



A PROSPECTIVE STUDY OF RESULTS OF MESH HERNIOPLASTY AND MODIFIED DARNING IN PRIMARY INGUINAL HERNIA

Surgery

Dr Rajat Suvra Moral

Associate professor, Dept of Surgery, CNMC&H, Kolkata.

Dr. Aniruddha Sow*

MS PGT, Dept of Surgery, CNMC&H, Kolkata. *Corresponding Author

Dr. Rekha Priya

MS PGT, Dept of Surgery, CNMC&H, Kolkata.

ABSTRACT

INTRODUCTION: Hernia may be generally defined as a protrusion of abdominal viscera or a part of viscera outside the abdominal cavity through a natural or acquired defect. This definition, however, does not include internal hernias in which abdominal viscera, usually the small bowel, enter preformed intraperitoneal sacs commonly found around the duodenum, cecum, and sigmoid colon.

AIMS AND OBJECTIVES: Inguinal hernia is one of the commonest surgical operations performed. There are many ways of repairing an inguinal hernia. Various techniques claim superiority over one another. The preferred method of inguinal hernia repair at all centres, particularly training institutes, utilize mesh because recurrence rates are low. However, it is shown that the less costly technique of "Darning" has the same incidence of complications and recurrence. This emphasizes the importance of training and supervision no matter which technique is employed.

MATERIALS AND METHODS: Synthetic Non absorbable monofilament material like polypropylene mesh and Prolin 2-0 Suture in Groin hernia repair. Patients with Groin hernia attending at OPD of SSKM Hospital and. CNMC&H, Kolkata, West Bengal. In SSKM Hospital-MARCH 2017 – SEPTEMBER 2018 and CNMC&H OCTOBER 2018- MARCH 2021, N=200 (n=100 in each group.) Randomized prospective parallel group study.

RESULTS AND ANALYSIS: In proline darning, 8 patients had neuralgia Complications after hernia repair- (late >7 days) and 4 patients had scar tenderness Complications after hernia repair- (late >7 days). In our study, 72 (72%) patients had Proline darning RIH Diagnosis, 4 (4%) patients had Proline darning BLIH Diagnosis and 24 (24%) patients had Proline darning LIH Diagnosis.

SUMMARY: Thus the above study shows that there is no significant difference between mesh/darn method of repair of primary inguinal hernia in terms of postoperative complications, duration of hospital stay, time of surgery, day off work provided necessary surgical skill, patient compliance, facilities are available. Though darning requires expertise in maintaining no tension during surgery, with little experience one can perform it with ease and results similar to mesh repair. It is the cheaper and effective alternative to mesh repair in remote areas where availability of mesh and other facilities are difficult.

CONCLUSION: So endogenous tissue is always superior to any foreign material once the mesh becomes infected it becomes resistant to healing and present with persistent sinus or fistula or abscess. Source control is the applied histology of any inflammatory process. Its foundation lies in the optimal harnessing off the process of inflammation and tissue repair to expedite the resolution of infection. Endomesh created by using the endogenous tissue, internal oblique and transversus abdominis muscle and the use of redundant hernial sac is the future of herniorrhaphy operation.

KEYWORDS

Mesh Hernioplasty, Modified Darning And Primary Inguinal Hernia Hanging Down Technique, Katha-Stitch, Weaving Procedure.

INTRODUCTION

Hernia may be generally defined as a protrusion of abdominal viscera or a part of viscera outside the abdominal cavity through a natural or acquired defect. This definition, however, does not include internal hernias in which abdominal viscera, usually the small bowel, enter performed intraperitoneal sacs commonly found around the duodenum, cecum, and sigmoid colon.¹

Often hernia is also defined as an actual anatomical weakness or defect. 75% of abdominal wall hernias are groin hernias.² 15% of males and 55 of females will develop groin hernia. Greek word hernia means offshoot, a budding/bulge (2). Latin word hernia means rupture or tear.

External abdominal hernia is the most common form of hernia. The relative frequencies of external abdominal hernia are:³

Inguinal - 78%
Incisional - 10%
Femoral - 7%
Umbilical - 3%
Epigastric - 1%
Others - 1%

Hernias occur at all ages & make about 10% of surgical workload.

Although the causes of hernia are many, the treatment of choice is single – surgical repair of the defect. Risk of hernia repair is negligible⁴. It is one of the commonest surgeries performed worldwide.

AIMS AND OBJECTIVES

This study is done to compare advantages and disadvantages of mesh repair and darning in primary inguinal hernia.

Darning may be done conveniently by surgeons especially working in

remote areas. With this in mind, study will be conducted to evaluate and compare the short term outcome of mesh repair and Darning for primary inguinal hernia.

SPECIFIC OBJECTIVES

To study the following:

1. Infection rate following mesh and darning.
2. Time taken for operation
3. Complications
 - a) Mesh related
 - b) Darn related
 - c) Wound related
4. Post op hospital stay
5. Rehabilitation
 - a) Pain
 - b) Normal activity
6. Total expense
 - a) Hospital
 - b) Patients
7. Follow up

MATERIALS AND METHODS

Synthetic Non absorbable monofilament material like polypropylene mesh and 2-0 proline Suture.

STUDY AREA:

Groin hernia

STUDY POPULATION: Patients with Groin hernia attending at OPD of SSKM HOSPITAL, Kolkata, West Bengal and CALCUTTA NATIONAL MEDICAL COLLEGE AND HOSPITAL, Kolkata, West Bengal

STUDY PERIOD: MARCH 2017 – SEPTEMBER 2018 in SSKM

and OCTOBER 2018- MARCH 2021

SAMPLE SIZE: N=200 (100 in each Group)**SAMPLE DESIGN:** Independent randomized sample n=100 in each group.**STUDY DESIGN:** Randomized prospective parallel group study.**PARAMETERS TO BE STUDIED:**

1. Duration of hernia
2. Nature of occupation of patients
3. Type of hernia
4. Type of operations
5. Approximate total cost of therapy
6. Post operative duration of hospital stay
7. Postoperative complications Early (< 7 days)
Late(> 7 days) Recurrence

STUDY TOOLS: Vide protocol**STUDY TECHNIQUE:**

After approval of the institute's ETHICS committee and obtaining written Informed consent from the patients, they will be divided into two groups for study. Patients will undergo thorough preoperative evaluation and will be checked against exclusion criteria of the study.

EXCLUSION CRITERIA

1. Unwilling patients
2. Uncontrolled diabetes
3. Patients with severe respiratory, cardio-vascular, neurological, renal diseases.
4. ASA physical status III, IV
5. Hemodynamically unstable patients
6. Pregnancy, infancy
7. Complicated hernia
8. Patients with bleeding diathesis

PLAN FOR ANALYSIS OF DATA

Data analysis has been done according to standard statistical methods to see whether there is any statistical significant difference in the parameters studied between two groups.

PICTURES**SALIENT POINTS ABOUT OPERATIVE STEPS**

Pertinent steps of Modified Darning (Hanging down technique). The external oblique aponeurosis is incised along the line of incision so that it opens up to the superficial inguinal ring. Forceps are applied to the cut edges, the upper leaf is retracted to expose the conjoint muscle arching over the cord and the lower leaf retracted to expose the surface of inguinal ligament. Ilioinguinal and Iliohypogastric nerves are identified and safe guarded.

The cord along with the sac is lifted from the medial part of the incision and spread out on the finger. Sac is a pearly white structure lies in the sub cremasteric layer, is dissected out and skeletonized. Care must be taken that the Vas Deferens which is palpable as a firm cord, is not detached along with the sac in the process of stripping. In indirect inguinal hernia, Inferior epigastric vessels lay on the medial aspect of the neck of sac.

Superiorly the transversalis fascia blends with the aponeurosis of internal oblique, this holds suture well and excellent material for repairing the defect or weakness of the posterior wall of inguinal canal.

IN MODIFIED DARNING Moral's Weaving technique, the fleshy fibres of internal oblique arching above the canal can be retracted upward to expose the transversus muscle in a deeper plane. Dissection of external oblique aponeurosis from fleshy fibres of internal oblique muscle as high as possible where the muscle merges with lineae semilunaris. This dissection has to be done as high as possible, almost to the level of the umbilicus.

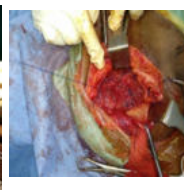
These fleshy fibres of internal oblique muscle are used as a base and weave to the inguinal ligament. Weaving stitch should start from the pubic tubercle, with proline 2-0 suture and the technique used is called "KATHA STITCH". The inguinal ligament and the conjoint tendon and muscle are woven without any tension. The fleshy internal oblique muscle fibres are gradually hanged down by weaving.

Weaving should be done as high as possible on internal oblique in different tissue planes, so that the fleshy muscle becomes imbricated by gradually weaving. Making multiple parallel suturing in the fleshy muscle belly of internal oblique (avoiding Iliohypogastric nerve) becomes imbricated and muscle hanged down gradually and approximated to inguinal ligament without any tension. The cord is lateralized. Weaving has to be continued the same way lateral to deep ring using the fleshy fibres of internal oblique in different planes and the inguinal ligament. Two to three rows of parallel weaving stitch on fleshy internal oblique and inguinal ligament with 2-0 proline create a mesh like structure which is definitely tension free. Due to multiple layered weaving (stitching) by 2-0 proline suture, the strength is dissipated to the imbricated muscle of internal oblique and transversus abdominis. This weaved internal oblique, transversus abdominis muscle and the inguinal ligament would act like a diaphragm as well as an endogenous mesh like structure. Redundant hernia sac may be used as onlay patch on the lattice work created by weaving.

This modified Darning technique requires 2-3 pieces of 2-0 proline suture for repair (Herniorrhaphy).



Hernial sac before using as endomesh over the darning.



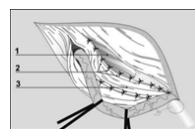
Endomesh placement following modified darning procedure. Endomesh created by hernial sac placed over the darn maneuver



Persistent granuloma formation following mesh placement in inguinal hernia repair.



Chronic infection following mesh placement of umbilical hernia



Desardas method. the undetached aponeurotic strip (3) is created and displaced from the anterior to the posterior of the inguinal canal. It was then secured to the abdominal internal oblique muscle (1) with interrupted sutures (2) and to the inguinal ligament.



Modified darning katha stitch done by proline 2-0 suture. (By hanging down technique)

Here fleshy internal oblique muscle is weaved to inguinal ligament by step wise hanging down technique and internal oblique muscle is made flat. Thus making a tension less repair.



Mesh removal after one year following mesh hernioplasty.

RESULTS AND ANALYSIS

In our study, 72(72%) patients had proline darning RIH diagnosis, 4(4%) patients had proline darning B/L IH diagnosis and 24(24%) patients had proline darning LIH diagnosis.

Our study showed that 52(26%) patients had Mesh hernioplasty RIH

diagnosis, 36(36%) patients had Mesh hernioplasty B/L IH diagnosis and 12(12%) patients had Mesh hernioplasty LIH diagnosis.

Our study showed that in mesh, 2 patients had Haematoma Complications after hernia repair- Early (<7 days), 8 patients had Infection Complications after hernia repair- Early (<7 days), 2 patients had Neuralgia Complications after hernia repair- Early (<7 days), 12 patients had Seroma Complications after hernia repair- Early (<7 days), 8 patients had Wound oozing Complications after hernia repair- Early (<7 days) and 6 patients had urinary retention Complications after hernia repair- Early (<7 days). In pd, 4 patients had Neuralgia Complications after hernia repair- Early (<7 days) and 6 patients had urinary retention Complications after hernia repair- Early <7 days. In pd, 12 patients had neuralgia late presentation (>7days) and Scar tenderness 4 patients.

In our study, 40 patients had Mild Post op pain, 8 patients had Moderate Post op pain and 2 patients had Severe Post op pain. In Mesh, 16(16%) patients were 18-30 years old, 16(16%) patients were 31-40 years old, 20(20%) patients were 41-50 years old, 20(20%) patients were 51-60 years old, 12(12%) patients were 61-70 years old and 16(16%) patients were 71-90 years old.

In PD, 8(8%) patients were 18-30 years old, 8(8%) patients were 31-40 years old, 12(12%) patients were 41-50 years old, 24(24%) patients were 51-60 years old, 36(36%) patients were 61-70 years old and 12(12%) patients were 71-90 years old.

In mesh, 26 patients had Mild Post op pain and 24 patients had Moderate Post op pain. In pd, 40 patients had Mild Post op pain and 8 patients had Moderate Post op pain. In our study, 4 patients had Neuralgia Symptoms of proline, 6 patients had urinary retention Symptoms of proline, 8 patients had neuralgia (C/C >7days) Symptoms of proline and 4 patients had scar tenderness Symptoms of proline. In our study, 10(10%) patients were Swelling with dull pain and 90(90%) patients were Swelling with dull pain.

DISCUSSION & SUMMARY

Hernia repair operation is one of the most commonly performed operations in surgery. The philosophy of hernia repair has changed from open fascia transversalis repair to open prosthetic mesh repair, finally to the minimally invasive laparoscopic methods. The best method is yet to be agreed upon and it depends on surgeons' skill, facilities available and clinical comorbidities of the patient.⁵

The present study was conducted at S.S.K.M. Hospital & I.P.G.M.E&R and CNMC&H, Kolkata, West Bengal, to compare the two techniques, polypropylene mesh repair and polypropylene.

Darning repair in the treatment of inguinal hernia with respect to early postoperative pain, complications, return to normal activities, early recurrence and cost effectiveness.⁶

All the patients studied were male as groin hernia is less common in females. In this study no femoral hernia cases were found.

Total number of patients was 200 & the study was carried out by randomized prospective parallel group study.⁷

Most of the patients experienced mild-to-moderate pain irrespective of the type of repair done polypropylene mesh repair has no added advantage over prolene darn with respect to early postoperative pain complications or return to normal activities.

All patients operated on with general/spinal/local anesthesia.

There was no significant difference between the two groups in the rate of early or late complications.

During two years of follow up no recurrence was found in modified Darning repair and five recurrences in mesh repair group.

Darning was much less expensive than mesh repair. Darning is also an effective method in repairing an inguinal hernia and can be used in patients with constrained financial set up with equivalent results.

Late complications like testicular atrophy, sensory loss, groin pain and other nerve related problems and recurrence in 1 yr follow up period

were not detected during the study period.⁹

Thus the above study shows that there is no significant difference between mesh/darn method of repair of primary inguinal hernia provided necessary surgical skill, patient compliance, facilities are available.

Though darning requires expertise in maintaining no tension during surgery, with little experience one can perform it with ease and results better than mesh repair.¹⁰

More detailed significant difference between above methods can be obtained by larger sample size and a longer follow up.

CONCLUSION

While there is almost universal agreement as to the advisability of surgery there is considerable divergence of opinion regarding the last method of operative repair. Majority of surgeons at present prefer to carry out some form of reconstructive operation in all adult cases. Infection is the major aberrant of any cosmetic procedure.

For any hernia repair strengthening of the posterior wall of the inguinal canal is the primary objective. The strength of the posterior wall of inguinal ligament depends on proper apposition of the fleshy muscle belly of internal oblique and conjoint muscle to the inguinal ligament. As the internal oblique and inguinal ligament is dissimilar tissue former is muscle tissue and the later is elastic tissue. So these dissimilar tissues never be united by the natural healing process. For long lasting repair of these tissues require anon-absorbable suture like proline. Repair with absorbable suture would lead to recurrence of hernia in course of time.

Strength of muscle depends on muscle bulk. During initial stage of natural repairing process, random nature of the initial collagen deposition mean that the tendon lacks tensile strength for first 3-6 weeks. More over active mobilization prevents adhesion formation and healing process depends on the formations of fibrous adhesions between tendon and ligament. So non absorbable suture is necessary for success of any kind of hernia repair. Any kind of repairing mesh, to strengthen the posterior wall of the inguinal canal, what extent they increase the strength is debatable. But the endo mesh created by flattened fleshy internal oblique and transversus abdominis muscle and inguinal ligament by creating lattice work by proline 2-0 suture and later deposition of fibroblast would definitely increase the strength of the posterior wall. Infection in the process of wound healing decreases the strength of the wound and any mesh being foreign material would lead to further infection – a vicious cycle. So endogenous tissue is always superior to any foreign material and once the mesh becomes infected it becomes resistant to healing and present with persistent sinus, fistula or abscess. Source control is the applied histology of any inflammatory process. Its foundations lies in the optimal harnessing off the process of inflammation and tissue repair to expedite the resolution of infection. Endo Mesh created by using the endogenous tissue, internal oblique and transversus abdominis muscle and the use of redundant hernial sac is the future of herniorrhaphy operation.

Table: Complications after hernia repair

Symptoms	Mesh	Pd	P-value
Haematoma (C/C <7 days)	2	0	0.0001
Infection	8	0	<0.0001
Neuralgia (<7days)	2	4	0.2501
Seroma	12	0	<0.0001
Wound oozing	8	0	<0.0001
urinary retention	6	6	1.0000
neuralgia (C/C >7days)	12	8	0.2076
scar tenderness	4	4	1.0000
recurrence	0	0	0.0000

Table: Mode of presentation

Symptom	No. of patient	Percentage	Chi-square Value
Swelling with dull pain	10	10%	64
Groin Swelling	90	90%	

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