A STUDY BETWEEN LIECHTENSTEIN HERNIA REPAIR AND MODIFIED LIECHTENSTEIN HERNIA REPAIR- A PROSPECTIVE STUDY

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ABSTRACT

BACKGROUND

Hernia is the abnormal protrusion of a content/viscus through a defect in its wall/cavity that contains it. The word "Hernia" is derived from the Latin word which means to rupture. It is the most common surgery done all over the world due to its increased incidence and efficient treatment. As of today, 8 to 10 lakh cases are operated every year. But, Liechtenstein tension free mesh repair though is the gold standard, has complications like chronic pain, wound infection, prolonged surgery and abnormal sperm counts; so in recent years, due both to treatment and legal implications, the interest in evaluating these complications has increased. We wanted to determine as to whether the various modifications in surgical treatment reserved for identification and preservation of ilioinguinal, iliohypogastric, and genital branch of the genitofemoral nerves and modification of mesh and placement of cord, during Liechtenstein hernia mesh repair, is effective in reducing complications like chronic pain, wound infection, prolonged surgery and abnormal sperm counts.

METHODS

A prospective study involving 80 cases of hernioplasty was conducted. The patients were given questionnaires. The study evaluated for the results at 1st and 3rd months.

RESULTS

Overall, out of 40 patients treated under Liechtenstein hernioplasty, 20 had wound infection with chronic pain and 4 had abnormal sperm counts with overall increased duration of procedure. Out of 40 patients treated with the modified Liechtenstein hernioplasty, only 8 had minimal wound infection with pain and sperm counts found to be normal.

CONCLUSIONS

The present findings indicate that modified Liechtenstein procedure has increased effectiveness by reducing the complications and it has an easier learning curve.

KEYWORDS


BACKGROUND

Hernia is the abnormal protrusion of a content through a defect in its wall. The word “Hernia” is derived from the Latin word which means to rupture. It is the most common surgery done all over the world, due to its increased incidence and efficient treatment. As of today, 8 to 10 lacs cases performed every year. The incidence of hernia in general is more common in Males than females. The most common site for hernia is the inguinal region, and the indirect type being the more commoner than the rest.

Emeryology

The processus vaginalis is a peritoneal diverticulum in the lower anterior abdominal wall of the embryo that passes through the inguinal canal; in male it becomes the tunica vaginalis. In the eighth week of fetus, the processes vaginalis opens into the inguinal canal with an extraperitoneal gubernaculum, a mesenchymal tissue that connects the fetal testis to the developing scrotum playing a role in descent of the testis. By the 7-9 months of pregnancy, it is located behind the processus vaginalis at birth, 60% of infants can have a open processus. By first month it is halved. Persistent processus vaginalis is attributed for indirect inguinal hernia. About 25% with persistent processus do not have hernia and ironically patients with obliterated processus vaginalis have been noted to have a defect lateral to the epigastric vessels. Risk factors for hernia include smoking, a positive family hernia history, a patent processus vaginalis, collagen vascular disease, abdominal aortic aneurysm, history of an appendicectomy or prostatectomy, ascites, peritoneal dialysis, and chronic...
obstructive pulmonary disease. A single strenuous event in weight lifting, is indeed a significant risk factor. There is minimal evidence that vigorous abdominal wall activity is an independent risk factor for abdominal wall hernia development despite the overwhelming opinion to the contrary in the lay literature. Indeed, there is no increased incidence of hernias in athletes and weightlifters. Similarly, the role of constipation and prostatism is doubtful. Smoking cessation is the only proven risk factor to prevent the development of hernia.

**Mechanisms for Hernia Formation**

1. Increased intraabdominal pressure and relative weakness of the posterior inguinal wall are felt to be important in the development of direct inguinal hernias.
2. An abnormal attachment of the testicular gubernaculum that exerts a pull on the abdominal wall to form a peritoneal dimple, the precursor of a hernial sac.
3. Fruchaud’s concept—states that the basic reason for all groin hernia is failure of the transversalis fascia to restrain the peritoneum. This led to the development of surgeries by some of his students such as Rives and Stoppa, which are based on placing a barrier between the transversalis fascia and the peritoneum.
4. Bendavid’s unified theory it links anatomic, chemical, genetic, environmental, and metabolic aetiologies of inguinal hernias. He makes the point that the final common denominator in all of these proposed aetiologies is the collagen matrix.
5. Denervation theory states that weakness of abdominal muscles occurs after appendicectomy due to the injury of illoinguinal nerve causing hernia.
6. Theory of Uglavsky—He stated that chronically increased intra–abdominal pressure causes hernia.
7. Read’s theory—after performing biopsies of the rectus sheaths from patient with inguinal hernias. He found that specimens were lighter in hernia patients. There was a decrease in hydroxyproline (collagen precursor) in these patients. Hydroxyproline forms up about 80% of the rectus sheath. Subsequently, he found that fibroblasts cultured from the anterior rectus sheath of patients with inguinal hernias proliferated only half as compared to the normal people. The patients with direct hernia had the longest generation time for fibroblasts. Further, he showed decreased incorporation of radioactive prolactine in the rectus sheath samples of individuals with hernias and reduced hydroxyproline-to-proline ratio.
8. Peacock and Madden’s theory increased collagenolysis causes inguinal hernia.
9. Cannon and Read’s “metastatic emphysema”—increased elastase activity was increased in patients with direct hernias and decreased elastase inhibitory activity measured by serum antitrypsin levels mostly seen in smokers, who have very low levels of antitrypsin.
10. Bellon’s theory Matrix Metallo Proteinase-2 overexpression in fibroblasts is seen in patients with inguinal hernia. In the transversalis fascia, an alteration in collagen composition leads to increased tissue elasticity.

11. Zheng’s theory MMP-13 overexpression in patients with recurrent inguinal hernias. A decreased ratio of type I-to-type III collagens is seen in fascial and skin specimens obtained from patients with incisional hernia disease at both the mRNA and protein level. Further analysis of collagen content of mesh samples that were removed at the time of repair of a recurrence demonstrated a significantly decreased collagen type I-to-type III ratio.

12. Currently hernia disease is believed to be a polygenic inheritance, with the penetrance depending on complex interactions between environmental factors and multiple genes. The most likely candidate genes are the ones required for the production of fibrillar type I and III collagens, and MMPs. Polymorphisms occurring not only within the coding sequences but also within the regulatory and promoter sequences might be of importance in disease manifestation. Microarray analysis of ECM-related genes in patients with hernias and healthy subjects will help to determine the susceptibility genes for hernia development.

13. Desarda’s theory—The transverses abdominis and its aponeurotic arch forms the real posterior wall and definite strength for the inguinal region, and the development of hernia occurs in persons who have a defect in the transverses abdominis muscle and its fascia.

**Aims and Objectives**

To compare the effectiveness of Liechtenstein hernia repair and modified Liechtenstein hernia repair in terms of:
- 1. Operative time.
- 2. Length of hospital stay.
- 3. Wound infection rate.
- 4. Post-operative pain.
- 5. Sperm count.

**METHODS**

80 consecutive patients admitting with inguinal hernia in Department of General Surgery at GRH are selected based on non-probability sampling method after approval of Institutional Ethical Committee and obtaining informed consent.

**Study Centre**

Government Royapettah Hospital, Chennai-14.

**Duration of Study**

January 2018 to August 2018.

**Study Design**

Block randomized control study.

**Inclusion Criteria**

Patients aged more than 18 of both genders, with inguinal hernia and without comorbidity (TB, HT, DM, asthma, seizure) are included in the study.
Exclusion Criteria
Patients with co-morbid conditions like immune compromised patients, patients on cancer chemotherapy, immunotherapy and on long term steroids and patient with congenital hernia, Recurrent hernias, Patient presenting with irreducibility and obstruction.

Sample Size
80.

RESULTS

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<td>% within Groups</td>
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Table 4

The time taken was more than one hour in Liechtenstein hernia repair and less than one hour in modified Liechtenstein hernia repair. We found that Liechtenstein hernia group had an average of 4 days compared to modified Liechtenstein hernia group had 2 days. Patients treated with Liechtenstein repair had stay of 4 days as they had post-operative complaints, modified Liechtenstein hernia repair had lesser stay.

Review of Statistics
Among the patients treated in our study all patients came for follow up at 1st and 3rd month, out of 40 patients treated under Liechtenstein mesh hernioplasty, 20(50%) had wound infection and pain, 4(10%) had abnormal sperm count, while in the modified hernioplasty group, only 8 had wound infection.

1. We found that hernia is more commonly occurring after 3rd decade, as it is already established as the disease of old age.
2. The side of hernia was comparable in both groups and it had no significant (p>1.00)
3. The duration of procedure in respect to both groups was found to be significantly lower in modified Liechtenstein hernioplasty (p<0.0005)
4. The hospital stay among both groups was higher in the Liechtenstein hernioplasty group and rather lower in modified Liechtenstein hernioplasty group (p<0.0005).
5. The sperm count was affected in Liechtenstein hernioplasty group as compared to modified Liechtenstein hernioplasty group (p<0.0005).

Liechtenstein Hernia Mesh Repair
One of the adopters of meshplasty was Irving Liechtenstein who along with Alex Shulman and Parviz Amid developed this method of hernia repair. This technique followed in from the principles of the earliest mesh augmented repairs done by Francis Usher who used a piece of polypropylene mesh.
to create a cuff around the conjoined tendon before suturing it to the inguinal ligament. The Lichtenstein repair introduced as the classic Bassini or McVay (Cooper's ligament) type procedures were associated with higher than acceptable long-term recurrence rates even when relaxing incisions in the anterior rectus fascia were employed. This repair requires the surgeon to define precise anatomic landmarks. A tension-free repair is then done utilizing a modest size polypropylene mesh to reconstruct the floor of the inguinal canal which continues laterally with a keyhole in the mesh to accommodate the spermatic cord thus reconstructing deep ring. An inguinal skin crease incision made, incision deepened in layers and fascia. Camper identified by 2 veins which are the superficial circumflex iliac vein and superficial external pudendal vein, both veins ligated and fascia Scarpa opened to see the external oblique muscle, the external oblique muscle cut along the direction of its fibres to expose the spermatic cord. The cord then lateralisef and scar is seen. The inferior epigastric artery pulsations noted. After isolating the hernial sac and reducing the contents, the three nerves were identified and ligated, the posterior wall repair is done with 2-0 vicryl interrupted sutures, then polypropylene mesh was then placed and fixed with stitches in 1-0 polypropylene. The first stitch on the pubic tubercle. The other sutures fixed the lateral margin of the mesh to make fish tailing, one at the level of the internal inguinal ring and the other a continuous suture along the inguinal ligament and few interrupted sutures over the conjoint tendon and internal oblique. After placing of the mesh, continuous sutures with 2-0 vicryl were placed in the aponeurosis of the external oblique muscle and the elements of the spermatic cord underneath.

Technique Variations in Women
The presence of the round ligament in place of the spermatic cord requires some importance to be given. Some surgeons prefer to ligate the round ligament in the as it comes out of the deep ring or near the preperitoneal space with the idea that future indirect hernia recurrence risk is lessened by closing the entire floor of the canal of Nook In younger women, this could reduce the support to the uterus and may not be advisable. In the event the round ligament is to be preserved and it is handled in a fashion analogous to the spermatic cord in males by making a somewhat smaller keyhole in the mesh.

Modified Liechtenstein Hernia Mesh Repair
The same procedure is done as like the Liechtenstein Hernia repair. After isolating the hernial sac and reducing the contents, the three nerves were identified and isolated and pushed away from the operative field, the posterior wall repair is done with 2-0 vicryl interrupted sutures. Then polypropylene mesh was fashioned around the cord s that no contact was between them and then placed and fixed with three stitches in 1-0 polypropylene. The first stitch on the pubic tubercle. The other two sutures fixed the lateral margin of the mesh to make fish tailing, one at the level of the internal inguinal ring and the other at an intermediary point between this and the pubic tubercle. The ends of the mesh were drawn together and closed up above the point where the spermatic cord went into the internal inguinal ring with a last suture of 2-0 polypropylene. Unlike the original Lichtenstein procedure, no suture was fixed on the upper margin of the mesh to the internal oblique muscle. After placing of the mesh, interrupted sutures with 2-0 Vicryl were placed in the aponeurosis of the external oblique muscle under the elements of the spermatic cord so that cord remained outside the aponeurosis.

This was the Gvenetadze’ modification where firstly the deep ring was narrowed with a purse string sutures between the two leaves of transversalis fascia, and the mesh was tailored around the cord so that no contract was there between the mesh and the cord and a gap of 0.5 cm was given.

DISCUSSION
Hernia is the mostly a troublesome surgical disease to a patient, mostly occurring in a manual labourer causing significant loss of quality of work and life, so it is one of the most commonly done surgeries if this modern era, though historically this surgery was difficult and cruel, recent advances made this surgery feasible and effective. Lichtenstein mesh hernia repair proved to a revolutionary procedure of this era as it was very effective in preventing recurrence, but it had some drawbacks like a complaint of chronic pain following inguinal hernia repair is becoming a significant clinical problem to be considered. This is evident due to the involvement of an increasing number of patients and surgeons, as can be seen from the rising number of publications over a period of the last 10 years where postoperative pain syndrome has been dealt with. Different reasons have been put forth, like, the low recurrence rates associated with the use of mesh repair that have focused the hernia surgeons’ attention from recurrence to other outcome parameters and the awareness of patients today of pain parameters. Regardless, with more frequency, patients visit us complaining of groin pain, after having hernia operations done in other places, consulting both for a second opinion regarding treatment and availability of possible legal procedures. But, the first thing to be checked is to find out if it is chronic pain or acute pain.

Early postoperative pain is present soon after surgery which is easily and successfully manageable with analgesics and commonly resolves itself within 15 to 30 days of surgery without other treatments to be undertaken. On the other hand, moderate to severe chronic pain, usually seen 3 months after surgery, may develop into a potentially debilitating condition, evolving not only into a therapeutic
challenge but occasionally making the patient unable to perform daily activities or being able to return to work. It may be refractory to analgesics and can only be treated by further surgery, such as neurectomy, neurolysis, or excision of the neuroma.\textsuperscript{10-15} This complication is actually more frequent than has been recorded in the literature, with the incidence increasing in the recent years. Although the exact incidence of chronic pain needs to be verified, varying in different series and only a few studies presenting long-term follow-up and a sufficiently large study population brings about problems. While dedicated centers studies' show a 0% to 2% incidence of chronic pain,\textsuperscript{16-18} others from public hospitals and universities reported that 30-40% of patients still presented complaints of pain even 1 year after hernia repair.\textsuperscript{19} Danish Hernia Data Base Group\textsuperscript{20} have revealed in their report that the incidence of chronic pain, regardless of grade, 12 months after surgery, is approximately 29%, with 11% of patients complaining of severe, invalidation pain. The range may vary depending on the different modality of graduating and defining pain.

In the current study of some authors, pain maybe defined as 'pain persisting beyond the normal tissue healing time, assumed to be 3 months' with incidence of 40%. Many factors have been considered as predictors of chronic pain, such as, the experience of the surgeons, surgery due to recurrence,\textsuperscript{21} damage to inguinal nerves,\textsuperscript{22} and mesh implementation.\textsuperscript{23} Neuralgia has been said to occur depending on the different surgical techniques used as well as the different ways the inguinal nerves were managed during surgery. It is the belief of some authors that the general use of implanted prosthetic mesh, and the open, instead of laparoscopic, inguinal hernia repair may be the major cause in the increased incidence of chronic pain.\textsuperscript{24,25} However, tension-free mesh repairs are thought to be less likely to cause chronic groin pain than non-mesh repairs.\textsuperscript{26,27} There appears to be no statistically significant difference between open mesh, versus laparoscopic mesh repair.\textsuperscript{28} Other probable reasons reported to be responsible for chronic pain after herniorrhaphy are partial division, neuroma formation, injury or entrapment of the ilioinguinal, iliohypogastric or genitofemoral nerves. Much controversy exists regarding the treatment to reserve for the inguinal nerves during hernia repair.

Some authors suggest elective division of the ilioinguinal nerve to reduce the risk of postoperative chronic pain. But It is a recommendation of Lichtenstein\textsuperscript{29} to always preserve the nerve to reduce the incidence of chronic pain. Yet, studies have proved to show relationship between the division or preservation of the ilioinguinal nerve to the risk of developing chronic pain, A 98% follow-up rate as seen in the current large-scale prospective multicentric study, shows in all clarity that the risk of developing chronic postoperative groin pain is directly related to the number of nerves identified. A crucial factor influencing chronic pain appears to be nerve injury during surgery. It can be seen, chronic pain at 6 months after surgery was zero in those patients in whom all 3 nerves were identified and preserved, compared with the 40% incidence when these nerves were all divided, or 4.5-20% when not all nerves were identified. Therefore, this data suggests that, if 1 or more nerves are not detected during surgery, it is possible that they could be inadvertently sectioned, entrapped, or secured, for example, if a continuous suture is introduced along the inguinal ligament or injured if the external spermatic vessels are divided to skeletonize the cord and thus generate severe pain even some considerable time after the operation. The increased risk of developing chronic pain with the number of nerves divided can be explained by the fact that resection of the nerve has generally been performed distal to its origin, leaving the site of the injured nerve intact to continue to generate the pain signal and exposed to neuroma formation.

Studies\textsuperscript{26,31} show that in cases in which operative management of an injured nerve is reported to be responsible for severe chronic pain, suggest that, if the nerve identified is inadvertently divided, it is important to resect it, as proximally as possible, so that it would not interfere or come into contact with the mesh, thus allowing retraction of the proximal segment into the ventral muscle or retroperitoneum. It should not be forgotten that nerves are most often injured when the surgeon is unaware of the location and course or fails to recognize these during surgery. Caution is stressed when teaching this common procedure to resident physicians. The Lichtenstein procedure is considered the gold standard by the American College of Surgeons for the repair of inguinal hernia.\textsuperscript{32} The technique was somewhat modified in 1984 to produce a more tension-free procedure. In the original version, the method involved the complete fixation of the mesh onto the floor of the inguinal canal with the use of nonabsorbable sutures inserted not only into Cooper's ligament, but also into the inguinal ligament and the internal oblique muscle.\textsuperscript{33}

The operative time required was found to be significant in the study group, as the sutures to be placed was fewer compared to the control group, this not only gave the advantage of lesser anaesthesia time but also in terms of stress occurring during surgery, and easy return to work and the procedure can be done as a day care surgical procedure. Although it is important to make sure that the mesh is securely fixed to avoid the formation of a meshoma, the original technique gave rise to several problems. Of those identified by the original authors of the procedure, one of the most notable involved the shrinkage of the mesh, which implicated approximately 20 per cent of its original length; this led to tension on the tissues in all directions and produced a less tension-free procedure. Lichtenstein himself proposed a modification of his original technique between 1984 and 1988, by suggesting that the mesh should be fixed without stretching it but leaving a slight cupola to avoid contraction, which would pull on the tissues in all directions.\textsuperscript{34} However, although using mesh for the repair of inguinal hernia offers several advantages like simplicity and low incidence of recurrence,\textsuperscript{36} it has by itself been a cause of postsurgical pain, because it increases scar tissue formation and nerve entrapment.\textsuperscript{35,36}

The true incidence of post herniorrhaphy groin pain has not yet been fully looked into, probably because most
surgeons have been more concerned with the recurrence rate than with this seemingly insignificant symptom. In their review found an incidence rate ranging from 0 to 63 per cent. Franneby et al. demonstrated that after 24 to 36 months of follow-up, approximately 30 per cent of patients undergoing inguinal herniorrhaphy reported pain or discomfort and nearly 6 per cent reported high-intensity pain resulting in the inability to perform daily living activities. Although several risk factors leading to chronic postoperative pain have been recorded, for example, postoperative hematoma, wound infection, and composition of the mesh, the most frequent cause appears to be entrapment of the inguinal canal nerves, especially the iliohypogastric nerve, which is the regional nerve at the highest risk during tension-free repair because it may be trapped by the overlapping mesh in the scar tissue forming between this and the muscle plane along which the nerve runs. Alfieri in his study is of the opinion that the most preventive step to reduce the incidence of postoperative groin pain is careful dissection and preservation of the ilioinguinal, iliohypogastric, and genitofemoral nerves. When all three nerves were identified and preserved, no cases of chronic pain were identified at the 6-month follow-up. This was in stark contrast to the 40 per cent of patients who reported moderate to severe pain when all three nerves were divided.

In our modification and enhancement of the Lichtenstein procedure, we fix the mesh to pubic tubercle, near the deep ring and apart from this to the inguinal ligament only, thus avoiding the fixation of its upper margin to the internal oblique muscle. By doing this, not only is it possible to avoid the formation of a meshoma, but there is also an absence of tension, because the mesh is able to shrink in one direction only. Furthermore, we maintain that if the upper margin of the mesh is not fixed to the internal oblique muscle, its shrinkage will not bring about traction of the internal oblique muscle with the resulting reduction of the risk of entrapment of the nerves of the inguinal canal and considerably less chronic postoperative pain. Applying this variation of the original procedure, we found that 20 per cent of our patients felt only slight pain at 72 hours after surgery and had no need for painkillers. Furthermore, 80 per cent of the patients had no pain at all 7 days after surgery. Comparing these results with those of a group of patients undergoing the original Lichtenstein procedure, a significant difference (P <0.01) can be observed regarding both the intensity and the duration of pain within the first 15 days after surgery. In this control group of patients, in fact, the intensity of pain was more severe and the pain lasted longer compared with the patients in the study group. Return to work was also fairly rapid, in the study group rather than late return for work seen in the control group.

Thus we can conclude that, the Modified Lichtenstein hernioplasty is an extremely efficient and effective technique for the management of inguinal hernia both for the few overall complications related to mesh implantation and for the extremely low recurrence rates evaluated in approximately 0.5 per cent of the cases. The Lichtenstein procedure has side effects which cause troublesome to the patient, hence modifications are required. The abdominal approach is also to be considered only moderately invasive not only because it involves locoregional anaesthetic, which proves to be efficient and well tolerated by the patient, but also taking into account the rapidity of the surgical procedure. Moreover, the Lichtenstein open tension-free repair appears to be superior to laparoscopic repair, because the latter results in a higher recurrence rate, is associated with operative mortality, and presents only the insignificant advantage of only 1 day before the return to normal physical activities and unquestionably less pain for 8 days. The control of postoperative pain is, in fact, an extremely important factor leading to the reduction of patient discomfort and a more rapid return to normal working activity. Though earlier there were no studies regarding changes in sperm morphology and quality, the study conducted by Kiladze et al proved the point, the mesh after being placed in the body, heals after a period of inflammation by inciting a foreign body reaction which causes fibrosis and the posterior wall strengthening.

The success of the polypropylene mesh in inguinal hernia repairs has been attributed to its tensile strength. This intricate, interwoven prosthetic mesh is very thin and porous and unable to harbor infection yet is easily infiltrated with fibroblasts that impart permanent strength to the repair. This fibrotic reaction appears to strengthen the floor of the inguinal canal and decrease the incidence of recurrence. Because such a reaction is expected, the spermatic cord, which lies anterior to the mesh, could intuitively be affected in some fashion. Typical signs of inflammation are seen even after years of the procedure and The cord during this process if entangled in the ongoing inflammation, becomes on flamed and thrombosed which affect the sperm quality. Trabucchi et al reported similar findings in human biopsies 7 days to 9 years after mesh placement, Beets et al found foreign body reaction to the polypropylene mesh in pre peritoneal placement in pig model, Adhesions between mesh and cord were elaborated by Fitzgibbons et al, LeBlanc et al placed polypropylene mesh and found that adhesions between mesh and the spermatic cord occurred 30 days after the procedure and persisted along with venous congestion also persisted, Langenbach et al found that painful copulation with ejaculation occurred in 10%, Silch and McSherry found that spermatic granuloma and spermatoceles occurred in 0.8%, venous thrombosis were observed by Peiper et al moreover shin et al reported 14 cases of azospermia secondary to polypropylene mesh,, so Lichtenstein mesh repair done in a young individual though recurrence can be prevented. Uzzo and associates examined the local effects of polypropylene mesh on the spermatic cord in 12 male beagle dogs by performing a comparative histologic and clinical study of standard inguinal herniorrhaphy versus mesh inguinal herniorrhaphy. Although major difference was not seen in testicular volume, temperature, and vascularity was, there was a significant decrease in cross-sectional vasal luminal diameters in both herniorrhaphy groups when

Compared with controls. Furthermore, a clearly marked foreign body reaction to the mesh was present in the tissue surrounding the spermatic cord. Studies have shown that the incidence of vasal injury ranges from 0.3% to 7.2%. May occur for different reasons. It may be due to iatrogenic injury caused by ligation, cauterization, or incision. However, it also may result from vascular compromise or extrinsic compression. In many cases, delayed obstruction secondary to fibrosis or extrinsic compression or vascular compromise may remain unrecognized. Because invasive diagnostic studies such as vasography would be necessary to determine actual frequency of injuries and these studies are not always clinically appropriate, the true incidence of IVO will likely remain difficult to ascertain. Some surgeons use the mesh as a patch to cover the floor of the inguinal canal. Placement of a mesh in direct contact with a bare vas is not recommended. Alternatively, mesh with a polytetrafluoroethylene surface (Bard; Spermatrix, Murray Hill, NJ) could be used to minimize adhesions and tissue attachments between the spermatic cord and prosthesis. In addition, careful handling of the spermatic cord during hernia sac dissection reduces the risk of exposing the vas deferens to the mesh. Abnormal sperm morphology even occurred post laparoscopy hernia repair, further providing evidence that in both techniques there is a risk due to the mesh placed and of the skill of the surgeon. Therefore, patients in the reproductive age group must be warned about the risks of abnormal sperm count or morphology and they need to be counseled well before the surgery and then the fertility factor comes into question which must be addressed by a simple modification of fashioning the mesh around the cord with a gap of 0.5-1cm and placing the cord outside the external oblique we can avoid contact between the cord and the mesh, thus saving it from the inflammatory process.

Summary

1. Proper knowledge of inguinal anatomy is required before operating hernia.
2. Adopting measures to teach the residents about the modifications is necessary.
3. Careful dissection during surgery for the preservation of all the three nerves is important.
4. Conducting further research to evaluate the procedure in different populations is required.

CONCLUSIONS

Liechtenstein tension free mesh repair is considered as the gold standard in the treatment of hernia. In terms of recurrence, it shows favourable results, but the complications are troublesome, and no patient would want any complication whatsoever. Earlier when recurrence was high in hernia surgery, many great surgeons aimed at reducing the recurrence rate without giving much importance to other side effects, especially those of the mesh. Mesh placed in the body, though very safe and effective, is still a foreign body and has its side effects. So, many studies do show the ill effects of mesh; but considering the risk benefit ratio, Liechtenstein hernia repair was given the gold standard status. But now slight modifications to the procedure show an increased effectiveness of the procedure and it has a easier learning curve and the final results are more fruitful. By this study, it proves significant difference can be brought with some minor modifications, and overall effectiveness be increased.

REFERENCES


