

Ventral and Inguinal Hernia Repair- Polyglactin - 910 better than Polypropylene?

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Abstract

Background: Mesh repair has been one of the most popular methods of hernia repair with the lowest recurrence rates as compared to other tissue repairs. With increasing incidence of incisional hernia which is only 2nd to inguinal hernia in incidence, number of surgeries performed for incisional hernia has increased considerably. The mesh fixation has traditionally been done with Polypropylene which are non-absorbable sutures. This study aims to compare the group of patients in which polyglactin-910 was used with patients in which polypropylene was used. **Methods:** The study is a prospective study conducted over a period of 4 years at the largest tertiary care hospital of Western India. 400 patients were included from which 256 patients had inguinal hernia and the rest 144 had ventral incisional hernias. Two groups were framed from these 400 patients – one in which polyglactin-910 was used (120 patients) and the other in which polypropylene (280 patients) was used. All the patients were followed up for at least 1 year and the complications were compared. **Result:** Out of 400 patients in 120 patients mesh repair was done with polyglactin-910 and rest with polypropylene, and study was conducted over a period of 4 years with results showing incidence of pain 23% with polypropylene against relatively low incidence with polyglactin-910 of 12%. Another observation was that incidence of sinus formation was 13% with polypropylene and only 0.8% with polyglactin-910. **Conclusion:** The study concluded that the association of pain and sinus formation was higher with polypropylene.

Keywords : Hernia, Inguinal, Polyglactin – 910, Polypropylene, Ventral

Introduction:

Hernias are one of the most common anatomical derangements in men and women. Abnormal protrusion of an organ or tissue through a defect in its surrounding walls is defined as a hernia. Inguinal hernia repair is one of the most commonly performed surgery worldwide.⁽¹⁾ Inguinal hernia repair consists of two steps: reduction of the hernia sac and reconstruction of the posterior wall of the inguinal canal. After the discovery of synthetic polymers in 1935, polymers like polypropylene and polyester were used to make surgical meshes.⁽²⁾ Liechtenstein 1987 described a tensionless technique based on

strengthening the posterior wall of the inguinal canal with prosthetic material, reducing the recurrence rate to 0.7%.⁽³⁾ Use of mesh led to complications like infection, seroma, hematoma, chronic pain, erosion/contraction/rejection of mesh.

Ventral hernia can be further defined by location and origin. An incisional hernia occurs at any previous surgical site of the anterior abdominal wall. Traumatic hernias occur due to injury of the fascia and musculature of the abdominal wall, and can be in any location. Lateral abdominal wall hernias, also known as flank hernias are often caused by blunt trauma with disruption of the attachments of the lateral muscles of the abdominal wall.⁽⁴⁾ Sub-xiphoid hernias are located just inferior to the xiphoid process at the midline. Epigastric hernias can be spontaneous or incisional at the midline between the xiphoid and the umbilicus. Umbilical hernias are

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located at the umbilicus and can be congenital or acquired spontaneously. Hypo gastric hernias at the midline, inferior to the umbilicus are rare spontaneous occurrences. Suprapubic and par iliac hernias occur adjacent to the bony structures of the pelvis. Finally, spigelian hernias are spontaneous hernias that occur along the semilunar line, typically at the junction with the arcuate line of Douglas.⁽⁵⁾ The European Hernia Society has classified the primary ventral hernias into midline- umbilical and epigastric and lateral- spigelian and lumbar.⁽⁶⁾

In our center, the number of patients being admitted with incisional hernia is constantly increasing. The open surgical repairs performed in our institute for an incisional hernia repair are 1. Preperitoneal meshplasty 2. Retrorectusmeshplasty (Rives Stoppasublay) 3. OnlayMeshplasty. In all incisional hernia repairs, a drain was placed in the subcutaneous plane over the anterior sheath. For umbilical and epigastric hernias we do not routinely insert a subcutaneous drain unless onlaymeshplasty has been done. Traditional teaching has always dictated the use of Polypropylene suture material to fix the mesh and tissue repair.⁽⁷⁾ One of the complications of a mesh repair is sinus formation which has usually been attributed to the non-absorbable nature of suture material.⁽⁸⁾ We have compared various complications of both groups of patients who underwent a mesh repair with an absorbable and a non-absorbable suture.

Methods:

The present study of 400 patients was done in our institute from August 2014 to August 2018. 400 patients with clinically diagnosed hernia (Inguinal and Ventral) were included in this study. Only unilateral inguinal hernias were included. For inguinal hernias, Lichtenstein open tension-free hernioplasty was performed. For ventral hernias-preperitoneal meshplasty/retrorectus meshplasty was done. The suture material polyglactin-910 was compared to polypropylene at the under given sites.

Inguinal hernia – fixation of the mesh and closing the external oblique aponeurosis. (polyglactin-910 2/0 curved cutting v/s polypropylene 2/0 curved cutting) Ventral hernia- closing the posterior sheath/peritoneum , fixation of the mesh and closing the anterior sheath (depending on the type of repair done).

It was a prospective study. All patients were operated in our hospital. In each case detailed history, clinical examination, investigation and follow up was recorded according to age, symptoms, type of hernia, modality of management and complications. Associated comorbidities were not considered in the distribution of the patients. The mean body mass index (BMI) of the patients in the study is 23.5. A preoperative injectable antibiotic Cefotaxim 1 gm (3rd generation cephalosporin) was administered 30 minutes before the incision.

The patients operated for ventral hernias, a drain was placed in 100 patients and was not placed in 44 patients. Both these groups were included in the study.

Table 1: Distribution according to the type and subtypes of hernia

Type of hernia	No. of patients
Inguinal	
Indirect	110 (43%)
Direct	128 (50%)
Pantaloon	6 (2.3%)
Recurrent	12 (4.68%)
Total	256 (100%)
Ventral	
Incisional	64 (44.4%)
Recurrent incisional	20 (13.9%)
Umbilical	40 (27.7%)
Epigastric	20 (13.8%)
Total	144 (100%)

Table 2: Distribution according to gender

Gender	Inguinal	Ventral
Male	250 (97.65 %)	50 (34.72%)
Female	6 (2.34%)	94 (65.27%)

Table 3: Distribution according to suture materials used

Suture material used	Ventral Hernia (n=144)	Inguinal Hernia (n=256)	Total
Polyglactin 910	36 (25%)	84 (32.8%)	120
Polypropylene	108 (75%)	172 (67.2%)	280

Table 4: Distribution according to the complications

Complications	Polyglactin-910	Polypropylene
Pain	10 (12%)	56(23%)
Seroma	8 (6.6%)	20(7.14%)
Hematoma	2 (1.6%)	4 (1.42%)
Infection	4 (3.3%)	6 (2.14%)
Dehiscence	1 (0.8%)	1 (0.35%)
Recurrence	4 (3.3%)	6 (2.14%)
Sinus formation	1 (0.8%)	37 (13.2%)

Inclusion Criteria

1. Elective surgeries
2. Patients more than 16 years of age
3. All ventral hernias
4. Method of repair-open
5. For ventral hernia-pre peritoneal/retro rectus
6. Mesh used- lightweight polypropylene of appropriate size
7. Operated in our hospital
8. Lichtenstein tension free repair

Exclusion Criteria

1. Mesh other than light weight polypropylene
2. Laparoscopic repair
3. Onlay repair
4. Patients less than 16 years of age

Result:

Out of 400 patients in 120 patients mesh was fixed with polyglactin-910 and in rest it was done with polypropylene. It was observed that pain and sinus formation was significantly reduced in whom mesh fixation was done with polyglactin-910(p value <0.05, which is significant). The observation suggests fewer cases with seroma and hematoma formation with polyglactin-910 suture. But there was no such difference in our study as p value= 0.81620 which is not significant. The difference was not significant.

Discussion:

Seroma formation was the one of the most common complication following hernioplasty, incidence being 6.6% with polyglactin and 7.14% with polypropylene. In most cases the Seroma subsided by conservative management. In 8 patients,

aspiration of the seroma was done under sterile conditions at least 15 days after the surgery. In 3 patients, reaspiration was done. However in 1 case of incisional hernia (polypropylene group) it progressed to infection of the wound with purulent discharge wherein diabetes was a precipitating factor. The patient was managed by a CT-guided drain placement and this led to resolution of all symptoms. The patient was uneventfully discharged. The formation of seroma usually is not attributed to the suture material used but the type of surgery performed.⁽⁹⁾ Seroma formation is more in surgeries like onlay meshplasty as compared to Retrorectus meshplasty.

Pain was the most common complication in the patients with polypropylene incidence-23%, whereas incidence was 12% in polyglactin910. Pain was measured by a pain scale from 1-10 over the postoperative stay, at the time of discharge and at 1 week follow up. Patients with a score of 6 or more at the time of discharge or postoperative day 3 (whichever was early) were considered in this group.

Pain was the most distressing complication in the patient undergoing inguinal hernioplasty. In most cases pain was controlled by simple analgesics and conservative management. However 4 patients had prolonged pain (after 28 days) following hernioplasty, all of patients were from the polypropylene group with inguinal hernioplasty. The most common cause of pain in a patient operated for inguinal hernioplasty has been attributed to entrapment of nerve in the mesh. Other causes are pubic osteitis, somatic pain, functional cause.⁽¹⁰⁾ The non absorbable nature of polypropylene leads to persistent pain due to nerve entrapment whereas the absorbable nature of Polyglactin-910 did not show a single patient with pain beyond 1 month. Similar advantage is also seen in ventral hernia repairs. Hence from the study we can conclude that polypropylene use predisposes more to prolonged duration of post-operative pain.

A similar study published in international journal of research in medical science with two study groups one with abdominal wound closed with absorbable and another with non absorbable suture material. Results were “the incidence of wound pain was observed in all the patients in both immediate and delayed postoperative period in the polypropylene suture material compared to Polydioxone.”⁽¹¹⁻¹⁴⁾ Sinus formation is a late complication (usually occurs after 21 days) following hernioplasty. In our study about 37 patients in whom polypropylene was used resulted in sinus formation and in 1 patient incidence were reported with polyglactin-910 use. Hence we can conclude that sinus formation is a complication associated more with polypropylene suture. Most sinuses present as a spontaneous appearance after stitch removal from the main wound. Out of 37 patients, 35 patients had a spontaneous remission of the sinus tract on conservative management. On exploration of the sinus in 2 patients 2 months after the surgery, polypropylene suture was found at the base of a sinus which was removed and led to resolution.

The incidence of infection was similar in both groups 3.3% in polyglactin and 2.14% polypropylene. The recurrence was observed at the end of 1 year and before. Recurrences beyond 1 year were not included in this study. Incidence of recurrence was - polypropylene group 2.14% and 3.3% with polyglactin. It is estimated that 75% of all recurrences are due to infection and inadequate repair material fixation and/or overlap. The recurrence was studied separately in the inguinal hernioplasty group which showed 0% patients with recurrence in Polyglactin-910 group while the recurrence was 1.7% in the polypropylene group. Lichtenstein repair is associated with <1% recurrence rates.

Conclusion :

The study concluded that the rate of incidence of pain and sinus formation were significantly increased

in the group where polypropylene sutures were used for a ventral/inguinal hernia repair in the form of fixation of the mesh/ repair of fascial defects. There is no statistical difference in the comparison of all other complications in both the groups of sutures.

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