



Proline mesh hernioplasty of inguinal hernia: under general versus local anaesthesia

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Abstract

Background: Repair of Inguinal hernia is one of the most common surgical procedures that can be performed under general, spinal or local anaesthesia. Selection of type of anaesthesia depends on different factors. There has been a revival of use of the local anaesthetics.

Aim: This study is to compare outcome of open proline mesh hernioplasty under general anaesthesia versus local anaesthesia.

Patients and Methods: This study included 258 patients with inguinal hernioplasty who were allocated into two groups according to type of anaesthesia used. Group I included 146 patients who were operated on under local anaesthesia, while Group II included 112 patients who were operated on under general anaesthesia. Each patient was informed about the type of anaesthesia and signed consent was obtained.

Results: Reading operating time, Group I had mean \pm SD of 53.15 \pm 9.44 minutes (m) with a median of 53m and a range between 33-71m, while the mean \pm SD of Group II was 55.41 \pm 10.57 m with a median of 57m and a range between 34 - 75 m. One hundred thirty three patients (%) of group I were discharged home as day cases while only 64 patients (%) were discharged home as day cases ($p = 0.0001$). There were no significant differences between both groups regarding the duration of surgery (p - value was 0.7). The two groups had statistically no significant difference regarding surgical complications and body mass index (BMI). There was no mortality.

Conclusions: Local anaesthesia is a safe, quick, cost effective anaesthetic procedure for performance of the inguinal proline mesh hernioplasty. Also it is the preferable anaesthetic procedure for patients in whom general anaesthesia is contraindicated or risky such as patients with cardiopulmonary diseases.

Keywords: inguinal hernia, proline mesh, local anaesthesia.

Introduction

Abdominal hernia is a protrusion of an organ or part of an organ through a defect in the fascial layers of the abdominal wall^[1]. Hernial surgery rate is 10-15% of all surgical procedures, 80% of them are inguinal hernias. About 92% of inguinal hernias occurred in males^[2]. Inguinal hernias are universally common accounting 75% for all types

of hernias. They are more common in males than females in a ratio of 20:1^[3]. Despite being a basic surgical procedure taught to junior surgeons, but nearly 80 techniques have been innovated since Bassini who reported his technique in 1889^[4].

This operation can be performed under general, spinal, epidural or local anaesthesia. Local anaesthesia with suitable analgesia and sedation are

safe for most of the open inguinal hernia repairs as a problems of other type of anesthesia may be avoided. Local anesthesia is safer, cheap with less postoperative respiratory and cardiovascular complications with short anesthesia time and helpful in reducing the surgical list load. The other advantage of local anesthesia is the independence of surgeons from anesthetist. Conversely, spinal anesthesia has advantages of full work up of the patient and decreasing postoperative pain. Its disadvantages include long hospital stay, postoperative urinary and cardiovascular complications and it is more expensive. With Local Anesthesia; although anesthesia time is shorter the mean duration of surgery may be prolonged^[5]. Transient femoral nerve palsy is a recently documented complication that can lead to delayed ambulation in a considerable number of patients^[6]. High incidence of wound infection and wound hematomas are other important consequences^[7].

We performed this study to compare between local anesthesia and general anesthesia in open hernia repair to show the outcomes of these two methods.

Patients and Methods

This is a prospective study conducted at Al-Zahraa teaching hospital/college of medicine/ Wasit university/Iraq, from February,2013 to October,2016. 258 patients who scheduled for elective inguinal hernia repair were included in this study, the patients divided into two groups according to the type of anaesthesia which is used during operation. Group 1 include 146 patients where local anaesthesia was used while group 2 include 112 patients where general anaesthesia was used. Each patient informed about the type of anaesthesia and accept the method of anaesthesia. Female patient, non-elective procedure, recurrent hernia and patient with age less than 20 years not included in this study. All the operations were done by the same consultant surgeon. Case notes were obtained and the parameters studied were

- Efficacy of the anaesthesia

- Surgical procedure and average time
- Safety and postoperative course
- duration of hospital stay
- Recurrence

a full history was taken and detailed clinical examination was done. Routine investigations like haemoglobin concentration, renal function tests, random blood sugar, electrocardiogram and X-ray of the chest were done for all patients. Patients were followed up for a maximum of three years.

The anaesthetic and surgical techniques

The local anaesthesia which was used is a mixture of 2% lignocaine 15- 35 milliliters and 0.9 saline 20 - 40 milliliters, this mixture was buffer with 5 milliliters of 8.4 sodium bicarbonate, so the total volume of mixture was range from 40 - 80 milliliters and the volume of it which was used for operation was recorded.

At first, 10 - 15 milliliters of the local anaesthetic mixture was infiltrated in the line of planned incision then 5 milliliters were injected at the surface anatomical markings of both the superficial and deep inguinal orifices to anaesthetize the inguinal canal. Local anaesthetic infiltration was also injected around the pubic tubercle . Local anaesthetics mixture was also infiltrated before dissection of the preperitoneal space, according to the patient's need.

The mesh hernioplasty technique was made as reported by Robbins and Rutkow^[8].

The surgical technique was mesh plug with onlay mesh (patch) repair. For the indirect inguinal hernia, the hernial sac was dissected and it's opened and its contents were reduced intraperitoneally then transfixed to edges of the spatulous deep inguinal ring and excised distally while the direct inguinal hernial sac was dissected and retroperitoneally reduced . The proline mesh plug was used to reconstruct the spatulous deep and spatulous external inguinal ring in case of direct inguinal hernias. The onlay proline patch was fixed by 2/0 nylon stitches to conjoint tendon and inguinal ligament. Six cases

required suction drains that were removed 24-48 hour postoperatively.

The study was approved by the local ethics committee. All the data collected from the database were analyzed using SPSS version 22.0

Result

Two hundred fifty eight patients included in this study, all are male patients with elective inguinal hernia repair, 180 [69.76%] patients with indirect inguinal hernia and 78 [30.23%] patients with direct inguinal hernia, group 1 underwent repair under local anaesthesia 146 [56.58%] while the second group who underwent operation under general anaesthesia include 112 patients [43.41%].

The mean age for group 1 was 45.45 ± 15.71 with a median 45 and range between 20 and 80 years old. while the mean age for group 2 was 41.02 ± 14.49 with a median 37.5 and a range between 20-70 years old.

The mean of the duration of operation of group 1 was 53.15 ± 9.44 minutes with a median 53 and a range between 33-71 minutes, while the mean of the duration of group 2 was 55.41 ± 10.57 minutes with a median 57 and a range between 34 - 75 minutes. There was no significant differences between both groups regarding the duration of operations, *p* - value was 0.7. There was no mortality.

Table. 1. Demographic distribution Of the study Patients

The statistical characteristics of study patients	Group I N . 146	Group II N . 112	P - value
Median age	45 (20–80)	37.5(20-70)	0.3
Gender	M (100%)	M (100%)	
Indirect hernia	102	78	
Direct hernia	44	34	
Left sided hernia	62	48	
Right sided hernia	83	65	
BMI	25.7	26.3	0.7
Duration of operations per minutes	53.15	55.41	0.7
Day cases	133	64	0.0001

In our study, wound infection occurred in 13 (8.9%) patients of group 1 and 7 (6.25%) patients of group 2. 3(2.05%) patients. In group 1, urine retention occurred in 3(2.05%) patients while in group 2, 10(8.92%) suffered from retention. scrotal swelling occurred in 13(8.9) patients from group 1 and 15(13.39) patients from group

2. wound hematoma occurred in 5(3.42%) patients from group 1 and only 3(2.67%) patients from group 2. Regarding chronic groin pain, group I had 9 (6.16%) patients while group II had 6(5.53%) patients. This study had no any patient required conversion from local anaesthesia to general anaesthesia.

Table 2 Complications of GA and LA group

Complications	Group I (N= 146)	Group II (N= 112)	P - value
Wound infection	13 (8.9%)	7(6.25%)	0.4
Urinary retention	3(2.05%)	10(8.92%)	0.012
Scrotal swelling	13(8.9%)	15 (13.39%)	0.25
Wound haematoma	5 (3.42%)	3 (2.67%)	0.73
Chronic groin pain	9(6.16%)	6 (5.53%)	0.78

There was no significant difference ($P > 0.05$) regarding age, gender, operative time, mesh size,

length of stay, infection, recurrence, reoperation, or death

Discussion

Inguinal hernia is a common surgical problem occurring in 15% of adult males . its repair is universally the most common performed surgical operation ^[9,10]. Hernia treatment has changed noticeably in the past 25 years. At the end of the 20th century, surgeons started to repair inguinal hernias with a laparoscopic approach, and simultaneously, open mesh repair became popular. Both are better than the older techniques, but the open mesh repair is simpler to perform, easier to learn, and has about the same or lower recurrence rate^[1].

Incidence rate of inguinal hernia is more in elderly patients above age of 65 years^[11] who have medical diseases that increase surgical complications , morbidity in elderly patients was reported to be three folds more than in younger patients, despite that, age or comorbidity will not be contraindications to inguinal hernia repair^[12].

The ideal mesh characters are inertness, biocompatibility, pliability, molecular permeability, resistance to infection, transparency and mechanical integrity. The disadvantage of the absorbable mesh has disadvantages that it dissolves too early to give time to the collagen fibers deposition .Also the multi-filament meshes may harbor bacteria increasing the risk of mesh infection. Monofilament mesh is now the most acceptable in use. The various types of proline meshes have alot of special advantages ^[11] .Use of porous proline mesh allows a large surface area for in-growth of connective tissue resulting into permanent fixation of the proline mesh resulting in good vascularized, tissue coverage of all surfaces of the mesh. Many surgeons are afraid of the complications caused by mesh implantation but these have been confirmed to be without basis. In order to minimize seroma or haematoma formation, vacuum drain is used in large inguinal hernias.

In some hernias general anaesthesia is preferable^[13] such as: children, obese patients, bilateral hernias and huge hernias.

Repair of bilateral inguinal hernias under local anaesthesia may be difficult to be performed due to large volume of the required local anaesthetic and prolonged time of its injection .It is reported that performing operating on bilateral inguinal hernia at the same time may increase risks of complications and recurrence because of repair under tension . A definite advantage of local anaesthesia is the minimal physiologic disturbances making it much safer for patients with respiratory and cardiovascular disturbances with minimal postoperative sedation and drowsiness allowing early ambulation and recovery^[4]

Many studies reported that an appropriate preparation and selection of the patient resulted in more than 90% of inguinal hernias operations can be performed under local anaesthesia^[14]. A definite advantage of local anaesthesia is the minimal physiologic disturbances making it much safer for patients with respiratory and cardiovascular disturbances with minimal postoperative drowsiness and sedation allowing early ambulation and recovery^[4].

Regarding early postoperative outcomes , long-term groin pain and recurrence at the 4.5 year follow-up period, our study reported that there were no significant statistical differences between the two techniques of anaesthesia (local versus general anaesthesia).

Inguinal hernioplasty is one of the commonest operations performed in our country. The long waiting time for this operation puts a strain on our medical services and also increases the risk of the hernial obstruction or strangulation while waiting a list of elective surgery. This study showed that hernia repair under local anaesthesia was suitable for the majority of patients complaining of inguinal hernia. The operation was accepted well. Only 12.5% had a mild discomfort.

The literatures have sufficient data advising proline mesh hernioplasty is easy and safe to be performed by hands of both general surgeons and hernia surgeons, but there are minimal data comparing inguinal hernioplasty under local versus general anaesthesia. Our study revealed

statistically no important differences between the two anesthetic techniques regarding early and late complications. However, inguinal hernioplasty under local anaesthesia can increase day case hernioplasty.

The average period of postoperative analgesia was four hours. Most patients felt that the subsequent pain was more tolerable because it came on slowly. This was similar to the study of Young,^[15]

in which patients with local anaesthetic technique had a lesser need for post operative analgesia compared with those who had their surgery performed under spinal or general anaesthetics. The mean time required for the total surgical procedure including infiltration of local anaesthesia was 53.15 minutes. A good relationship was needed as the patient remained awake and was required to do the cough stress tests. The use of local anaesthesia would not show to extend the intraoperative time. In fact, less time was spent in the operating suite compared with general and spinal anaesthesia which may require longer periods of patient monitoring.^[16] This technique has been shown

to result in a reduction in the hospital costs^[16,17] and decreasing elective waiting list.^[18,19]

Most of the studies analyzing mesh inguinal hernioplasty under local anaesthesia have reported a few cases of conversions to general anaesthesia due to patient discomfort.^[20,21] These conversions were either due to a high body mass index of the patients or due to shortage of local anaesthetic solution. The local anaesthetic mixture used in my study was of a large-volume that was buffered with sodium bicarbonate to decrease the pain of infiltration. It facilitated hernioplasty under local anaesthesia without conversion. Twenty one (14%) patients of Group I and 18 (16%) patients of Group II had a body mass index more than 30; however, no conversions were needed for these patients. My study had incidence rate of chronic groin pain statistically slightly high, however, the majority of the patients had mild groin pain neither affecting the day activities nor quality of life. This indicates the high satisfaction rates with both techniques.

In our study, all the patients were operated under local anaesthesia, no conversion to general anaesthesia.

Table .3 comparison of our study outcomes with those of other studies

Study	No.	Year	Type of anaesthesia	Complications						
				Wound infection	Scrotal oedema	Local pain	Recurrence	Urine retention	Wound haematoma	
Z A Choudry[22]	250	2005	local	2	?	2	3	5	5	
P SANJAY[11]	77	2007	local	5	2	61	4	2	15	
			general	2	1	42	3	5	7	
Ainul Hadi[23]	135	2011	local	10	7	2	3	8	6	
Shaikh AR[24]	105	2012	local	3	?	?	?	1	4	
Jawad Kadhim Al-Dhahiry[25]	124	2014	local	82	3	?	18	1	1	3
			general	42	1	?	6	0	1	1
Chinmay Gandhi[26]	25	2015	Local	1	2	2	0	1	?	
Rajat Raghunath[4]	184	2016	local	2	?		1		2	
Our study	256	2017	Local	146	4	5	5	0	1	2
			General	112	3	3	2	0	2	1

Conclusions

local anaesthesia is a safe , quick , cost effective anaesthetic procedure for performance of the inguinal proline mesh hernioplasty with less postoperative morbidity. Also it the preferable anaesthetic procedure for a patients in whom general anaesthesia is contraindicated.or risky such as patients with cardiopulmonary diseases. Adult inguinal hernioplasty under local anaesthesia is very effective method. Inguinal mesh hernioplasty may result in increased day-case rates, decrease elective waiting list, hospital cost and postoperative analgesic requirements.

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