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A Comparative Study of Prolene & Ultra Pro (Composite) Mesh in Inguinal Hernia Surgery

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Abstract
Purpose- *The aim of the study was Comparison the use of Polypropylene mesh (Prolene mesh) and Light weight mesh (ultra pro mesh).*
Methods- *A total of 50 patients were studied observed and followed up at 15 days, 1 month, 3, months and 6 months. 25 patients were offered light weight mesh hernioplasty as the treatment of their condition and in rest 25 patients Lichtenstein hernioplasty with heavy weight mesh (prolene mesh) done.*
Results: *56% of hernia occurs is 41-60 years of age and least in age of 20-30 years which is less than 8%.76% of hernia patient presented with groin swelling while 24% patient presented with groin swelling with pain. 48% of patients had symptoms of hernia for more than 6 months to one year duration. Overall post operative complications were slightly high in heavy weight mesh hernioplasty than light weight mesh hernioplasty.*
Conclusion: *Lichtenstein hernioplasty using light weight mesh was better than heavy weight mesh hernioplasty in respect to immediate and late post operative complication, especially chronic groin pain.*
Keywords- *prolene, hernia, hernioplasty, polypropylene.*

Introduction

Inguinal hernia repair is one of the most common surgical procedures worldwide. In The Netherlands, approximately 30,000 hernia repairs are performed annually. The lifetime risk of undergoing a hernia operation is 27 % for men and 3 % for women[1].

The incidence of hernia recurrence has been the primary endpoint in inguinal hernia studies for many years, but with the introduction of the tension-free mesh repair, recurrence rates have dropped significantly to 2 to 3 %[2].

Usher first introduced polypropylene prosthetics for inguinal hernia in the late 1950 [3] however, the wide acceptance of them took place in 1980s following Lichtenstein's report of very successful results. A hernia mesh has certain features like material, strength, elasticity, density, and pore

size. Standard polypropylene mesh is the most frequently used one. It is cheap, available in most institutions, nonabsorbable, and strong enough to avoid hernia recurrence.[4] Nevertheless, some actual problems with mesh use like foreign body sensation and chronic postoperative pain have created a conflict about standard polypropylene mesh. Polyester mesh might be an alternative, but it could not gain popularity. Polyester meshes can degrade by time especially in infected area.

Newer lighter meshes have been produced to overcome these problems.[5] Nevertheless, all lightweight meshes are more expensive than standard polypropylene mesh. Pure polypropylene lightweight mesh is the most economic option. There are also coated polypropylene meshes in the market. The purpose of the coating is to attenuate the host response to the prosthetic, yet still provide adequate strength for repair.[6] Fish oil, beta glucan, and titanium have been used for coating.[7]

In addition, chronic pain is thought to occur due to excessive inflammatory response to the synthetic mesh with reduction in tissue compliance and entrapment of neural structure [8]. Heavy-weight meshes contain high concentrations of foreign material and cause excessive inflammatory response [9]. Light-weight meshes have larger pores and they encourage collagen production with integration of the mesh into the abdominal wall with adequate inflammatory response.[10]

The aim of the study was Comparison the use of Polypropylene mesh (Prolene mesh) and Light weight mesh (ultra pro mesh).

Methods

A randomized, prospective study was conducted in the Department of surgery, New Medical College Hospital, Government Medical College, Kota, Rajasthan from June 2015 to May 2016. This study conducted in 50 patients. A written informed consent was taken from each patients included in the study after thorough counseling. All cases were selected, taking into consideration the inclusion & exclusion criteria. An inclusion criterion was all patients between the age of 18 & 80 years undergoing elective unilateral Lichtenstein hernia repair with prolene & ultra-pro-mesh. Exclusion criteria were those with recurrent hernia irreducible or strangulated hernia, large inguino scrotal hernia, history of previous abdominal incision, peripheral neuropathy, impaired cognitive function, limited mobility, and female patients will be excluded.

Randomization & blinding

Patients will be randomly allocated to Lichtenstein tension free repair of hernia either with prolene mesh (group A) or with ultra-pro mesh (group B)

Operative Technique

Standard Lichtenstein tension free mesh repair will be adopted procedure performed in spinal anesthesia. In group A Prolene (Polypropylene) mesh is anchored with polypropylene sutures to inguinal ligament, conjoint tendon and floor of inguinal canal. Extreme care will be used during surgery to avoid inclusion of nerve tissue during suturing and mesh placement.

In group - B Ultrapro (Polyglecaprone-polypropylene composite) mesh repair is done in similar manner. The patient will be managed in standard clinical pathway postoperatively and followed by at the time of discharge, 1 and 3 months after operation.

Follow up and outcome measurement

During each follow up visit, pain or discomfort at rest and upon completion of various activities (coughing for 10 times, walking upstairs) will be assessed by 4 point scale (none, mild, moderate or severe). Patient will also be asked regarding pain or discomfort encountered during normal daily activities at home.

A total of 50 patients were studied observed and followed up at 15 days, 1 month, 3, months and 6 months. 25 patients were offered light weight mesh hernioplasty as the treatment of their condition and in rest 25 patients Lichtenstein hernioplasty with heavy weight mesh (prolene mesh) done.

Result

56% of hernia occurs is 41-60 years of age and least in age of 20-30 years which is less than 8%. 50% of hernia patient were heavy laborer workers, 32% were moderately hard worker and 18% sedentary workers.58% of patients, were belonging to rural population and 42% from Urban Population. (Table 1)

76% of hernia patient presented with groin swelling while 24% patient presented with groin swelling with pain. 48% of patients had symptoms of hernia for more than 6 months to one year duration. 48% of Patients had left side hernia and 6% had bilateral involvement. Direct type in 54% and indirect hernia in 46% patients. Inguinal swelling was 64% and inguinoscrotal in 36% patients. Built was poor in 54% of inguinal hernia patient. (Table 2)

58% of patients had no evident straining factor & 20% had chronic cough. (Table 3).50% hernia repaired with light weight mesh and rest 50% repaired using heavy weight mesh. (Table 4). Overall post operative complications were slightly high in heavy weight mesh hernioplasty than light weight mesh hernioplasty. (Table 5)

Table 1: distribution of inguinal hernia patients according to demographic profile

Demographic profile	Patients number	Percentage
Age		
20-30 Year	4	8%
31-40 year	9	18%
41-50 year	11	22%
51-60 year	17	34%
61-70 years	6	10%
> 71	3	6%
Occupation		
Labourer	25	50%
Moderately Hard Work	16	32
Sedentary work	9	18%
Parameter		
Rural	29	58%
Urban	21	42%

Table 2: distribution of inguinal hernia patients according to clinical profile

Clinical profile	Number of patients	Percentage
Parameter		
Swelling without pain	38	76%
Swelling with groin pair	12	24%
Duration		
0-6 Month	11	22%
7 month - 1 year	24	48%
1 year - 5 year	12	24%
> 5 years	3	6%
Side of hernia		
Right	23	46%
Left	24	48%
Bilateral	3	6%
Type of hernia		
Direct	27	54%
Indirect	23	46%
Location of hernia		
Inguinal	32	64%
Inguinal Scrotal	18	36%
Nutritional status		
Good	7	14%
Average	16	32%
Poor	27	54%

Table – 3: Chronic Straining Factor for Inguinal Hernia

Parameter	No	% age
Dysnuria	5	10%
Chronic Cough	10	20%
Chronic Constipation	2	4%
Malgaignes Bulge	4	8%
No Factor	29	58%

Table 4: Type of Mesh used in Hernia Region

Parameter	No	% age
Heavy Weight Mesh	25	50%
Light Weight Mesh	25	50%

Table 5: Early & Late complications

Parameter	Light weight mesh repair N = 25		Heavy weight mesh repair N = 25	
Infection	0	0%	1	4%
Retention of Urine	4	16%	5	20%
Chronic Groin Pain	0	0%	1	4%
No Complaint	21	84%	18	72%

Discussion

Patients included were in the 20-80 years age group and the average age was 50. High incidence of hernia (34%) was found in 51-60 years slot whereas only 8% patients were <30 years. A

similar study conducted in 1996 in USA revealed that 30% patients were above 65 years of age. Similar numbers of patients were 15-44 years of age.

54% of patients suffering from groin hernia had poor built and 32% had average built in our set up. This led to the conclusion that patients who were malnourished (poor built) are more predisposed to hernias. Similar results were drawn by Abrahamson (1978) in his study.[12]

Half of hernia patients in our study were heavy labour and only 9 out of 50 were sedentary workers emphasizing the role of strenuous activity and repeated increase of intraabdominal pressure in hernia patients. Majority of patients in our study *(58%)* were from rural background and rest were part of urban population. Higher incidence of hernia in villagers may be attributed to poor nutrition and strenuous activity. Almost all patients included in our study had a visible groin swelling but this was the presenting complaint in only *76%, 24% p*atients presented with groin pain along with swelling.

In our study greater than 1 year was the average duration of swelling in 52% patients. Delay in presentation of these patients was due to no apparent discomfort, delay in recognition and unawareness of the treatment options available.

Left sided 48% direct 54% inguinal hernia was more common in our group of patients. 6% had B/L hernia analysis of the hernia centre's 51% had right sided involvement and 64% had indirect type which was in contrast to our observations.

According to Nordback I[13] 44.13% patients have right sided and 31.13% had left sided and 24.73% had bilateral hernias. Such high incidence of hernias in our study can be related to the age of most patients (>65), poor built 54% and strenuous occupation (50%).

In our study almost half 58% patients had no evident straining factor whereas 20% had chronic cough and 10% had dysuria. According to Balamaddaiah G [14] chronic cough, straining and smocking were predisposing factors in development of recurrence.

Equal numbers of patients (25 each) were offered Lichtenstein Hernioplasty in our series using heavy weight (Prolene) mesh in 25 and light weight (ultrapro) mesh in 25 patients.

Post-operative complications were judged after following the patients after 1 month, 3 months and 6 months. Rates of different complications like pain, urinary retention varied between the 2 series. Infection in the form of frank purulent discharge was found in 2% of heavy mesh repairs and non after light weight mesh hernioplasty.In a series conducted by Falagas ME [15] et al infection rate was 1-8% after mesh repairs.

Usher et al (1962) [11]noted seroma formation in 1.0% patients after using marlex mesh. No seroma formation observed in this study. In immediate post-operative period sharp cutting groin pain was experienced by 2% patients of Lichtenstein hernioplasty. All patients obtained relief by Diclofenac tablets or injection.

Chronic groin pain was the complaint of 2% of hernioplasty using heavy weight patients after 6 months of follow up. This pain was temporarily relieved by regular analgesics (Diclofenac).

As high as 20% of incidence of urinary retention was observed post operatively in patients of hernioplasty. The occurrence of this, complication can be attributed to presence of pain and older age group. After six months of follow-up no recurrence was noted after hernioplasty. Abrahamson (1987-88)[12] concluded a recurrence rate of 8% after nylon darn repair.

Usher et al (1962)[11] noted 5.97 recurrence rate after using marlex mesh Lichtenstein group (1992) did not report any recurrence after using prolene mesh for hernia repair.

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