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A Comparative Study of Hernioplasty for Uncomplicated Inguinal Hernia Done Under Local Anaesthesia versus Spinal Anaesthesia

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Abstract
Background*: To study the effectiveness of local anaesthesia in comparison toregional anaesthesia in repairing uncomplicated inguinal hernia by measuringpostoperative pain and post operative complication and also tocheck the feasibility ofusing local anaesthesia for short stay surgery.*
Material &Methods*:Sixty patients with primary uncomplicated inguinal herniaadmitted in Department of general surgery atS.V.R.R.Govt. General Hospital/S.V.Medical College, Tirupatiduring the study period from January 2017 to May2018was randomized to study & controlgroup. In control group spinal anaesthesia is used to do hernioplasty& study grouplocal anaesthesia. Both groups are compared for intraoperative, immediate postoperative& delayed postoperative complication.*
Results *: Both local & spinal anaesthesia can be used for hernia repair on short staybases,but spinal anaesthesia has higher complication rates compared to localanaesthesia.There is significant increase in general complications like hypotension,urinary retention,& headache in spinal anaesthesia &local complications like seroma,hematoma, scrotal edema & recurrence were similar in both groups.*
Conclusion*: Local anaesthesia is with less immediate post operative complication,best suitable for short stay surgery when compared to spinal anaesthesia. When shortstay service is implemented there will be considerable savings to hospital service & to thepatients.*
Keywords: *LA-Local anaesthesia,SAB-Sub-archnoid block,Hernia, Hernioplasty*

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I. Introduction

Hernia is the "protrusion of the viscous or part of theviscous through an abnormal opening in the walls of its containing cavity". Inguinalhernias are the commonest of all hernias and adult inguinal herniorrhaphy accountsfor 15% of operation in general surgery. Surgery is the definitive treatment for thehernia. Inguinal hernias are operated both as an out patient procedure and in thetraditional way with the patient hospitalized and operated on elective basis. Althoughthey can be discharged after a short period (Short-stay Surgery) or after completerecovery. For more than a century it has been customary to admit patients for allsurgeries and keep them in hospital until they are self sufficient, ambulant and till thesutures are removed. This causes increasing demand for hospital beds and increasedwaiting list for hernia surgery. It increases the economic burden for the hospital(government) and to patient. Prolonged rest in hospital often leads to complication.Hence out patient repair of groin hernia's has proved to be cost effective andenhances the quality of surgical care and decreases the waiting list. This approachcan't be practiced in our government hospitals. Because the living condition of mostof the people admitted to our hospital are poor.Most of the patients are illiterate and from the rural and semi urban placeswhere primary facilities for day care surgery are not up to the mark for follow up. Sonow a days discharging the patient early from the hospital is being practiced. Thisintroduction of short stay surgery, not only relieves the hospital waiting lists but alsorepresents an economic advantage and has certain social benefits

for the patient. Ashernia repair can be done under local, spinal and general anesthesia. Generalanesthesia and spinal anesthesia have their own complications. Prerequisites such asmedical fitness, post operative care, trained personal and field block technique forhernia repair is within the capability of operating surgeon. Complications and postanesthesia care for local anesthesia is negligible compared to traditional spinal orgeneral anesthesia.

With the introduction of Day care Surgery for inguinal hernia repair, the localanesthesia has its role as it reduces the cost and duration of hospital observation.Local anesthesia can be considered for hernial repair operations, in the areaswhere lack of trained personal and anaesthesic facilities are not available. There is along waiting list for hernia repair surgeries & it is found from the studies that localanesthesia reduced the hospital stay and cost with fewer complications. So this workis designed to study that hernioplasty can be performed without trained anaesthesicstaff by operating surgeon. And to study that hernioplasty under local anesthesia is anacceptable alternative to conventional hernioplasty using spinal anesthesia. This studyis also intended to know which suitable best is for the patients coming to our hospital(most of them are from low socio economic group) and to study the safety and costeffectivenessin both patient and hospitals point of view.

II. Aims & Objectives Of The Study

This study has been done prospectively to evaluate the:

1)To study complication of inguinal hernia repair under local anaesthesia duringthe time of surgery like bradycardia, hypotension, pain during surgery,hemorrhage, any cardio respiratory complication & also to compare with spinal anaesthesia.

2) To study the post operative complications like urinary retention, post operativepain, headache, seroma, haemotoma, scrotal edema, infection, recurrence, timeat ambulation &post operative hospital stay.

3)To study the feasibility of inguinal hernia repair using local anaesthesia whencompared to spinal anaesthesia for short stay surgery.

4)To study whether " short stay surgery" for inguinal hernia suitable for patientscoming to our hospital & the number of days required for ambulation andresumption to work after surgery.

III. Methodology

SOURCE OF DATA: Patients attendingout patient department (OPD)at S.V.R.R.Govt. General Hospital and those who were admitted in thehospital for uncomplicated inguinal hernia repair.

METHOD OF COLLECTION OF DATA

Patients admitted with inguinal hernia in surgical wards, S.V.R.R.Govt. GenreralHospital,Tirupati,during the study period JAN 2017 to MAY 2018,satisfying inclusion and exclusion criteria areconsidered into study.

-A thorough history and clinical examination of the cases are done.

-Patient will undergo necessary preoperative investigations.

-Randomisation of the cases done by lottery method and grouped into A and B.

-Patients with inguinal hernia repair done under local anaesthesia are given anaestheticmixture of 2% xylocaine(15 ml)+0.5% Bupivacaine(15ml)+Distilled water(30ml).

-Intra operative observations like bradycardia,hypotension and pain during surgery are assessed.

-Post-operative recovery will be assessed including complications like urinaryretention, post operative pain, headache, seroma, hematoma, scrotal edema, woundinfection, ambulation time,recurrence and duration of hospital stay.

-Post operative pain will be assessed using visual analogue scale at 30,60,120 and 240minutes.

-Further patients will be followed up in surgery out patient department (OPD) for 6 months.

-Final outcome will be evaluated.

INCLUSION CRITERIA:

1)All patients admitted and operated in surgical wards S.V.R.R.Govt. General Hospital,Tirupati with primary uncomplicated inguinal hernia on elective basis

2) Patients aged above 18 years

3)Patients with unilateral hernia

EXCLUSION CRITERIA:

1)Complicated and Irreducible hernia

2)Patients with recurrent hernia

3)Patients with bilateral hernia

4)Patients with psychiatric problems,pregnancy

5) Patients with medical illness like uncontrolled DM, HTN, COPD, Obesity, BPH, Bleeding disorders.

6) Patients below 18 years

7)Anxious and apprehensive patients
Details of cases will be recorded including history, clinical examination, andinvestigations done. All patients will be operated for hernioplasty. Patients will be randomized either to control group (where regional anesthesia used) or study group (where local anaesthesia) in the operating room by lottery method. Investigations required are standard protocol. These investigations are required as routine for diagnosis and to test the sensitivity to the local anaesthesic.
1) Routine blood and urine tests
2) RBS, Blood Urea, Serum Creatinine, Chest X-ray.(when age of patient is >35yrs or if necessary)
3) USG if required
4) Routine test dose of local anesthesia.
Patients were explained about type of anesthesia & surgery. Also, about advantage &disadvantage of each type of anesthesia. Explained about benefits from early mobilization, early discharge. Local anesthestic was given by surgeon himself & spinal by anesthesiologist. Then hernioplasty was performed irrespective of type of anaesthesia.

Technique of administration of local anaesthesia:
(GROUP A)
Step 1: A skin wheal is raised 2 cm medial to the anterior superior spine of the ilium.Before the needle is extracted, approximately 10 ml of solution is injected, the needletraverses the parietal muscles, first in the direction of the iliac spine to block theiliohypogastric and ilioinguinal nerves, and then toward the umbilicus to block thelast two intercostal nerves.

Step 2: Approximately 5 ml of solution is used to infiltrate the epidermis at the exactsite of the incision.

Step 3: An additional 5 ml of solution is utilized to inject the subcutaneous tissuebeneath the incision before the surgery is begun. This serves to block the overlappingbranches of the external femoral cutaneous and the femoral branch of the genitorfemoral nerves. This step is essential or the patient will feel discomfort as thesuperficial vessels and nerves are divided.

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

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

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

GROUP B:3 ml of 0.5% Bupivacaine heavy is used for spinal anaesthesia (done inL3-L4 space).
The following parameters are studied in both local anaesthetic& spinal anaestheticgroup
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 beats/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
d) Any hemorrhage & cardio respiratory complication during surgery
3) Immediate post operative ambulation & complications
a) Ambulation after 1 hr of surgery
b) Nausea & vomiting
c) Difficulty in voiding & urinary retention
d) Headache
e) Post operative pain

4) Length of post operative stay in hospital & complications like
a) Seroma
b) Haematoma
c) Scrotal edema
d) Ischemic orchitis
e) Infection
f) Recurrence
g) Others like Testicular atropy , chronic groin pain &paraesthesia or hyperesthesia ifany.
Early discharge option given to the patients & encouraged, convenience of the patient. Maximumpost operative stay of 7 day was fixed for all patients, excepts for the conditions, which necessitates hospital stay like infection, hematoma & other complications. Stitches were removedon 7th post operative day.All patients were followed up for 6 months to study latecomplications.

IV. Results

In the present study age of the patient varied from 20 to 70 years with the highest prevalence noted in the age group of 31-40 years.

TABLE NO: 1 AGE DISTRIBUTION

AGE IN YEARS	**NO OF PATIENTS**	**PERCENTAGE%**
20-30	**15**	**25**
31-40	**20**	**33.3**
41-50	**9**	**15**
51-60	**11**	**18.3**
61-70	**5**	**8.3**
TOTAL	**60**	**100**

Present study shows more than 98.3% are male with only 1.7% of female presenting with inguinal hernia

TABLE NO 2: SEX DITRIBUTION

SEX	NUMBER OF PATIENTS	PERECENTAGE%
MALE	59	98.3
FEMALE	1	1.7

The above table shows that 75% of inguinal hernia in this study was indirect type and the remaining 25% was direct type. Out of 60 patients 66.7% had right sided inguinal hernia compared to left side which accounted for 33.3%. The local anaesthetic group (A) and spinal anaesthesia group (B) compared using following parameters

TABLE NO 3: LOCATION &TYPES OF HERNIA

TYPE& LOCATION	INDIRECT	DIRECT	TOTAL
RIGHT	35	5	40
LEFT	10	10	20
TOTAL	45	15	60

TABLE NO 4: TIME TAKEN FOR SURGERY

TIME TAKEN FOR SURGERY(In mins)	**NO OF PATIENTS IN LA**	**NO OF PATIENTS IN SAB**
35	0	2
40	4	5
45	18	16
50	3	3
55	5	2
60		2

TABLE NO 5: OBSERVATIONS DURING SURGERY

COMPLICATIONS	LA	SAB
BRADYCARDIA	1	5
HYPOTENSION	1	10
PAIN DURING SURGERY	8	0

In the LA group the time taken for procedure is in the range of 40-55 min,with maximum number of patients(18) requiring 45 min.
In the SAB group the time taken for procedure is in the range of 35-60 min,with maximum number of patients(16) requiring 45 min.
The following parameters are studied during the surgery:-
Bradycardia: heart rate <60 beats/min
Hypotension:systolic BP<90mm of Hg
Pain during surgery: by questioning the patient during procedure.
Bradycardia was noted in 1 patient of LA group & 5 patients of SA group.Theyare treated with injection atropine 1 mg IV & heart rate was converted into normalrhythm in 3 patients.
Hypotension was observed in 10 patients of SA group and were treated withcrystalloids& vasopressors. One patient in LA group experiencedhypotension. In LA group 8 patients experienced severe pain & needed sedation and analgesiaduring surgery, none of the patients experienced pain in SA group

TABLE NO 6: POST OPERATIVE OBSERVATIONS

POST OPERATIVE OBSERVATION	SAB	LA
NAUSEA/VOMITING	8	2
URINARY RETENTION	6	0
AMBULATION 1 HrAFTER SURGERY	0	28
POST OPERATIVE PAIN 2Hr AFTER SURGERY	1	2
POST OPERATIVE HEADACHE	1	0

8 patients in SAB group& 2 patients (10%) in LA group experienced nausea &vomiting
6 patients in SAB group & none in LA group experienced retention of urinewhich required catheterization.28 patients in LA group wereambulant at the end of 1hr & none in SAB group.
2Hours after surgery patients were questioned about pain & need for analgesia noted.1patient in SAB group and 2 patients in LA group experienced painand needed analgesia.
Post operative headache seen in 1patient in SAB group &none in patient of LA group.

TABLE NO 7: COMPLICATIONS OF HERNIA REPAIR

COMPLICATIONS	LA	SAB	TOTAL
SEROMA	3	6	9
SCROTAL OEDEMA	3	4	7
HEMATOMA	4	2	6
WOUND INFECTION	2	4	6

Three (10%) patients in LA group and 6(20%) patients in SAB group developed seroma.Intotal 9(15%) patients developed seroma.3(10%) patients of LA group and 4(13.33%) patients of SAB group developed scrotal edema.In total 7(11.6%)patients developed scrotal edema4(13.33%) patients of LA group and 2(6.67%) patients of SAB group developedhematoma.In total 6(10%) patients developed hematoma. Two (6.67%) patients of LA group and 4(13.33%) patients of SAB group developedwound infection.In total 6(10%) patients developed wound infection.

TABLE NO 8 :DURATION OF POST OPERATIVE HOSPITAL STAY

DAY OF DISCHARGE	DISCHARGES IN LA	DISCHARGES IN SAB
2	2	0
3	16	0
4	4	6
5	3	6
6	1	5
7	2	8
8	1	1
9	0	0
10	1	2
11	0	1
12	0	1

TABLE NO 9: DURATION OF POST OPERATIVE HOSPITAL STAY

DAY OF DISCHARGE	NO OF DISCHARGES IN LA	NO OF DISCHARGES IN SAB
2-3	18	0
4-5	7	12
6-7	3	13
>7	2	5

Most of the patients, 18(60%) in LA group were discharged on 2-3 days while in SAB group 13(43.33%)patients were discharged on 6-7days postoperatively.Two (20%) patients in LA group & 5(16.67%) patients in SAB group were discharged >7days post operatively.

RECURRENCE: No patients in study or control group developed recurrence during follow up period of six months.

V. Discussion

AGE AT PRESENTATION

In a study by Ira 18% of cases were <15% yrs of age,20% were 24-44 yrs,23% were45-65 yrs& 30% were >65 yrs;group with maximum number of cases between 25-65Yrs of age.(Ira M Rutkow 1998)[9]

The incidence of age at presentation of inguinal hernia was maximum between30-60years of life (Louies& Wendell,[12] Delvin,[5]Bhollasingh sidhu[1]).These results are comparable with the present study.

SEX DISTRIBUTION:

In study by Ira[9], 90% inguinal hernia cases were in males patients & 10% werefemales, study by Liechenstein[10] 94% were male patients & 6% female patients.Occurring at any age males are more commonly affected then females.In presentstudy 95% were male & 5% were females.The percentage of females in this study isless compared to other studies.This may be due to less awareness of women abouthernia. Socio - economic & educational level of the female patients contribute to lessnumber of female presenting to hospital with inguinal hernia in early stage in ourstudy.

TYPE OF HERNIA

Right sided inguinal hernia is common type in both direct & indirect type ofhernia.This is due to later descent of right testis & higher incidence of failure ofclosure of processes vaginalis.

Comparison between SA & LA group.

1) Duration of procedure:

In SA group the mean operating time was 48+/-5.18 minutes & in LA group sameprocedure too 46+/-4.62minutes. There was no much difference between the timetaken for procedure in both the groups.

2) Anaesthesia:

In our study both local & spinal anaesthesia was used in equal number of cases (30each).

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

COMPLICATIONS

In the present study none of the patients experienced pain while under spinalanaesthesia. This could be because of higher level of spinal anesthesia that is >T9level as attained in present study, than the previous study (David V Young 1987)[4].

Present study can be compared with previous studies. Limitations of the present studyare small size, & 100% matching not done between the study groups.In our study people operated under local anaesthesia had significantly over all lesscomplications except for mild pain during surgery. In patients operated under spinalthere was significant general complications like intra operative hypotension, postoperative urinary retention & headache. Most of the patients in LA group (>80%)were ambulant after 1 hour of the surgery but none of the patients were in SA group.In addition to the above general complications there were local complication likeseroma, hematoma, scrotal edema, wound infection & recurrence occurred in both thegroups. When compared there was no significant difference between the two groups.In present study, the type of anaesthesia had no significant influence on localcomplications. Only the skills, technique, gentleness & experience of the surgeonshave influence on these complications.

Complications of hernia repair:

The local complications like seroma, hematoma, scrotal edema, taken together fromboth the groups, 15 % had seroma, 11.6% had scortal edema, 10% had hematoma,10%had infection. All complications treated

conservatively with scrotal support & analgesics .Theyresolved in 15-20 days. Infections eventually resolved after drainage of the pus in twopatients & change of antimicrobial treatment in rest of the cases. None of the casesdeveloped chronic groin pain , testicular atrophy &paraesthesia.

In previous studies infection occurred in 7.8% cases (T.B Burke, 1978)[2],5.9% ofcases (MaxemoDeysine , 1991)[13],1.2% of cases (B Millant 1993)[14], upto8%of cases (Allen E Kark 1998)[11]& 2% cases in (T Faish 2000)[7]. These are similar to thepresent study & are comparable with the previous studies.

Duration of hospital stay:

In our study only post operative period was calculated, because of delay in pre operative investigation. In present study 80% of the LA group discharged by 5thday& more than 40% patients in SA group by 5th day.Previous study shows that post operative stay for short stay surgery was 3-4 days (Sven Kornhale 1976)[15], 2.2 days (Makuria 1979)[16], 3.8 days (S R Canon 1982)[3],2-3 days (Glassow 1984)[6].

David Young[4] 1987 study shows that 4.4days for LA group & 6 days for SAB group(present study LA 4.7 +/- 2.2 days & SAB 6.7+/-2 days).This is comparable with the previous study which shows that short stay surgery canvery well be practiced in our hospital

Recurrence

In the present study the recurrence rate is nil even though it cannot be compared becauseof study group is small & follow up period was less. It is very difficult to projectaccurate incidence of recurrence, it will depend on length of follow up.In idealsurgeries the recurrence rate would be <1% . This is possible only in hernia specialization centers[8]

VI. Conclusion

1)Commonest age group affected is in 4th to 6th decade
2)Most of them were males with right sided hernias
3)Indirect hernia were common with all patients presenting with swelling in thegroin
4)Both local & spinal anaesthesia can be used for hernia repair on short staybases,but spinal anaesthesia has higher complication rates compared to localanaesthesia
5)There is significant increase in general complications like hypotension, urinaryretention, headache, bradycardia, headache & local complications like seroma,hematoma in spinal anaesthesia & recurrence were similar in both groups.
6)Local anaesthesia is with less immediate post operative complication, bestsuitable for short stay surgery when compared to spinal anaesthesia.
7)When short stay service is implemented there will considerable savings to hospital service & to the patients.

VII. Summary

Ours is 17 months study of the effectiveness of local anaesthesia in comparison toregional anaesthesia in repairing uncomplicated inguinal hernia by measuringpostoperative pain and post operative complication. So also to check the feasibility ofusing local anaesthesia for short stay after surgery.

Sixty patients were randomized to study & control group. In control group spinalanaesthesia is used to do hernioplasty & study group local anaesthesia. Both groupsare compared for intraoperative, immediate post operative, & delayed postoperativecomplication.

In our study we found that both local & spinal anaesthesia can be used for herniarepair on short stay bases, but spinal anaesthesia has higher complication ratescompared to local anaesthesia. There is significant increase in general complicationslike hypotension, urinary retention, bradycardia,nausea/vomiting,& headache in spinalanaesthesia & local complications like seroma, hematoma,& recurrence were similarin both groups.

Local anaesthesia is with less immediate post operative complication with significantnumber of patients being ambulant at 2hrs post surgery, best suitable for short staysurgery when compared to spinal anaesthesia. There is less post-op hospital stay andfewer complications with high patient acceptability. When short stay service wasimplemented there will be considerable savings to hospital service & to the patients.

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