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Comparative Study of Incidence of Inguinodynia after Open and Laparoscopic Inguinal Hernia Mesh Repair

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Abstract: To compare the incidence of inguinodynia in both methods of inguinal hernia repair, open Lichtenstein's and laparoscopic method. Prospective observational study. Study population is the inguinal hernia repair patients in Private Speciality Hospital in Pune city of Maharashtra state, India. Study was carried out for the period of two years. Patients were randomly selected and divided in to two groups, Group A consisting open repair cases and Group B consisting laparoscopic repair cases. A Visual Analogue Scale (VAS) was used to assess the pain scores. Patients with post inguinal hernia repair pain lasting more than 3 months are considered as having inguinodynia. Attempt is made to compare the incidence of inguinodynia. Mean, standard deviation were used as descriptive statistics. For Inferential statistics Chi-square test and Fisher's exact test were used. Total 100 patients were included in the study. 50 patients were randomly divided into Group A consisting open repair cases and Group B consisting laparoscopic repair. There was no statistically significant difference between incidence of inguinodynia after open Lichtenstein's and laparoscopic repairs of inguinal hernia. No statistically significant difference was observed in the incidence inguinodynia of in two groups with respect to age, gender, duration, complications. There was no difference in the incidence of inguinodynia after open Lichtenstein's and laparoscopic repairs of inguinal hernia.

Keywords: Inguinal hernia, Repair, Laparoscopic, Open, Inguinodynia, Comparision.

INTRODUCTION

Inguinal hernia repair is one of the most frequently performed procedures in general surgery, with approximately 20 million repairs every year worldwide [1].

The hernia is repaired using either open surgery or minimal access laparoscopy. The most common laparoscopic techniques for inguinal repair are transabdominal preperitoneal (TAPP) repair and totally extraperitoneal (TEP) repair [2].

Inguinodynia as a hernia post-operative chronic pain syndrome may occur due to an assortment of causes including mesh shrinkage, inflammation, scarification, as well as surgical technique

Chronic postoperative inguinal pain (postherniorrhaphy inguinodynia or CPIP) is defined by the International Association for the Study of Pain as "pain beyond three months after inguinal hernia surgery" [3]. CPIP is generally classified as neuropathic and non-neuropathic (inflammatory or nociceptive) pain. Neuropathic postherniorrhaphy pain can be a result of nerve entrapment by the inserted mesh or direct damage to inguinal nerves during surgery [4].

The principal clinical characteristics of neuropathic pain are a sharp, burning or 'shooting' sensation which is progressive after repetitive stimulation. Paraesthesia ('tingling', 'crawling', or electrical sensations) and dysaesthesia (spontaneous or evoked unpleasant abnormal sensation) with radiation towards the associated skin area of the involved inguinal nerve are often reported.

Laparoscopy is no better than open surgery at reducing recurrence or chronic pain, however with

laparoscopic surgery patients do have less postoperative pain and less superficial wounds [5].

This study was carried out with aim to compare the incidence of inguinodynia in both methods of inguinal hernia repair, open Lichtenstein's and laparoscopic method.

MATERIALS & METHODS

Study area: Sahyadri Speciality Hospital, Pune

Study population

Target population are patients who were operated for inguinal hernia at Sahyadri Speciality Hospital during the study time period and were included in the study as per the inclusion and exclusion criteria, mentioned below.

Sample size

Study group consists of total 100 cases who have undergone inguinal hernia repair which includes, 50 cases (group A) of open inguinal hernia mesh (Lichtenstien) repair and 50 cases (group B) of laparoscopic inguinal hernia repair.

Sample size calculation and sampling

By considering the occurrence of VAS score or pain in open Lichteinstein's group of 24% and laparoscopic group of 5.4%, calculated by using pilot study of 20 patients. We have calculated the sample size of 110. We have used the simple random method to divide the patients in 2 groups. By considering inclusion, exclusion criteria and loss of follow up, we have examined total 100 patients with 50 patients in each group.

Study design: Prospective cross sectional.

Inclusion criteria

Patients who were clinically diagnosed to have inguinal hernia and who have undergone inguinal hernia repair during time period of this study
Age >18 and < 80 yrs

Exclusion criteria

- Bilateral inguinal hernias.(to avoid bias)
- Recurrent inguinal hernia.
- Complicated inguinal hernia (obstructed, strangulated, incarcerated).
- Patients suffering from other pain syndromes and chronic disorders like, spine traumas, diagnosed neuropathies, collagen vascular disease, chronic renal failure, bleeding disorders and immune compromised status
- Patients who have preoperative inguinal region pain.
- Non- compliant patients.
- Psychiatric patients.

Detailed study protocol

Patients were selected on the basis of above mentioned inclusion and exclusion criteria. A case record proforma was prepared for each patient.

All patients with an elective inguinal hernia repair performed between May 2013 and May 2015 at Sahyadri Speciality Hospital were included in the study. Patients were evaluated on 7th post operative day in OPD. Also at the end of 3rd, 6th and 12th (wherever possible) post operative month. Patients having inguinal region pain for more than and/or after 3 months of elective inguinal hernia repair were considered to have Inguinodynia and were evaluated further.

7th post operative day evaluation in OPD was included as routine post operative follow up for all hernia cases, while further follow ups were done for patients who had complains of inguinal region pain or discomfort or delayed resumption of routine activities, based on telephonic/ email conversation as part of follow up questionnaire designed for the study.

This questionnaire evaluated outcome and satisfaction with the surgical procedure. All patients were asked if they had pain in their groin/scrotal/thigh region or at the site of the hernia repair at any point. In addition men were asked if they had pain in their testicle on the same side. Those who had pain were asked to grade it as per the severity of pain. Patients were also asked about numbness around the groin and in the thigh on the side of the hernia operation. They were asked about the character of their pain, effect of pain on general activities, mood, walking ability, normal work, personal relations, sleep and enjoyment of life.

Patients complaining of pain or discomfort were called in OPD for examinations. All these patients were subjected to detailed history taking, including history of pain including onset, duration, progress, severity and character of pain. Visual analogue scale (VAS 0-10) was used to assess the severity of pain. Patients with inguinodynia were classified according to VAS into mild (score 1-3), moderate (4-7) and severe (8-10). The words used to characterise patient's pain were used to classify the pain into neuropathic (sharp, shooting and radiating pain or numbness/pins and needle sensation) and nociceptive (dull, aching or irritating) pain or visceral. Also patients were asked if they suffered from other chronic pain conditions such as chronic backache, headache, irritable bowel syndrome or any other chronic condition associated with pain. The patient was asked if they are on any medications.

A detailed clinical examination was performed after the history taking. Physical examination included local examination of inguinal region to look for local swelling, scar, neuropathy, etc. Also systemic

examination was done to rule out systemic diseases complicating the pain.

Patients were also examined for any recurrence of inguinal hernia. Also for other complications like hematoma which included only wound or hernia site hematoma or ecchymosis but not bruising. Seroma included fluid collections at the hernia site. Wound or superficial infection was defined as wound related to infection only and included pus from wound, fistula and sinus formation. Length of hospital stay was defined as time from the day of surgery to discharge from the hospital. Time to return to usual activities was defined as number of days required to resume normal social activities.

Patients were also inquired about the requirement of the treatment they needed for the pain (non pharmacological, pharmacological, interventional, surgical)

Statistical Analysis

Data analysis was done by using statistical package Primer of Biostatistics. Mean, standard deviation, percentages, proportions were used for descriptive statistics. For Inferential statistics Chi-square test and Fisher's exact test were used to find the association and significance between 2 groups with various quantitative parameters like gender, type of hernia, type of pain, severity of pain, occurrence of complication etc. P value < 0.05 was considered as significant.

Ethical considerations

The study was conducted according to the Declaration of Helsinki. Institutional Ethical Committee Approval was taken prior to commencement of the study. Written and informed consent was taken from all patients for including them into this study. Patients were provided with Patient information sheet, which had detailed information about the study being conducted and details about their participation and confidentiality of their data.

RESULTS

Total 100 patients were included in the study. Out of which 96 were males and 4 were females. Majority of the patients that is 57 patients were in the age group of 60-79, followed by 40-59 age group, 35 patients while only 8 patients were belonged to 20-39 age group.

Table-1: Distribution of patients with respect to age and method of hernia repair

Method used	Number of patients	Age (years)	
		Mean	SD
Open (Lichtenstein)	50	65.60	12.10
Laparoscopy	50	55.16	13.91

Table-2: Distribution of patients with respect to gender and method of repair used

Gender	Method used		Total
	Open (Lichtenstein)	Laparoscopy	
Male	49	47	96
Female	1	3	4
Total	50	50	100

There is no significant association between inguinodynia with respect to age and gender of the patients.

Table-3: Association between Incidence of Inguinodynia (overall VAS score) and type of repair method used (Open and Laparoscopic).

Method used	Overall Visual analogue score				Total	P-value
	Nil	Mild	Moderate	Severe		
Open	40	6	3	1	50	0.769, NS
Lap	43	5	2	0	50	
Total	83	11	5	1	100	

There was no significant association between inguinodynia with respect to method used open or laparoscopic.

Table-4: Association between occurrence of complications and method of repair used.

Method	Complication		Total	P-value
	Yes	No		
Open (Lichtenstein)	9	41	50	0.123 NS
Laparoscopy	3	47	50	
Total	12	88	100	

There was no significant association between occurrence of complication with method used.

Table-5: Association between type of pain and method of repair used.

Method	Type of pain			Total	P-value
	NC	NP	Mixed		
Open (Lichtenstein)	14	6	3	23	0.715
Laparoscopy	13	4	3	20	NS
Total	27	10	6	43	

There was no significant association between type of pain and method of repair used.

Table-6: Comparison between Open (Lichtenstein's) repair and Laparoscopic repair with respect to incidence of pain

VAS at		VAS				Total	P-value
		Nil	Mild	Moderate	Severe		
1st week	Open (Lichtenstein)	27	17	6	0	50	0.117
	Laparoscopy	34	15	1	0	50	NS
3rd month	Open (Lichtenstein)	40	6	4	0	50	0.731
	Laparoscopy	43	5	2	0	50	NS
6th month	Open (Lichtenstein)	44	4	1	1	50	0.71
	Laparoscopy	47	2	1	0	50	NS

There was no significant difference between VAS score distribution (at 1st week, 3rd month and 6th month) with respect to method used.

DISCUSSION

Inguinodynia or post inguinoplasty pain syndrome is an entity that has gained importance in recent times. It is because of the decline in recurrence rate after inguinal hernia repairs, which has shifted attention of surgeons to this entity, which is one of the important factors, which decides success of operative treatment of inguinal hernia. Also it can be used to determine superiority of one method of inguinal hernia repair over the other. As pain is a subjective criterion, it is very difficult to assess the true incidence of inguinodynia.

Traditionally, Lichtenstein's tension free mesh repair is considered as the standard surgical procedure for the repair of inguinal hernia. Laparoscopic inguinal hernia repair has gained popularity in recent times. We thereby have made an attempt to compare the incidence of inguinodynia after these two approaches of inguinal hernia repair.

Comparison of incidence of inguinodynia between open and laparoscopic groups at 3 months has p value of 0.731(not significant) and at 6 months it is 0.715(not significant). While comparison between incidence of inguinodynia with open, TAPP and TEP methods at 3 months has p value of 0.665(not significant) and at 6 months it is 0.978(not significant). Grant et al reported severe incapacitating pain in 2% to 5% of patients [6]. In 2003, Poobalan et al, in their own follow up study identified around 10 % patients who reported to have moderate pain [7].

Patients were divided into 3 age groups for comparison. Groups were of age groups between 20 to 39 years, 40 to 59 years and between 60 to 79 years. In group of less than 40 years of age, only one patient had mild post operative pain out of total 8 patients. In group of age between 40 to 59 years, out of total 35 patients, 4 had mild pain while 3 had moderate pain. In age group of 60 to 79 years, 6 patients had mild pain, 2 had moderate pain and 1 patient had severe pain. Comparison between incidence of inguinodynia and these age groups showed p value of 0.901(not significiant). This shows there is no association between age of the patient undergoing hernia surgery and incidence of inguinodynia. Langeveld et al stated that younger patients (18-40 years) presented more often with CPIP than middle aged patients (40-60 years) and elderly (>60 years), 43% vs. 29% vs. 19% [8].

Bay – Nielsen M *et al*., described female sex as an independent risk factor for the development of inguinodynia. This is possibly because females report the pain more and also have lower pain threashold [9]. In our study, incidence of pain in females is less, possible due to less number of female patients. Larger sample size is required to find true association.

CONCLUSION

In the present study of inguinal hernia repair, there was no difference observed between the incidences of inguinodynia with respect to the method of inguinal hernia repair used, open Lichtenstein's repair and laparoscopic repair. Though factors like younger age, female gender have been mentioned in literature to be the risk factors for development of inguinodynia, in the present study there was no statistically significant association between these two factors and inguinodynia. There was no significant difference between incidence of complications between open and laparoscopic repairs. There was no association between occurrence of inguinodynia and type of hernia and length of stay.

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