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A comparative study between local inguinal block and general Anesthesia in inguinal Hernia Surgeries

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Abstract
Aim & Objectives: To a comparative study was done between local anaesthesia and general anaesthesia in inguinal hernia repair.
Materials Methods
Type of study: A prospective a prospective, randomized study was conducted on 40 patientscoming for inguinal hernia repair. They were randomly allocated into either local anesthesia group or general anaesthesia group study in Department of Anesthesiology Dhanalakshmi Srinivasan Medical College And Hospital, Perambalur
Results: The observations and results show a clear benefit from local anaesthesia for inguinal hernia repair with advantages of Good patient satisfaction, No major hemodynamic changes in the intra-op period and quicker recovery time
Conclusions: The conclusions from this study is inguinal hernia repair done under local anaesthesia with ilio-inguinal, iliohypogastric nerve blocks[1] with field block is a very effective and attractive alternative to general anaesthesia.

Keywords: Local anesthesia vs general anesthesia, inguinal hernia repair, inguinal block

Introduction
Inguinal hernia is a very common problem in the general population with a very high incidence. In fact, inguinal hernia is most common type of hernia. As a result of this high incidence, inguinal herniorraphy [2] or hernioplasty [10] is a commonly performed procedure. Hence, the plan of anaesthesia becomes very important. Most of the cases are done as a day-care procedure or with just one day of in-hospital stay and ideally, the plan of anaesthesia should be with the aim of quicker recovery, minimum side effects, maximum pain relief and good patient satisfaction. So, towards this end, a comparative study was done between local anaesthesia and general anaesthesia.

Aim of the Study
The aim of this study is to compare the differences between local and general anaesthesia for inguinal hernia repair by comparing intra-op hemodynamic parameters, recovery profiles, post-op pain relief, post-op pain satisfaction, and post-op side effects

Materials and Methods
A prospective, randomized study was conducted on 40 patients coming for inguinal hernia repair. They were randomly allocated into either local anaesthesia group or general anaesthesia group by flip of a coin.
Place of Study: Department of Anaesthesiology Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur

Inclusion Criteria
- ASA Status I & II
- Age 18 to 65 years
- Weight 50 to 70 kg
- Elective procedure
- Unilateral, reducible inguinal hernia
- Mallampati Class I and II

- Mouth opening > 3 cm
- Neck movements adequate

Exclusion Criteria:
- Patient refusal
- Active gastroesophageal reflux disease or other predisposing conditions for possible aspiration
- Significant neurological, psychiatric, cardiovascular, respiratory, renal or hepatic disease
- Any signs or conditions indicating anticipated difficult airway
- Not fulfilling inclusion criteria

Procedure for Group L - Local Anaesthesia:
- Premedication - Glycopyrrolate 0.2mg iv
- Fentanyl 2 micrograms/kg iv
- 20 ml of 2%lignocaine + 20 ml of 0.5% bupivacaine with 100 micrograms adrenaline is taken
- Midazolam titrated to Ramsay Sedation Score of 3 (max dose of 0.1 mg/kg)
- Supplementation of local anaesthetic [1] allowed intraoperatively by surgeon
- Maximum dose of lignocaine with adrenaline is 500 mg
- Maximum dose of bupivacaine with adrenaline is 225 mg

Technique
Skin wheals with 25 G needle at
a) 2 cm medial and inferior to anterior superior iliac spine
b) superficial inguinal ring

23 G Quincke's needle is introduced at (A) in a lateral and inward direction so as to touch the iliac crest. On its way out, the needle is moved in a fan- shaped manner for even spread in all the layers. Around 10 ml of local anaesthetic is injected in this manner. Through the same skin wheal, the needle is introduced medially, parallel to and above the inguinal ligament around the anticipated line of incision, with around 5 ml of local anaesthetic.
23 G Quincke's needle is introduced at (B) in a medial and downward direction so as to touch the pubic symphysis. Around 5 ml of local anaesthetic is injected here. Through the same skin wheal, the needle is introduced laterally, parallel to and above the inguinal ligament around the anticipated line of incision, with around 5 ml of local anaesthetic. Through the same skin wheal, the needle is introduced towards the umbilicus and around 10 ml of local anaesthetic is injected subcutaneously.

5 ml of local anaesthetic is kept which can be used intraoperatively by the surgeon. Once the spermatic cord is exposed, if there is any traction pain, around 5 ml of local anaesthetic is injected under direct vision at the deep inguinal ring by the surgeon to anaesthetize the genitofemoral nerve and sympathetic fibres around the cord.
- Sensory block is assessed by ether-soaked cotton at the operative site.
- ↔ Analgesic failure is managed with general anaesthesia and these patients are excluded from the study.
- Intraoperatively, patients receive supplemental oxygen, midazolam, and intravenous fluids.
- Heart Rate, NIBP, O2 Saturation, Sedation Score are measured every 5 mins till the end of the procedure.

Procedure for Group G - General Anaesthesia
- Premedication - Glycopyrrolate 0.2 mg iv
Fentanyl 2 micrograms/kg iv
- Induction - Preservative-free lignocaine 1.5 mg/kg iv Propofol 3 mg/kg iv
- Insertion of 4 Size Classical LMA
- Maintenance - N2O: O2 = 66: 33
Sevoflurane 0.5 to 2%Intravenous fluids
- HR, NIBP, O2 Saturation are recorded every 5 mins till the end of the procedure
- LMA is removed after patient is fully awake

Post-operative Analgesia
- Both the groups receive uniform analgesia – Tablet Diclofenac Sodium 50 mg bd
- Rescue analgesia – In case patient complains of pain or the score in the Visual Analog Score is in the moderate range, Injection Pentazocine 0.6 mg/kg.

Parameters that are compared
- Intra-operative events like HR, NIBP, O2 Saturation.
- Recovery time based on Modified Aldrete Score
- Post-op pain scores based on Visual Analog Scale at 6 hours at rest and during movement and at 24 hours at rest and during movement.
- Patient satisfaction with the mode of anaesthesia asked at 24hours rated as poor, average, good, excellent.
- Post-op side effects like nausea, vomiting, backache, headache, pruritis, sore throat, urinary retention, wound infection, wound hematoma

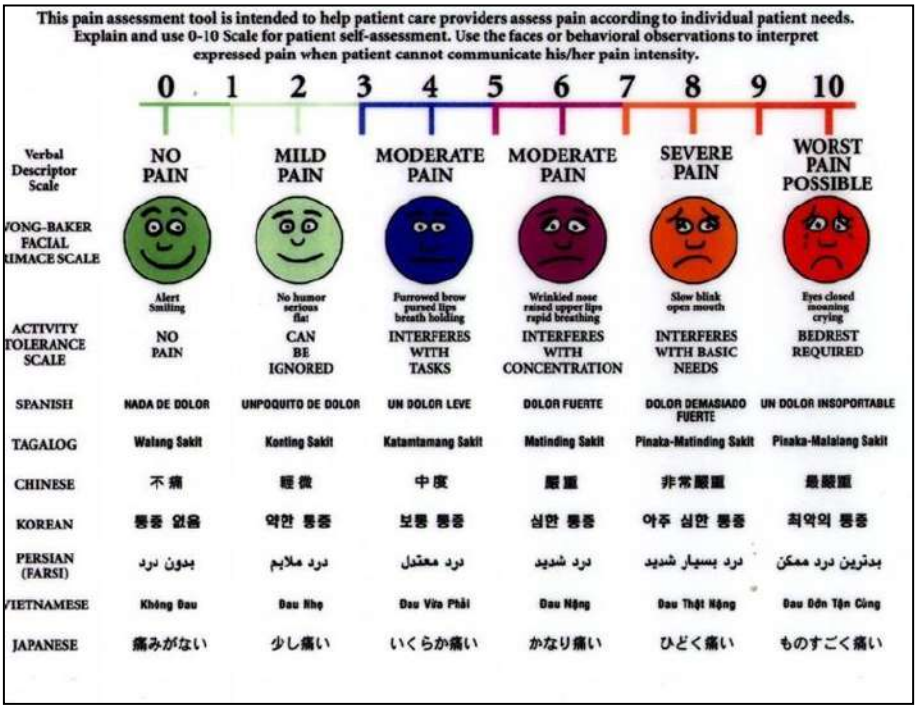

Fig 1: Universal pain assessment tool

Ramsay Sedation Score

1. Patient is agitated and anxious or restless, or both
2. Patient is co-operative, oriented and tranquil
3. Patient responds to commands only
4. Patient exhibits brisk response to light glabellar tap or loud auditory stimulus
5. Patient exhibits sluggish response to light glabellar tap or loud auditory stimulus
6. Patient exhibits no response

Modified Aldrete Scoring System

Activity: able to move, voluntarily or on command

2 - Four extremities
1 - Two extremities
0 - No extremities

Respiration

2 - Able to breathe deeply and cough freely
1 - Dyspnea, shallow or limited breathing
0 - Apnea

Circulation

2 - Blood pressure within 20 mm Hg of preoperative level
1 - Blood pressure within 20 – 50 mm Hg of preoperative level
0 - Blood pressure + or – of preoperative level

Consciousness

2 - Fully awake
1 - Arousable on calling
0 - Unresponsive

Oxygen saturation

2 - Saturation > 92%
1 - Needs oxygen to maintain saturation > 90%
0 - Saturation < 90% with oxygen

Statistical methods used

The descriptive statistics of the variables studied are represented as two-way tables. The categorical factors are represented by the number and frequency (%) of cases. The continuous variables are represented by measures of central frequency (like mean, median & mode) and deviation (standard deviation and range). The differences in the proportions are tested for statistical significance using non-parametric Chi-square test for variables measured on nominal scale. Fisher's exact probability test was employed wherever required. For variables measured on a continuous scale, when testing for two groups, Student "t" test is used to test for statistical significance in the differences of the two means.

Table 1: Distribution of cases by patient satisfaction and group

Subjective rating of patient satisfaction	Group G (n=20)		Group L (n=20)		P-value
	No.	%	No.	%	
Good	6	30.0	13	65.0	
Others	14	70.0	7	30.0	0.03

The frequency of cases whose subjective rating of satisfaction as "Good" was more among Group L than Group G and the difference was statistically significant (p=0.03)

Table 2: Distribution of cases by rescue analgesia and group

Rescue analgesia	Group G (n=20)		Group L(n=20)		Total	
	No.	%	No.	%	No.	p-value
Category 1	11	78.6	3	21.4	14	0.05
Category 2	4	66.7	2	33.3	6	N.S

Among the rescue analgesia [9] category coded as 1 (n=14), the distribution of the number of cases was more among Group G (79%) than Group L (21%) and the difference was statistically significant (p=0.05). Among the rescue analgesia category coded as 2 (n=6), the distribution of the number of cases was more among Group G (67%) than Group L (33%). However, the difference was statistically not significant.

Table 3: Distribution of cases by post OP side-effects and group

Complications	Group G (n=20)		Group L (n=20)		p-value
	No.	%	No.	%	
Nil	15	75.0	18	90.0	N.S
Headache only	0	0.0	1	5.0	
Sore throat only	1	5.0	0	0.0	
Nausea+Vomiting	3	15.0	0	0.0	
Nausea+Vomiting+S	1	5.0	0	0.0	
Pruritis	0	0.0	1	5.0	

The distribution of the number of cases reporting no post-OP side- effects was more among Group L (90%) than Group G (75%). However, the difference was not statistically significant.

Table 4: Distribution of cases by post-OP pain assessment at 6-hours

Post OP pain assessment category: at 6-hours	Group G (n=20)		Group L (n=20)		p-value
	No.	%	No.	%	
At rest					
2	2	10.0	16	80.0	<0.001
3	15	75.0	4	20.0	
4	3	15.0	0	0.0	
At movement					
2	1	5.0	9	45.0	
3	5	25.0	9	45.0	
4	12	60.0	2	10.0	
5	2	10.0	0	0.0	0.001

The differences in the frequency of cases by post-OP pain assessment category at 6-hours between Group G and Group L were statistically significant at rest (p<0.001) and at movement (p=0.001).

Table 5: Distribution of cases by post-OP pain assessment at 24-hours

Post OP pain assessment category: at 24-hours	Group G (n=20)		Group L (n=20)		P-value
	No.	%	No.	%	
At rest					
2	1	5.0	4	20.0	0.06
3	13	65.0	15	75.0	
4	6	30.0	1	5.0	
At movement					
2	1	5.0	3	15.0	0.13
3	12	60.0	15	75.0	
4	7	35.0	2	10.0	

The differences in the frequency of cases by post-OP[3] pain assessment category at 24-hours between Group G and Group L were statistically not significant at rest (p=0.06) and at movement (p=0.13).

Table 6: Distribution of recovery time of cases by groups

Age	Group G	Group L	p-value
No. of cases	20	20	<0.001
Mean	5.6	1.4	
S.D.	1.28	0.59	
Median	5.5	1	
Range	3 – 8	1 - 1	

The mean recovery time was observed to be lesser in Group L than Group G, the difference being statistically significant (p<0.001).

Table 7: Distribution of values by groups and MAP values

MAP at different times	Group G (n=20)	Group L (n=20)	p-value
0- min Mean SD	92.4 7.99	93.3 7.03	0.71
5- min Mean SD	91.3 8.59	92.1 7.65	0.54
10- min Mean SD	89.2 7.64	91.6 7.69	0.33
15-min Mean SD	89.1 7.21	90.9 6.28	0.41
20-min Mean SD	88.2 7.37	89.8 6.90	0.48
25-min Mean SD	88.2 7.28	90.1 6.65	0.42
30-min Mean SD	88.0 7.75	90.7 6.60	0.24

Table 8: Distribution of values by groups and pulse values

MAP	Group G (n=20)	Group L (n=20)	p-value
0- min Mean SD	76.7 6.52	77.5 6.96	0.71
5- min Mean SD	75.8 6.68	77.2 5.96	0.49
10- min Mean SD	73.5 6.15	75.4 6.74	0.36
15-min Mean SD	73.4 5.70	75.1 6.03	0.37
20-min Mean SD	70.4 4.24	75.3 5.21	0.002*
25-min Mean SD	70.9 4.83	75.3 5.74	0.01*
30-min Mean SD	70.0 4.86	75.8 6.65	0.003*
35-min Mean SD	69.7 4.56	73.2 4.41	0.02*

The mean values were generally higher among Group L than Group G at all the time points studied. However, the differences were statistically significant only from 20 minutes and later and not at the rest of the time points studied. The trend of mean values of pulse rate with increasing time points was generally decreasing with minor fluctuations among both groups.

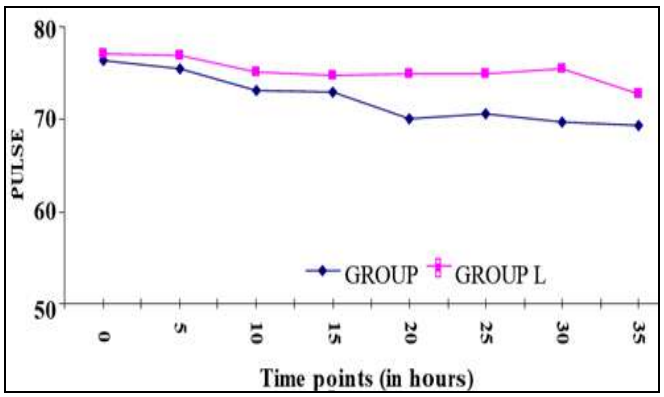

Fig 2: Mean distribution of pulse rate by group

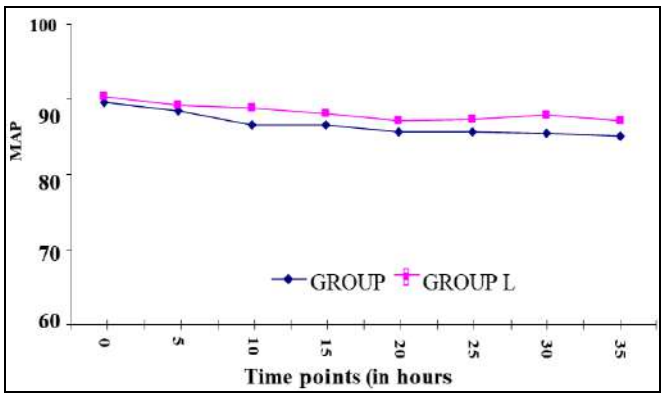

Fig 3: Mean distribution of map values by group

Discussion

The observations and results show a clear benefit from local anaesthesia for inguinal hernia repair.

Local anaesthesia4 provides the following advantages

Good patient satisfaction 8

No major hemodynamic changes in the intra-op period

Quicker recovery time

Lower pain scores in the immediate post-op period, upto 6 hours

Less post-op opioid requirements, so better pain relief

No major post-op side effects

General anaesthesia3 has the following main disadvantages

Prolonged recovery time

Decreased duration of post-op pain relief

Increased post-op opioid requirements as rescue analgesia

Summary

This study was conducted in unilateral inguinal hernia7 repairs as a comparative, randomized, prospective study between local anaesthesia and general anaesthesia 5,6. Taking into account inclusion criteria and exclusion criteria, the patients were randomly divided into local anaesthesia and general anaesthesia groups. The procedures for each group was meticulously followed and the patients followed up for 24 hours. The parameters that were compared in the study were noted down for each patient and the results computed using relevant statistical tests.

Conclusion

Based on the parameters compared and the statistical analysis results, it is seen that inguinal hernia repair under local anaesthesia is better because it provides better recovery, better post-op pain relief and good patient satisfaction.

The conclusions from this study is inguinal hernia repair done under local anaesthesia with ilio-inguinal, iliohypogastric nerve blocks1 with field block is a very effective and attractive alternative to general anaesthesia.

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