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RESEARCH ARTICLE

IS SYNTHETIC MESHPLASTY THE ONLY METHODFOR INGUINAL HERNIA REPAIR OR ARE THERE OTHER RESOURCEFUL ALTERNATIVES?

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Abstract

There are multifactorial causes for development of inguinal hernia. Weakness in the fascia transversalis plays a major role in causing a inguinal hernia. There are different techniques of repair of the inguinal hernia that are currently being practiced. Traditionally, inguinal hernia repair included usage of autogenous tissue (Shouldice, Bassini, Cooper's). But the use of synthetic mesh for the repair of inguinal hernia had decreased the recurrence rate. Gradually, the complications associated with the use of synthetic mesh like infections, adhesions, granulomas, fistulae, migrations, etc became challenging to deal with. To avoid such complications and to overcome these challenges, we will be using autologous biological tissue i.e, an expanded sac for the repair of inguinal hernia in this study.

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Introduction:-

A hernia is defined as a region of weakness or total destruction of the fibromuscular layers of the body wall. Structures that arise from the cavity contained by the body wall can pass through, or herniate, through such a defect. Even though the definition is univocal, the term is often misinterpreted. To clarify the concept, hernia denotes the actual anatomic weakness or defect, whereas contents of the hernial sac describe the structures which pass through the defect.

Hernias are among the most ancient problems of human world and surgical repair of inguinal hernia is the most common general surgery procedure. Of all inguinal-scrotal hernias, 95% are of the inguinal canal, rest being femoral hernia defects. Inguinal hernias are about nine times commoner in males than in females¹. Even though femoral hernias are seen often in females, inguinal hernia is the most common hernia in females.

Despite the advent of various innovative surgical platforms and operative techniques, a definitive indication of the best surgical option for treatment of inguinal hernia remains unsettled.

Bassini revolutionized the repair of inguinal hernia with his novel anatomical dissection which led to low recurrence rates. He published his initial outcomes in 1889². Various modifications followed over the years. The developments in hernia repair following Bassini had the primary goal of reducing long-term hernia recurrences. These brought the era of usage of synthetic material followed up synthetic meshes. Lichtenstein developed a sutureless hernia repair

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technique using a plastic mesh placed over the inguinal floor. In search for a technical means to taper the recurrences, emphasis shifted to meticulous dissection which would avoid placement of a foreign mesh^{3,4}.

Biological tissue was then used for the repair of inguinal hernias, now for decades—both autologous or allogeneous³. The invention of biological as well as synthetic mesh for the repair of inguinal hernia has reduced the use of biological tissue repair due to decreased rate of recurrence but the complications associated with mesh repair are arduous.

To triumph over these complications a study was performed to evaluate the clinical outcomes and the complications associated with the use of autologous biological tissue repair in the form of an expanded sac over the reconstructed posterior inguinal wall, a technique based on pure tissue repair. This technique was compared with the currently standard Lichtenstein prosthetic mesh repair.

The operation has been associated with good long-term outcomes and low recurrence rates.

Material and Method:-

Objectives:-

To compare these two techniques of inguinal hernia repair in terms of -operative time, post operative pain assessment, total cost of stay, post-operative infections and recurrence rates.

The study included patients between 18-60 years age willing to give a written informed consent to participate in the study, patients with indirect inguinal hernias, indirect with direct hernias and/or obstructed hernias. We excluded the patients under 18 and above 60 years age, those who were unfit for surgery, pregnant women, purely direct inguinal hernias and strangulated inguinal hernia.

Method:-

It was a prospective simple randomized control study for a period of 6 months in which a set of 60 patients were divided in groups of 30 each where 'Group A' had patients that were to be operated by autologous biological tissue repair in the form of expanded sac whereas Group B included patients to be operated by Lichtenstein hernioplasty. These groups were formed by a random chit picking system.

Written and informed consent was obtained from all patients after detailed explanation of the purpose of the study. Preoperative evaluation including proper history taking, clinical examination, and contrast CT scan of the inguinal region was done. Postoperatively follow up of the patient was taken in the 1st week, 3rd week, after 1 month, 3 months and after 6 months, to look for complications like pain, infection, cost, recurrence. And a follow up contrast CT scan was done after 1 month to look for tissue scarring.

Expanded sac method-

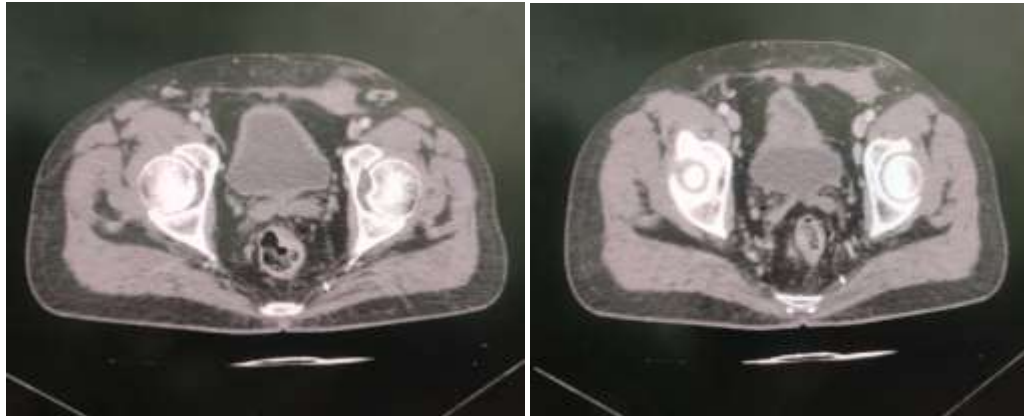
After preoperative preparation, skin incision was made, subcutaneous tissue and external oblique aponeurosis opened, the spermatic cord elevated from the posterior wall of the inguinal canal. In indirect hernias, the hernial sac was identified, dissected up to the internal ring and opened to allow examination of its contents. The sac was ligated and its distal portion and the entire length of the sac was used for reconstruction of the posterior inguinal wall. The aponeurosis of external oblique was then closed using absorbable sutures (Vicryl No 2-0). Skin closure done.



Preoperative images:- A) Clinical image of a left inguinal hernia B) Hernia seen on CT scan.



Intraoperative images of expanded sac method of herniorrhaphy showing: A)contents of inguinal canal b)expanded indirect hernial sac. C) Fixation of expanded sac.



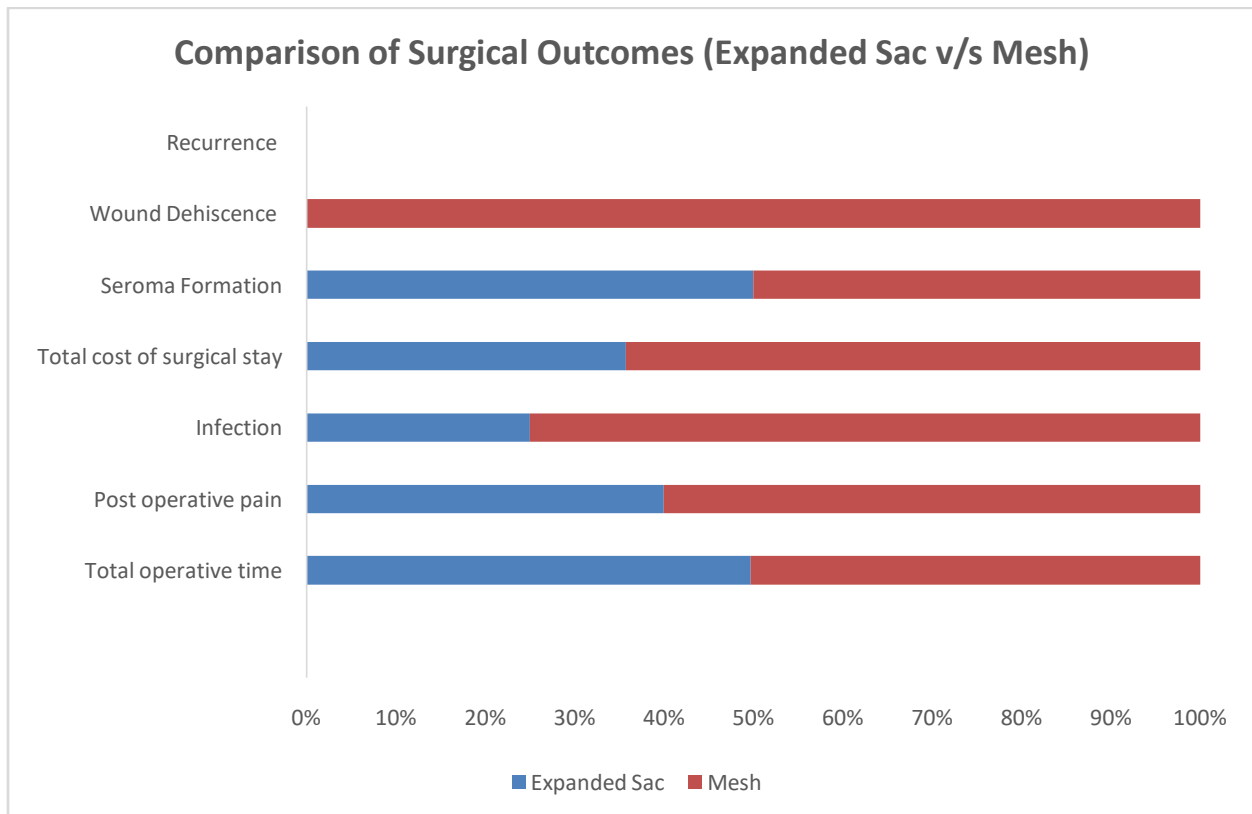
Postoperative images:- A) Sutureline. B) fibrosis of the expanded sac seen on CT scan after 3 months.

Lichtenstein Mesh Repair-

After incising the skin, subcutaneous tissue, and external oblique aponeurosis (standard procedure), the spermatic cord is elevated from the posterior wall of the inguinal canal. Sac dissected away from cord contents and excised. A polypropylene mesh (3 × 5 inch) is trimmed to fit the floor of the inguinal canal, and its apex is first sutured to the public tubercle using a Prolene No 3-0 suture. Interrupted Prolene sutures then suture the two cut edges of the mesh together around the spermatic cord. The aponeurosis of external oblique is then closed using absorbable sutures (Vicryl No 2-0)^{9,13}. Skin closure done.

Results:-

In our study. Parameters used were total operative time (for learning curve), post operative pain (visual analogue scale), cost (in rupees), post operative infection (at surgical site with or without wound dehiscence), recurrence.



For group A total operative time was 92.10 minutes and for group B, it is 93.20 minutes. All techniques (especially endoscopic techniques) have a learning curve that is underestimated. For large scrotal (irreducible) inguinal hernias, the Lichtenstein repair is the preferred surgical technique. For recurrent hernias, after previous posterior approach, an open anterior approach like the expanded sac method seems to have clear advantages, since another plane of dissection is to be used.

Post operative pain was found in 12 cases from Group A and 18 patients from group B. Pain is usually due to surgical stress but can often present due to tension repair, nerve entrapment or pain due to mesh placement.

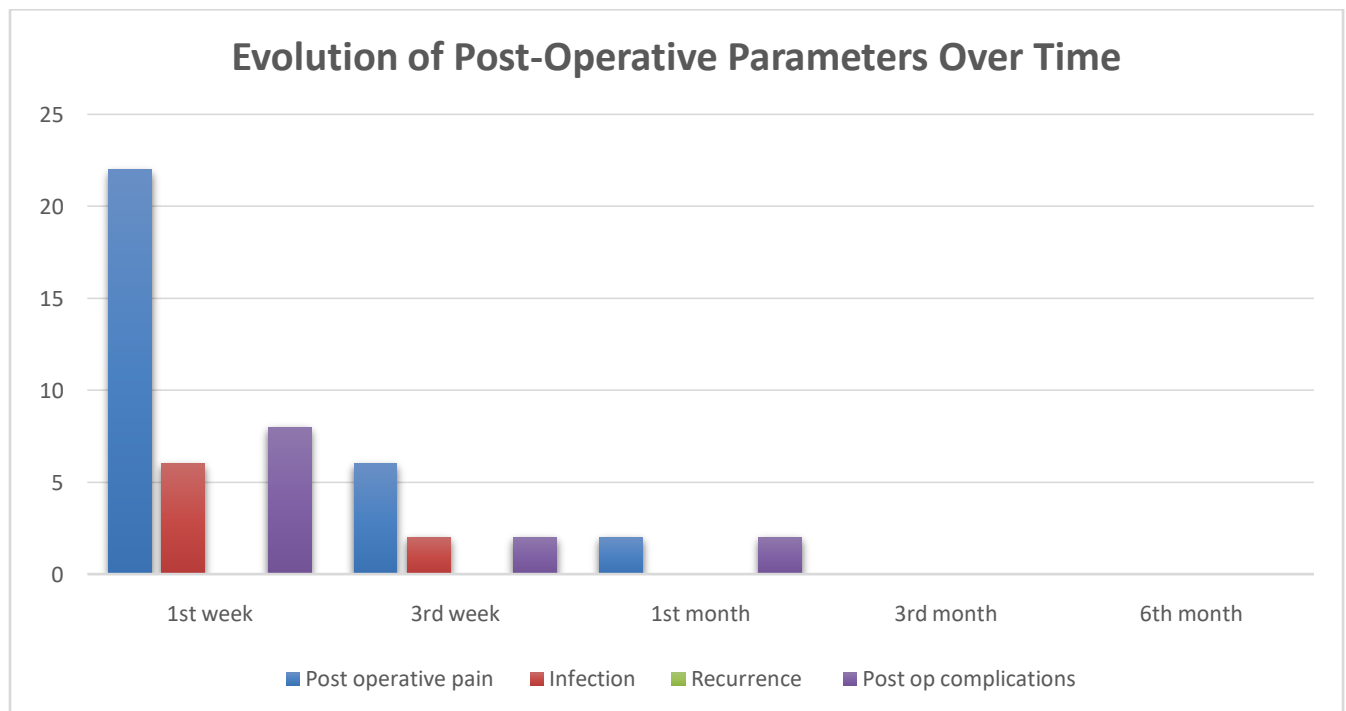
Post operative infection was seen in 2 patients from group A and 6 patients in group B. 2 patients from group B were diagnosed to have infected mesh which was surgically removed and infection settled using antibiotics. The risk of infection following an inguinal hernia operation, with or without mesh, is between 0 and 14.4%. In RCTs, the average incidence of wound infections is 4.3% in conventional repair and 2.4% in open mesh repair. Deep infections are rare and do not have to lead to the removal of the mesh when monofilament materials are used.

Seroma developed in 2 patients from group A and 2 patients from group B. No surgical intervention was done. Seroma settled with compression and antibiotics. Most seromas disappear spontaneously within a period of 6–8 weeks. Should a seroma persist, it can be aspirated. Infection following the aspiration of seromas is regularly described. Studies concerning postoperative drainage to prevent seromas are contradictory.

Wound dehiscence was found in 2 patients from group B in 1st month and was treated with dressing and antibiotics followed by secondary suturing. The use of autologous tissue should reduce the incidence of erosion into underlying structures⁵.

Recurrence was found in no patients.

Postoperative recovery is defined as a return to normal activities of daily living and the resumption of paid work which was seen after 5 days in Group A and 7 days in group B.



Discussion:-

Inguinal hernia repair is the most commonly performed general surgical operation in the World. Despite developments in surgical technique and mesh technology, the rate of recurrence following primary repair remains at

approximately 10%⁷. Several factors are associated with an increased risk of recurrent herniation: poor operative technique and post-operative complications, aberrations of local anatomy and repetitive elevation of intra-abdominal pressure. Reconstruction of complex abdominal wall and inguinal hernia are challenging and technically demanding. They often require an individualised operative strategy with specialist skills of both hernia repair and reconstructive plastic surgery^{1,5,14}.

The complex anatomical structure of the inguinal ligament acts as a strong anchor or origin for the abdominal wall musculoaponeurosis, retaining abdominal contents whilst permitting passage of the iliofemoralneurovascular bundle. An intact inguinal ligament plays a crucial role in the successful repair of inguinal hernias⁵.

The aetiology of IH is by multifactorial causes. The weakened transversalis fascia by an abnormal collagen, alteration to collagen type I to type III ratio (presented at the Association of Surgeons in Training Annual Conference, Sheffield, UK, May 2011) and an imbalance of protease and antiprotease can play a role in IH formation⁴. Smoking is almost certainly a risk factor. People with abnormal collagen metabolism (also known among smokers) have an increased risk, which is also revealed in a higher incidence of inguinal hernias in patients with aortic aneurysm. Also, patent processus vaginalis is a risk factor. A low (cosmetic) incision for appendectomy can disrupt the shutter mechanism and increase the risk of an inguinal hernia on the right-hand side. Inguinal hernia is a known complication after radical retropubic prostatectomy, open procedure as well as endoscopic, and has been reported to occur in 7–21% of patients¹⁰. Even other types of lower midline incision surgery could promote the development of postoperative inguinal hernia^{9, 10}. Urologists should be aware of this important postoperative complication and prophylactic surgical procedures must be evaluated to address the problem.

Up until now, Shouldice hernia repair technique is the best non-mesh repair method. The use of SM in surgery carries its own complications: infections, migration, adhesions, granulomas, fistula formation, erosions to adjacent organs, ischemic orchitis, meshoma and chronic postoperative pain⁶.

Inguinal hernias are corrected by repairing the fascial defect in the myopectineal orifice of Fruchaud or by reinforcing the weakened fascia transversalis and bridging the defect by inserting a prosthesis (mesh)^{5,7}. There is a lack of surgical options described in the literature for reconstruction of the inguinal ligament^{4,11}. The successful use of the described technique adds value as a potential alternative to synthetic mesh for surgeons encountering similar defects in the future. To the best of our knowledge, this is the first Indian paper to utilize expanded sac for the purpose.

All tension-free hernia operation techniques (open with biological tissue repair, Lichtenstein procedure or endoscopic approach, e.g. TAPP and TEP) have been analysed in various trials and result in a quicker postoperative recovery².

The newer technique has equivalent results as mesh repair but a wider sample size and a longer and large scale study will help in coming to a conclusion about introducing such a technique in common use. The newer expanded sac technique is not only easier, simpler but is also cost effective and can be attempted to perform in emergency scenarios. Advanced animal study may be required for exact mechanism of acceptance of autogenous tissue like expanded hernia sac.

References:-

1. Rutkow IM, Robbins AW. Demographic, classificatory, and socioeco- nomic aspects of hernia repair in the United States. *SurgClin North Am.* 1993;73:413.
2. Bassini E. *NouvoMetodo per la CuraRadiale dell' ErniaInguinale.* Padua, Italy: Prosperini; 1889.
3. McIntosh A, Hutchinson A, Roberts A, et al. Evidence-based manage- ment of groin hernia in primary care—a systematic review. *Fam Pract.* 2000;17:442.
4. Autologous reconstruction of the inguinal ligament using pedicled fascia lata flap: A new technique Alasdair R. Botta,*, ShaheelChummunna, Rory F. Rickarda,c, Andrew N. Kingsnorthb.
5. Pure tissue inguinal hernia repair with the use of biological mesh: a 10-year follows up. A prospective study B. Ravo1,3 · Giuliano Falasco1,2,3.
6. European Hernia Society guidelines on the treatment of inguinal hernia in adult patients M. P. Simons Æ T. Aufenacker Æ M. Bay-Nielsen Æ J. L. Bouillot Æ G. Campanelli Æ J. Conze Æ D. de Lange Æ R. Fortelny Æ T. Heikkinen Æ A. Kingsnorth Æ J. Kukleta Æ S. Morales-Conde Æ P. Nordin Æ V. Schumpelick Æ S. Smedberg Æ M. Smietanski Æ G. Weber Æ M. Miserez.

7. Costello CR, Bachman SL, Ramshaw BJ, Grant SA (2007) Materials characterization of explanted polypropylene hernia meshes. *BioMed Mater Res B Appl Biomater* 83:44–49.
8. Amid PK (1997) Classification of biomaterials and their related complications in abdominal wall hernia surgery. *Hernia* 1:12–19
9. Fang Z, Ren F, Zhou J, Tian J (2015) Biologic mesh versus synthetic mesh in open inguinal hernia repair: system review and meta-analysis. *ANZ J Surg* 85(12):910–916
10. Developments in hernia repair. G Voeller.
11. Simons MP, Aufenacker T, Bay-Nielsen M, Bouillot JL, Campanelli G, Conze J, et al. Guidelines on the treatment of inguinal hernia in adult patients. *European Hernia Society*. 2009;13:343-403.
12. Leblank KA, Complications associated with the plug and patch method of inguinal herniorrhaphy. *Hernia*. 2001;5:135-8.
13. Maingot R: The floss-silk lattice repair for inguinal hernias. *Br J Clin Pract*, 1979, vol 3, pp 97-98 and 110.
14. Primates P, Goldacre MJ (1996) Inguinal hernia repair: incidence of elective and emergency surgery, readmission and mortality. *Int J Epidemiol* 25:835–839.
15. Bay-Nielsen M, Kehlet H, Strand L et al (2001) Quality assessment of 26,304 herniorrhaphies in Denmark: a prospective nationwide study. *Lancet* 358:1124–1128.
16. Mitura K, Romanczuk M (2008) Comparison between two methods of inguinal hernia surgery—Lichtenstein and Desarda. *Pol Merkur Lekarski* 24:392–395.
17. Gallie WE, LeMesurier AB: The use of living sutures in operative surgery. *Can Med Assoc J* 1921;11:504-513.
18. Ansaloni L, Catena F, Coccolini F, Gazzotti F, D’Alessandro L, Pinna AD (2009) Inguinal hernia repair with porcine small intestine submucosa: 3-year follow-up results of a randomized controlled trial of Lichtenstein’s repair with polypropylene mesh versus Surgisis Inguinal Hernia Matrix. *Am J Surg* 198(3):303–312
19. Bochicchio GV, Jain A, McGonigal K et al (2014) Biologic vs. synthetic inguinal hernia repair: 1-year results of a randomized double-blind trial. *J Am Coll Surg* 218(4):751–757.
20. Aasvang EK, Møhl B, Kehlet H (2007) Ejaculatory pain: a specific postherniotomy pain syndrome? *Anesthesiology* 107:298–304.
21. Stranne J, Hugosson J, Lodding P (2007) Inguinal hernia is a common complication in lower midline incision surgery. *Hernia* 11:247–252.