

TENSION FREE HERNIOPLASTY

Vivek Nimboor¹, Kavita Nimboor²

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ABSTRACT: Since first true herniorrhaphy was performed by Bassini in 1884, all modification and surgical techniques have shared a common disadvantage that is suture line tension. The anatomic, physiologic and pathologic characteristics of inguinal hernia recurrence were examined. The prime etiologic factor behind most herniorrhaphy failures is the suturing the structures together under tension which are not normally in opposition. With the use of modern mesh prosthetics, it is now possible to repair all inguinal hernias without distortion of the normal anatomy and with no suture line tension. The study aims at evaluating the efficacy, safety and outcome of tension free hernioplasty for inguinal hernia in patients admitted during January 2007 to December 2012 at a tertiary care hospital in north Karnataka. A total of 277 cases diagnosed as inguinal hernia were studied, the results of the study revealed that the technique is simple, rapid, less painful and effective with zero failure rate and allowed the patient for resumption of early physical activity. The results were evaluated for its safety, and effectiveness.

KEYWORDS: Inguinal Hernia, Bassini's repair, Herniorrhaphy, Hernioplasty, Poupart's ligament.

INTRODUCTION: Reference to the surgical treatment of inguinal hernia dates back to first century, however formal description of hernia repairs did not appear until fifteenth century, castration with wound cauterization or hernia sac debridement with healing allowed by secondary intention were the most common operations. These early operations reflected a complete lack of understanding of anatomy of groin. In the early part of eighteenth century sir astley cooper recommended a truss rather than surgery and he felt that the only indication for operating on an inguinal hernia was strangulation. The later part of eighteenth century heralded dramatic changes as the anatomy of groin became better understood. In 1881 a French surgeon lucas champinniere performed high ligation of an indirect inguinal hernial sac at the internal ring with primary closure of the wound. Edoardo bassini is considered as the father of modern inguinal hernia surgery. By incorporating the developing disciplines of antisepsis and anesthesia with a new operation that included reconstruction of the inguinal floor along with the high ligation of hernia sac, he was able to substantially reduce the morbidity. It is universally agreed that this concept was responsible for the advent of modern surgical era of inguinal herniorrhaphy and is still valid today. The operation resulted in recurrence rate of one fifth of that which was generally accepted and considered the gold standard for inguinal hernia repair for most of the twentieth century. Lotheissen, mcvey, halsted, should ice and others described modification of bassini's repair in an attempt to further reduce the recurrence rate and to avoid complications. Low recurrence rates have been achieved with these variations in the hands of expert surgeons, however population based studies have shown an unacceptable high recurrence rate in general practice. In addition to this these operations have been considered relatively painful because of tension created by approximating tissues that are not in natural opposition although Bassini's principle of posterior

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wall reinforcement remains valid in surgical practice today, his operation has lost its popularity and used in only selected cases in which the use of prosthetic material is contraindicated. Tension free herniorrhaphy using modern mesh prosthetics is now of much benefit unlike other procedures of herniorrhaphy. All repairs including Bassini's, Halstead, Shouldice and McVay repairs regardless of the modification have shared one common disadvantage of tension on suture line and very high failure rate of 10%¹ it is the conviction of all surgeons that this tension is the cause of eventual suture or tissue disruption and the prime etiological factor in hernia recurrence. This technique described is tension free and betanoir of all hernia surgeons,² Polypropylene mesh (marlex) is strong monofilamented, inert, and readily available. It is unable to harbor infection; it is very thin and porous. Its interstices become completely infiltrated with fibroblasts and remain strong permanently. It is not subject to deterioration or rejection, and it cannot be felt by the patient or surgeon post-operatively. With the use of polypropylene mesh, it is now possible to eliminate formal reconstruction of the canal floor with its concomitant anatomic distortion and also suture line tension. This ambitious study was undertaken with following aims and objects.

- 1 To evaluate safety and efficacy of use of modern mesh prosthetics.
- 2 To evaluate whether it is justifiable to perform hernioplasty against herniorrhaphy.
- 3 To evaluate whether hernioplasty is better than herniorrhaphy in terms benefits to patients.

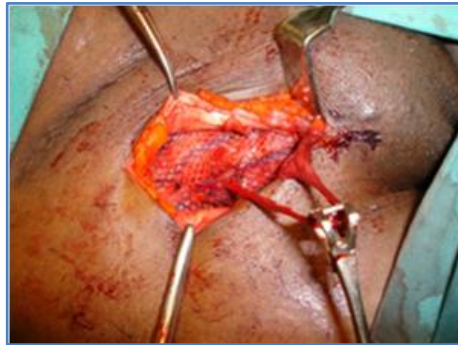
PATHO PHYSIOLOGIC CHARECTERISTICS: The cause of an inguinal hernia is far from completely understood, but is undoubtedly multi factorial, presumed causes of groin herniation are chronic coughing, chronic obstructive pulmonary diseases, obesity, straining due to constipation or prostatism. It is more common in babies with birth Weight less than 1500 gms. There is increasing evidence that connective tissue disorders predispose to hernia formation, by altering collagen formation, the so called secular theory of indirect inguinal hernia formation proposed by Russell remains popular. Russel hypothesis that the presence of developmental diverticulum associated with a patent processus vaginalis – was essential in every case is still valid. However this does not explain all cases of indirect inguinal hernias, because patent processus vaginalis was found at autopsy without evidence of inguinal hernia, and the patients with obliterated processus vaginalis had inguinal hernia.

It is appropriate to accurately define terms fascia is connective tissue, a very flimsy lining usually of one cell thickness, with more less condensation into a definite layer⁽³⁾ such tissue envelops all muscular and aponeurotic layers but lacks the organization and strength of an aponeurosis. The aponeurotic layers in the groin are the tendinous insertion of three flat abdominal wall muscles. Since tendons are composed of very strong collagenous tissues, they should be employed exclusively rather than fascia for herniorrhaphy, this distinction is vital because the transversalis fascia has little strength and is of questionable value as a supporting layer for herniorrhaphy as stated by Condon.⁽³⁾ This is an important point to keep in mind when reviewing the surgical literature as in recent years, particularly a great deal of emphasis has been placed on transversalis fascia and its role in hernia repair, transversalis fascia is of varying density and is often quite thin, even transparent. It possesses little intrinsic strength and by itself is a worthless material as far as construction of a sound hernia repair is concerned. The human

inguinal canal is protected by two guards an outer and an inner, the outer guard is external oblique aponeurosis and inner guard was first described by Cooper in 1807.⁽⁴⁾ It consists inferiorly of pouparts ligament. The superior part of the inner guard is represented by the combined internal oblique and transversus muscles, when these muscles are relaxed, there is an interval between their lower border and pouparts ligament which is filled by the thinned and often diaphanous transversalis fascia, when these muscles contract their lower edges approximate with pouparts ligament like a shutter or curtain, thus diminishing the inguinal gap. Since the transversalis fascia is the only cover bridging the gap it is the key area or the Achilles heel "of the groin" and is the only portion of the abdominal wall not protected by a musculoaponeurotic layer. The very presence of the hernia is the proof that this fascia is inadequate, s recurrences are almost invariably located in juxta position to the pubic tubercle or the internal ring. Once we have understood the basic anatomical deficiency in the inguinal canal the gap is repaired by modern mesh prosthetics.

MATERIALS AND METHODS: All patients diagnosed clinically as inguinal hernias including both direct and indirect inguinal hernia, admitted to the tertiary care centre were prospectively randomized to undergo hernioplasty operation. The male to female ratio was 12:1.s The inguinal hernias in infants and children were excluded as they underwent herniotomy. In this study patients between the age group of 25 and 90 years were include. After clinical diagnosis of inguinal hernias, following investigations were performed. Hb%, complete Blood Picture (CBP), RBS, Serum Bilirubin, Serum Creatinine, urine analysis, Chest X-Ray, and ECG. All patients underwent pre-operative assessment. Following parameters were studied in all cases- operative time, analgesic requirement, post-operative hospital stay. Time required to resume his/her normal activity and recurrence rate.

SURGICAL PROCEDURE: Lichtenstein was the first surgeon who described the surgical procedure for repair of inguinal hernias with polypropylene mesh during the year 1969. The procedure is also called as Lichtenstein tension free repair for inguinal hernias. The benefit of tension free technique without closure of the defect was well established in the year 1984. The procedure was done under local or spinal anaesthesia depending on the condition of the patient. The skin and the subcutaneous tissues were incised and the external oblique aponeurosis was slit open to reveal the inguinal canal. Then the hernia sac was identified and in indirect hernias the sac was opened in order to explore the canal floor and simply inverted in to the abdomen without excision, suture or ligature.² In direct hernias with large sac, the sac was separated and inverted by means of single absorbable invaginating suture. A sheet of polypropylene mesh measuring about 5cm x 10cm was fashioned. The lower edge was sutured by continuous suture of 3-0 prolene, which secured the mesh medially to the pubic tubercle, lacunar ligament and then laterally to the pouparts ligament beyond the internal ring. The medial edge was sutured to the rectus sheath-with 3-0 prolene by continuous suture.



The prosthetic mesh was sutured to aponeurosis or internal oblique muscle with interrupted sutures. The lateral edge of the mesh was slit and two tails are passed around to embrace the cord at the internal ring. They then were crossed over each other and tracked down to the pouparts ligament with one 3-0 prolene suture. This creates new internal ring and shutter mechanism. The external oblique aponeurosis then was re-sutured in front of the cord. This was a completely tension –free repair and required no formal reconstruction of the canal floor. This is a revolutionary departure from the routine tissue repairs and used for the past 100 years.

RESULTS: The mean duration of surgery was 40 minutes. There was wound infection in 6 cases (2.16%). There were hematomas in 4 cases (1.4%) which resolved spontaneously and there was less pain post operatively. The cases operated under local anesthesia were ambulatory in the evening and were discharged in the evening only. The cases operated under spinal anaesthesia were discharged on next day. All patients attended their usual duty after 3 days. The failure rate was zero,⁵ anyhow follow up period was very short within 5 years.

DISCUSSION: The human inguinal canal is protected by two guards an outer and inner. The outer guard is the external oblique aponeurosis. The inner more complex, guard consists of pouparts ligament and coopers ligament inferiorly.⁴ The superior part of inner guard is represented by the combined internal oblique and transversus muscles. They arch above the spermatic cord at internal ring. The internal ring and external ring are covered by the fascia which is a connective tissue, a flimsy lining usually of one cell thickness.⁵ This architectural error was exposed when man in his determination to walk upright in order to feed himself, to fight or for flight created all unsupported area.⁶

It is the genetic pre-disposition, few individuals have no collagen fibers from the transverse abdominis aponeurosis extending in to the transversalis facial layer, decreased collagen turn over or increased collagen degradation that pre-disposes to the development of inguinal hernia^{7,8} recurrence, are almost invariably located at inguinal ring or at pubic tubercle. There are two basic reasons in these recurrences.

- 1) It is evident that with conventional hernia repair, reinforcement of the canal floor at pubic tubercle demands suturing together of tendinous structures that are normally not in opposition. At the internal ring approximation of the transverse abdominis fibers are

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prevented by the emergence of the spermatic cord. Suture line tension is a clear violation of basic surgical principles and is the ultimate cause of the recurrence and the result the inescapable.

- 2) The suture at the most medial and lateral ends of the repair have no bordering stitches to distribute the distractive force more uniformly^{1,9} the centre of the repair is strongest. This predisposes to tearing at either end of the suture line and can begin an unzipping effect with time. In our studies there was no difference in age, weight and duration of symptoms when compared with other studies. The time taken for surgery was 40 minutes. The analgesic requirement was significantly less ($p=0.02$). The hospital stay was 2 to 3 days. The time to return to normal work was 3 to 4 days. There were 6 cases with wound infection, there were 4 cases with hematomas which resolved spontaneously and the recurrence rate was zero.

Sex	Number of Cases	%
Male	254	91.7
Female	23	8.3
Total	277	100

TABLE 1: SEX DISTRIBUTIONS

Number of cases	%
Wound infection 06	2.16
Haematomas 04	1.4
Recurrence of hernias 00	00
Mortality 00	00

TABLE 2: POST OPERATIVE COMPLICATIONS

CONCLUSION: Prosthetic mesh implantation is regarded as the standard treatment of inguinal hernias and this is a revolutionary procedure which has zero recurrence rate. The prime cause of recurrent inguinal hernia is the approximation of normally unopposed tissues. This creates tension, a clear violation of basic surgical principles. This new concept permits hernia repair without distortion of the normal anatomy and without any suture line tension. Finally this technique is simple, rapid, relatively less painful, safe and allows the patient for prompt return to his normal work.

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AUTHORS:

1. Vivek Nimboor
2. Kavita Nimboor

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Surgery, Bidar Institute of Medical Sciences.
2. Associate Professor, Department of Surgery, Bidar Institute of Medical Sciences.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Vivek Nimboor,
MIG- 9, KHB Colony,
Bidar – 585401, Karnataka.
E-mail: drviveknimboor@yahoo.co.in

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