for procedure was in the range of 40-60 min, with Maximum number of patients(33.3%) required 50 min.

Procedure	Mean Time Taken (min ± SD)
LA	47± 4.12
SA	49 ± 5.38
P value	0.018

Observations During Surgery:

The following parameters were studied during the surgery:- Bradycardia: heart rate <60 beats/min, Hypotension: systolic BP<90mm of Hg, Pain assessment during surgery (done by questioning the patient during procedure.)

Table 4. Observations during surgery

Complications	LA	SA	P value
Bradycardia	3(10%)	5 (16.7%)	0.019
Hypotension	1(3.33%)	9(30%)	0.021
Pain during surgery	7(23.3%)	0	0.005

As seen in Table 4, Bradycardiawas noted in 3(10%) patients of LA group & 5 (16.7%) of SA group. They were treated with injection atropine 1mg iv & heart rate was converted into normal rhythm in 3(10%) patients.(p=0.019) Hypotension was seen in 9 (30%) patients of SA group and were treated withcyrstalloids& vasopressors. One patient in LA group (3.33%) experienced hypotension (p= 0.021).

Patients in LA group 7 (23.3%) experienced severe pain & needed sedation and analgesia during surgery, none of the them experienced pain in SA group (p=0.005).

Table5. Post- Operative observations

Post -operative observations	LA	SA
Nausea/Vomiting	2(6.7%)	5(16.7%)
Urinary Retention	0	8(26.7%)
Ambulation 1 hr after surgery	27(90%)	0
Pain 2 hrs after surgery	4(13.3%)	8(26.7%)
Headache	2(6.7%)	7(23.3%)

As seen in table 5, 90% of the patients were ambulant one hour after surgery although 13.3% reported pain in patients under LA group.However in patients operated under GA none of them were ambulant one hour post-operatively and 26.7% of them reported pain.

Table No 6: Complications Of Hernia Repair

Complications	LA	SA	Total(LA+SA)
Seroma	2(6.7%)	2(6.7%)	4(6.7%)
Scrotal Edema	3(10%)	4(13.7%)	7(11.6%)
Hematoma	1(3.3%)	1(3.3%)	2 (3.3%)
Wound Infection	1(3.3%)	1(3.3%)	2(3.3%)

As seen in table 6,3(10%) of the patients in LA group reprted scrotal edema as a complication of hernia repair however, in SA group 4 (13.3%) patients developed Scrotal edema following hernia repair. Complications like seroma, hematoma and wound infection were same in number among both the groups**.**

Table 7. Duration of Post-Operative hospital stay

Day of Discharge	No. Of Discharges in LA Patients	No. Of Discharges in SA patients
2	15(50%)	4(13.3%)
3	11 (36.7%)	6(20%)
4	4(13.3%)	12(40%)
5	0	7(23.3%)
6	0	1(3.3%)

As seen in Table 7, among LA group 50% odpatints were discharged on 2nd day and all the patients were discharged on 4th post-operative day. However, among SA group only 13.3% of patient were discharged on 2nd day and by the end of 4th day only 40% patients discharged post operatively.

Recurrence:
No patients in LA or SA group developed recurrence during followingperiod of 6 months.

Discussion-
Age at Presentation
The incidence of inguinal hernia was maximum between30-60 years of life in our study. These results are comparable to study by Louies& Wendell[3] and Bhollasinghsidhuet al[4]

Sex Distribution
In the present study all patients of inguinal hernia were males and there were no females patients presented with inguinal hernia during the study period. This may be due to less awareness of women about hernia. Socio -economic & educational level of the female patients contribute to less number of female presenting to hospital with inguinal hernia. This is supported by Liechenstein et alin a study were 94% male patients &only 6% female patients were presented with hernia.

Type of hernia
In the present study 75% of patients presented with indirect hernia and 25% presented with direct hernia. This is similar to study by Lousies et al[3] and L. palanivelu et al[5]who reported higher number of patients with indirect hernia as compared to direct hernia.

Location of hernia
Right sided inguinal hernia is common type in both direct & indirect type of hernia. This is due to later descent of right testis & higher incidence of failure of closure of processes vaginalis. In our study majority (56.7%) of hernia was observed on right side as compared to left side (43.35).This presentation is supported by earlier studies (Lousies&Wendall[3], BholasinghSindhu[4])

Comparison between SA & LA Group
Duration of procedure: In SA group the mean operating time was 49 ±5.38 minutes and in LA group same procedure took 47±4.12 minutes. There was no significant difference between the time taken for procedure among the groups.

The following parameters are studied & compared between the two groups as shown in table (P value identified by using Mann-Whitney U test)

Table11. Complications following surgery among both Groups

Complications	SA	LA	P Value
Bradycardia	5	3	0.019
Hypotension	9	1	0.021
Pain During Surgery	0	7	0.005
Nausea And Vomiting	5	2	0.029
Ambulation After1 Hr	0	27	0.000
Post -Operative Pain After 2 Hrs	8	4	0.023
Urinary Retention	8	0	0.003
Post-Operative Headache	7	2	0.035
Seroma	2	2	1.000
Scrotal Edema	4	3	0.690
Hematoma	1	1	1.000
Wound Infection	1	1	1.000
Recurrence	0	0	

***Significant p>0.05**

Table12. Comparing Complications with previous studies

Complications	Study by David V Young 6	Present Study		
	LA (%)	SA (%)	LA (%)	SA (%)
Nausea/ Vomiting	8	7	6.7	16.7
Pain during surgery	13	7	23.3	0
Urinary retention	7	18	0	27.7
Headache	7	8	6.7	23.3
Hematoma	5	4	3.3	3.3
Infection	1	2	3.3	3.3

In the present study none of tattained in present study, than the previous study (David V Young6he patients experienced pain while under spinal anaesthesia. This could be because of higher level of spinal anesthesia that is T9 level as).

Volume : 5 | Issue : 12 | December-2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 78.46

Present study can be compared with previous studies. Limitations of the present study are small size, & 100% matching not done between the study groups.

In our study patients operated under local anaesthesia had significantly over all less complications except for mild pain during surgery. In patients operated under spinal there was significant general complications like intra operative hypotension, post-operative urinary retention & headache. Most of the patients in LA group (90%) were ambulant after 1 hour of the surgery but none of the patients were in SA group.

Local complication like seroma, hematoma, scrotal edema, wound infection & recurrence occurred in both the groups. When compared there was no significant difference between the two groups. In present study, the type of anaesthesia had no significant influence on local complications. Only the skills, technique, and experience of the surgeons have influence on these complications.

Table 13. Complications of hernia repair

Complications	(LA+SA) in percentage
Seroma	6.7
Scrotal edema	11.6
Hematoma	3.3
Wound infection	3.3

All complications were treated conservatively with scrotal support & analgesics. They resolved in 15-20 days. Infections eventually resolved after drainage of the pus & change of antimicrobial treatment. None of the cases developed chronic groin pain, testicular atrophy and paraesthesia.

In previous studies infection occurred in 7.8% cases (T.B Burke, 1978)[7], 5.9% of cases (MaxemoDeysine , 1991)[8], 1.2% of cases (B Millant 1993)[9], upto 8% of cases (Allen E Kark 1998)[10], and 2% cases in (T Faish 2000)[11]. These are similar to the present study and are comparable with the previous studies.

Duration of Hospital Stay

In present study more than 80% of the LA group patients discharged by 3rd day & more than 80% patients in SA group by 5th day.Study conducted by David Young[6]shows average of 4.4 days hospital stay for LA group & 6 days for SA group.

Previous study showed that post- operative stay for short stay surgery was 2.2 days (Makuria 1979) [12], 3.8 days (S R Canon 1982) [13], 2-3 days (Glassow 1984)[14].This is comparable with the previous study which shows that short stay surgery can very well be practiced in our hospital.

Recurrence

In the present study the recurrence rate is nil even though it cannot be compared as the study group is small & follow up period was less. It is very difficult to project accurate incidence of recurrence as it depends on length of follow up. In an ideal surgeries the recurrence rate would be lesser than one percent

Summary

We conducted 24 months prospective study to compare the effectiveness of local anaesthesia with spinal anaesthesia in repairing uncomplicated inguinal hernia by measuring postoperative pain and post-operative complications. The study also looked at the feasibility of using local anaesthesia for short stay surgery.

Sixty patients were randomized to group A and group B. participants in group A was operated under local anaesthesia for hernioplasty and in group B spinal anaesthesia was used. Both groups were compared for intraoperative, postoperative pain and intraoperative, postoperative complication.

In our study we found that both local & spinal anaesthesia can be used for hernia repair on short stay basis, but spinal anaesthesia has higher complication rates compared to local anaesthesia. There is significant increase in general complications like hypotension, urinary retention, bradycardia, nausea/vomiting and headache in spinal anaesthesia. Local complications like seroma, hematoma and wound infection were similar in both groups.

Local anaesthesia has less immediate post-operative complication, with significant number of patients being ambulant at 2 hours post-surgery, best suitable for short stay surgery when compared to spinal anaesthesia. There is less post-op hospital stay and lesser complications with high patient acceptability. When short stay service is implemented there will be considerable savings to hospital service and to the patients.

Conclusion

Commonest age group affected with hernia is in 3rd to 6th decade .Majority of cases were males with right sided hernias. Indirect hernias were common in patients presenting with swelling in the groin. There is no significant difference in the duration of Hospital stay in all cases undergoing inguinal hernioplasty surgery irrespective of the type of anaesthesia. There is no significant difference in incidence of local complications seroma, hematoma and recurrence in all cases undergoing inguinal hernioplasty surgery irrespective of the type of anaesthesia However Local anaesthesia is safer as it does not have the general complications associated with spinal anaesthesia i.e., headache, urinary retention and hypotension.

It can be concluded that Local anaesthesia is best suitable for short stay surgery when compared to spinal anaesthesiaas; there will considerable savings to hospital service and to the patients with the implementation of short stay in hospital services.

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