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Comparison of progrip mesh v/s conventional mesh in lichtenstein's inguinal hernia repair at our Institute.

General Surgery

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ABSTRACT

Introduction: Inguinal hernia is a very common surgical disease. It is estimated that at least 5-8% of the population will develop a groin hernia in their lifetime, making groin hernia repair one of the most common operations performed by general surgeons. The only way to treat inguinal hernia is surgery.
Aim: The aim of our study is to compare the outcome after Lichtenstein's inguinal hernia repair using conventional mesh v/s self-fixating Progrip mesh. The primary endpoint of the study will be the incidence of post-operative pain.
Objectives:
1) To compare the outcome in terms of operative time.
2) To compare possibility of complications.
3) To compare postoperative pain.
Conclusion: Lichtenstein's inguinal hernia repair using self-fixating Progrip mesh has an advantage over conventional mesh in terms of less operative time and post-operative pain.

KEYWORDS:

inguinal hernia, progrip mesh, conventional mesh.

Introduction

Inguinal hernia most probably has been a disease ever since mankind existed. It occurs in different kind of animals, particularly primates; even prehistoric human beings were affected with the disease. The surgical history of inguinal hernias dates back to ancient Egypt. From Bassini's heralding of the modern era to today's mesh-based open and laparoscopic repairs, this history parallels closely the evolution in anatomical understanding and development of the techniques of general surgery [9]. Accounting for 75% of all abdominal wall hernias, and with a lifetime risk of 27% in men and 3% in women, inguinal hernia repair is one of the most commonly performed surgeries in the world [10]. In the US, inguinal herniorrhaphy accounts for approximately 8,00,000 cases yearly[11].

It is estimated that of all hernias, 66% are indirect and 33% direct [12]. Hernias are typically repaired through a surgical procedure called herniorrhaphy, in which the surgeon repairs the hole in the abdominal wall by sewing surrounding muscle together or by placing a patch called "mesh" over the defect. Most surgeons make an incision at the site of the hernia in order to gain access to the defect, although some surgeons prefer to do these procedures laparoscopically. During a laparoscopic hernia

repair, the surgeon makes very small incisions to pass through specialized instruments and an endoscope, a device that allows the surgeon to see the abdominal area without opening the patient up. Laparoscopic hernia repair generally results in less postoperative pain and recovery time than open surgery. Current inguinal hernia operations are generally based on anatomical considerations. Failures of such operations are due to lack of consideration of physiological aspects. Many patients with inguinal hernia are cured as a result of current techniques of operation, though factors that are said to prevent hernia formation are not restored. Therefore, the surgical physiology of inguinal canal needs to be reconsidered.

A physiologically dynamic and strong posterior inguinal wall and the shielding and compression action of the muscles and aponeuroses around the inguinal canal are important factors that prevent hernia formation or hernia reccurence after repair. In addition, the squeezing and plugging action of the cremasteric muscle and binding effect of the strong cremasteric fascia, also play an important role in the prevention of hernia. Inguinal hernia repair still remains a problem because of -1) The high recurrence rates seen in the hands of the junior surgeons; 2) risky dissection of the inguinal floor in the Bassini/Shouldice repair and 3) infection and chronic groin pain following mesh repair. The successful management of any problem depends on the understanding of its patho-physiology. In this context, some questions related to the physiology of the inguinal canal or factors that prevent herniation still

exist. Lateral and cephalad displacement of the internal ring beneath the transversus abdominis muscle and approximation of the crura results in a shutter mechanism at the internal ring [13]. When the arcuate fibers of the internal oblique and transversus abdominis muscle contract, they straighten out and move closer to the inguinal ligament (shutter mechanism) at the inguinal canal[14,15]. This opposite movement (upward & downward) of the same muscle needs proper explanation. The term "Obliquity of the inguinal canal" is not a perfect description since the spermatic cord is lying throughout its course on the transversalis fascia. Repeated acts of crying, thereby increasing the intra-abdominal pressure do not increase the incidence of hernia in new born babies inspite of the almost absent "obliquity of the inguinal canal" or "shutter mechanism". Similarly, every individual with a high arch or a patent processus vaginalis does not develop hernia [16]. Factors that are said to prevent herniation are not restored in the traditional techniques of inguinal hernia repair and yet 70-98% of patients are cured. Inguinal hernia repair is one of the most common performed surgical procedures. Inguinal hernia repair is associated with long term risks of pain and discomfort. In 1996 Cunningham *et al* were the first to report a pain incidence of 63% after one year [17]. Five years later, in a large cross sectional cohort study the rate of chronic pain was 29%. This complication was associated with functional impairment in more than half of those with pain [18]. Chronic pain accounted for restriction in daily activities in up to quarter of patients [19]. In an updated review the risk of a chronic pain state with clinically significant effects on daily activities was about 12%[20]. The foreign body response to meshes resulted in axonal edema, loss of myelinated axons, peri and endoneuronal edema and subsequently pain [21].

Pain may also be dependent on the method of fixation. Sutures may cause ischaemia, muscle contraction or nerve damage resulting in pain. This is corroborated by the fact that removal of sutures can be effective treatment in patients with pain [22]. There are several techniques for mesh implantation, but most involve sutures to anchor a mesh in position and prevent migration, wrinkling and curling. Sutures that anchor the mesh are blamed for extensive tissue tension and nerve entrapment leading to prolonged post-operative pain. Even the application of absorbable sutures instead of non-absorbable ones does not solve the problem. Chronic groin pain following inguinal hernia repair is a significant, though under-reported problem. Complications associated with sutured fixation of the mesh have prompted surgeons to use atraumatic fixation using substances such as human fibrin glue. These adhesives have shown reduced incidence of chronic groin pain, foreign body sensation and groin numbness in both randomised trials and observational studies [23]. Avoiding chronic groin pain should be a prime goal for any hernia surgeon, considering that 5-7% of patients with post-herniorrhaphy groin pain will sue their surgeons [24].

Practice of surgery has marched from being merely life and limb preserving to being enhancer of post-operative quality of life. Patient reported outcomes have always taken precedence over clinical outcomes and this has encouraged surgeons to innovate [25]. Introduction of polypropylene prosthesis by Francis Usher brought an era of progressively decreasing recurrence rates. Success with polypropylene meshes is associated with formation of mesh aponeurosis scar tissue complex. Inflammatory response induced by polypropylene is integral to mesh aponeurosis scar tissue complex formation, but continuation of inflammation beyond this complex has raised many concerns. Markers of inflammation continue to play around for years in the polypropylene implanted tissues around inguinal region [26]. Severe chronic pain has significant effects on return to work and quality of Keith A[27]. These effects can persist for several years after hernia repair and are associated with significant healthcare costs. The new progrip mesh is self-retaining, moves in harmony with the inguinal structures and so is compliant with the structures of the groin. It is 100% fixation free, promotes the regeneration of healthy tissue inside its structure [7] and shows low rate of complications [8]. The present study is aimed to study the usefulness of the progrip mesh in reducing the incidence of chronic groin pain after inguinal hernia repair.

Material and Methods This prospective study was conducted between March 2016 and June 2017 on patients with inguinal hernias admitted to S.B.K.S. & M.I.RC. Dhiraj Hospital Piparia Vadodara.

Inclusion criteria:
All Patients Undergoing Lichtenstein's Inguinal hernia repair in surgery department. Exclusion criteria
1. Patient not willing for study.
2. Paediatric Patients will be excluded

Method of collection of data
All the patient undergoing Lichtenstein's Inguinal hernia repair were enrolled in study and details of them was taken. Written and Informed Consent was obtained for taking part in study and for operative procedure. Patient's history and examination was done in details.

Patient were randomly divided into two groups A and B. Group A patient had undergoing Lichtenstein's repair with self -fixating progrip mesh and Group B had undergoing Lichtenstein's repair with conventional mesh. Time period in each group will be noted. Post - operative pain were noted according to pain score and at follow up. Result were compared with Study B (by Maharaul et al [28]) Patients were followed up after discharge on 14th day.
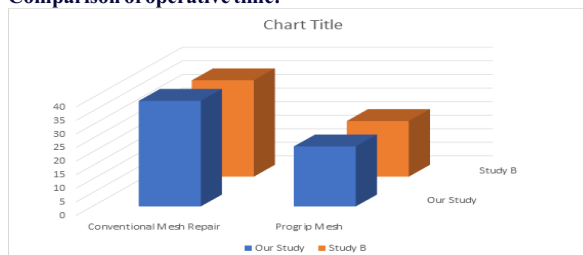
Results and Discussion:
50 patients in each group were enrolled in our study.

Age Incidence:
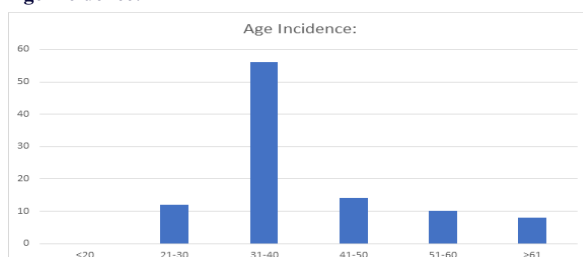
Mean age in our study was 38.5 years compared to 45.5 years in study B [28].

Comparison of operative time:

Average Operative time for Lichtenstein's Inguinal hernia repair using

conventional mesh was 38.9 min compared to 35.5 min in Study B[28] while using self-fixating progrip mesh was 22.1 min compared to 20.5 min in study B[28] which is almost similar.

Comparison of Post-operative pain
Post-operative pain is now considered the most frequent and disabling complication of hernia repair [2]. In our study as well as Study B post-operative pain was less in group A compared to Group B.

According to the International Association for the study of pain (IASP) Post herniorrhaphy chronic groin pain is defined as groin pain reported by patient at or beyond 3 months following inguinal hernia repair [3]. Severe chronic pain is a serious long-term problem that may occur after groin hernia repair [4]. Population based studies and randomized clinical trials indicate that around 30 percent of patients have some form of pain and 3 percent report severe pain at 1 year after hernia repair [5,6]. The reason for such pain is not clear, but factors such as nerve injury, tissue injury and use of biomaterials have all been implicated [4]. There is a consensus that tension-free repair is the gold standard in inguinal hernia

surgery because of higher patient comfort and lower recurrence rates [1]. Among the several tension-free techniques, the Lichtenstein's method has gained remarkable popularity due to its advantages of easy-to-perform, better patient comfort and less tissue dissection [2]. Because of the fact that the rate of chronic pain is higher than the rate of recurrence after open inguinal hernia repair, the tension-free inguinal hernia repair introduces questions concerning the long-term safety of implantation of mesh material, especially the risk of chronic pain [3]. Different studies reported the rate of prolonged pain after hernia surgery from 9.7% to 51.6%[4–6]; furthermore, the incidence of persistent postoperative inguinal pain that interferes with daily activities is reported to be as high as 6%[7,8]. Meanwhile such chronic pain can be disabling, and in half of the cases, it leads to depression and time off from work, with job loss as an ultimate result in one-fourth of patients [8]. The reason for such pain is unclear; mesh material, its structure and interaction with tissue, as well as scarring, nerve damage, or entrapment by fixation sutures have all been suggested as possible causes. Because of these facts, fixation of the mesh during operation continues to be a focus of interest. Different fixation procedures have already been investigated to determine whether and to which extended fixation of mesh is a source of acute and chronic pain [9]. A new self-gripping mesh (Parietene Progrip) has been developed; this self-gripping mesh is made of lightweight isoelastic large-pore knitted monofilament polypropylene fabric that incorporates resorbable microgrips to provide self-gripping fixation during the first few months after implantation [10]. The microgrips are clubshaped 1-mm projections that are made of biodegradable polylactic acid. The microgrips integrate into the tissue for 0.5 mm below the lower rim of the mesh and provide stronger tissue incorporation at 5 days than fixation with staples [11]. Fixation is, therefore, greatly facilitated without the requirement for sutures that can penetrate underlying tissues and damage cutaneous nerves. The objective of this study was to compare the results of inguinal hernia repair between the self-gripping meshes and conventional sutured Lichtenstein meshes, with the chronic pain as the main endpoint, and with other postoperative complications as secondary.

Conclusion Lichtenstein's inguinal hernia repair using self-fixating Progrip mesh has an advantage over conventional mesh in terms of less operative time and post-operative pain.

References
[1] Malangoni MA, Rosen MJ. Hernias. In, Townsend, Beauchamp, Evers, Mattox (ed). Sabiston textbook of surgery, 19th edition. New Delhi, Saunders Elsevier, 2012; 1114.
[2] Nienhuijs S, Staal E, Strobbe L, Rosman C, Groenewoud H, Bleichrodt R. Chronic pain after mesh repair of inguinal hernia: a systemic review. Am J Surg 2007; 194:394-400.
[3] Merskey H, Bogduk N. Classification of chronic pain: descriptions of chronic pain syndromes and definitions of pain terms. In, Task force on Taxonomy. IASP, 2nd edition. Seattle, WA: IASP press, 1994; 209-14.
[4] O'Dwyer PJ, Kingsnorth AN, Molloy RG, Small PK, Lammers B, Horeyseck G. Randomized clinical trial assessing impact of a lightweight or heavyweight mesh on chronic pain after inguinal hernia repair. Br J Surg 2005; 92:166-70.
[5] Bay-Nielson M, Perkins FM, Kehlet H. Pain and functional impairment 1 year after inguinal herniorrhaphy: a nationwide questionnaire study. Ann Surg 2001; 233:1-7.
[6] MRC Laparoscopic Groin Hernia Trial Group. Laparoscopic versus open repair of groin hernia: a randomised comparison. Lancet 1999; 354:185-90.
[7] Dynamic implant for inguinal hernia repair in porcine experimental model. A feasibility study. Hernia 2009; 13:S1-332.
[8] Dynamic autostatic implant for inguinal hernia repair. Early results in an explorative cohort of patients. Hernia 2010; 14:S55-100.
[9] Scott NW, McCormack K, Graham P, Go PM, Ross SJ, Grant AM. Open mesh versus non-mesh for repair of femoral and inguinal hernia. Cochrane Database Syst Rev 2002; (4):CD002197.

[10] Awad SS, Fagan SP. Current approaches to inguinal hernia repair. Am J Surg 2004; 188 (6A Suppl):9S-16S.

[11] Singh S. Innovative and regenerative hernia repair with dynamic implants. IHS Newsletter 2012; 6(2):5-8.

[12] Fitzgibbons RJ Jr, Giobbie-Hurder A, Gibbs JO, Dunlop DD, Reda DJ, McCarthy M Jr et al. Watchful waiting vs repair of inguinal hernia in minimally symptomatic men: a randomized clinical trial. JAMA 2006; 295(3):285–92.

[13] Desarda MP. Surgical physiology of inguinal hernia repair – a study of 200 cases. BMC Surg 2003; 3:2.

[14] Histological findings of the internal inguinal ring in patients having indirect inguinal hernia. Hernia 2009; 13:259-62.

[15] Nerve degeneration in inguinal hernia specimens. Hernia 2011; 15:53-8.

[16] Simons MP, Aufenacker T, Bay-Nielsen M, Bouillot JL, Campanelli G, Conze J et al. European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. Hernia 2009; 13(4): 343–403.

[17] Rosenberg J, Bisgaard T, Kehlet H, Wara P, Asmussen T, Juul P et al. Danish Hernia Database recommendations for the management of inguinal and femoral hernia in adults. Dan Med Bull 2011; 58(2): C4243.

[18] Purkayastha S, Chow A, Athanasiou T, Tekkis P, Darzi A. Inguinal Hernia. BMJ Clin Evid 2008; 2008: 0412.

[19] Aasvang E, Kehlet H. Chronic postoperative pain: the case of inguinal Herniorraphy. Br J Anaesth 2005; 95:69-76.

[20] Lau WY. History of treatment of groin hernia. World J Surg 2002; 26(6):748-59.

[21] Lichtenstein ME. The custom-tailored inguinal hernia repair. J Okla State Med Assoc 1954; 47:222-4.

[22] Felix EL, Michas CA, McKnight RL. Laparoscopic herniorrhaphy. Transabdominal preperitoneal floor repair. Surg Endosc 1994; 8:100-3.

[23] Ferzli G, Sayad P, Huie F, Hallak A, Usal H. Endoscopic extraperitoneal herniorrhaphy. A 5-year experience. Surg Endosc 1998; 12:1311-3.

[24] O'Dwyer PJ, Page B. Anatomy and Physiology. In, LeBlanc K (ed). Laparoscopic Hernia Surgery: An operative guide. London, Arnold Publications, 2003; 41-46.

[25] Lytle WJ. The internal inguinal ring. Br J Surg 1945; 32:441.

[26] Hammond TE. The etiology of indirect inguinal hernia. Lancet 1923; 204: 1206.

[27] Keith A. On the origin and nature of hernia. Br J Surg 1923; 11:455.

[28] Honeypalsinh H Maharaul, Vipul Shory, Shivang Joshi, Honeypalsinh H Maharaul et al. International Journal of Biomedical Research 2016; 7(10): 738-742.