



COMPARATIVE ANALYSIS OF SURGICAL APPROACHES FOR PARAUMBILICAL HERNIA REPAIR: MAYO REPAIR VS. MESH REPAIR IN THE INDIAN POPULATION

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Abstract:

Introduction:

Paraumbilical hernias pose significant health risks if left untreated, particularly in populations with high prevalence rates due to risk factors such as obesity and multiparity. Surgical repair is the standard treatment, with options including Mayo repair and mesh repair. Debate persists regarding the optimal approach, especially in the Indian population.

Objectives:

This study aimed to compare outcomes between Mayo repair and mesh repair for paraumbilical hernias in the Indian population, focusing on recurrence rates and patient outcomes.

Materials & Methods:

Conducted across two Indian centers, this multicentric study utilized a combined prospective and retrospective method between June 2020 and June 2022. Fifty patients meeting inclusion criteria underwent either Mayo repair or mesh repair. Clinical history, physical exams, preoperative investigations, and surgical procedures were documented.

Results:

Among 58 patients, predominantly females, both techniques showed efficacy in reducing symptoms. Mesh repair had no recurrences, while one recurrence occurred with Mayo repair. Complications included surgical site infections (more common in mesh repair) and seroma formation (more common in Mayo repair).

Discussion:

Risk factors for paraumbilical hernias, such as multiparity and obesity in females and smoking in males, were evident. While defect sizes did not significantly differ between repair groups, mesh repair tended to address larger defects. Complications varied between techniques, with mesh repair showing a higher risk of surgical site infections and Mayo repair associated with seroma formation. Recurrence rates favored mesh repair, though not statistically significant.

Conclusion:

This study underscores the importance of patient-specific considerations in hernia repair selection. Mesh repair may offer advantages in preventing recurrence but carries a higher risk of surgical site

infections. Mayo repair, conversely, may be suitable for smaller defects despite a higher seroma risk. Further research with larger cohorts is warranted to corroborate these findings.

Introduction-

Paraumbilical hernias are a common surgical problem, with a reported incidence of up to 10% of all primary hernias [3][5][6]. These hernias are more prevalent in parous, obese, middle-aged, and elderly women [4][5]. If left untreated, paraumbilical hernias can lead to complications such as bowel obstruction and strangulation, which can be life-threatening [3][5][6]. In the Indian population, paraumbilical hernias are a significant health concern due to the high prevalence of risk factors such as obesity and multiparity [4][5].

Conservative management of paraumbilical hernias is not recommended due to the high risk of complications, and surgical repair is the standard of care [3][5]. There are several surgical options available for paraumbilical hernia repair, including Mayo repair and mesh repair [3][5]. Mayo repair involves suturing the defect in the Linea alba, while mesh repair involves the placement of a synthetic mesh to reinforce the repair and reduce the risk of recurrence [3][5].

While both Mayo repair and mesh repair have been shown to be effective in reducing recurrence rates and improving patient outcomes, there is ongoing debate regarding the optimal surgical approach for paraumbilical hernia repair [3][5]. A comparative study by Naik et al. found that mesh repair had a lower recurrence rate (0%) compared to Mayo repair (10%) [3]. However, another study by Deari Ahmed Qasab found that onlay mesh repair had a low recurrence rate (1.72%) and was a simple, safe, and effective technique for paraumbilical hernia repair [5].

The lack of consensus regarding the optimal surgical approach for paraumbilical hernia repair is particularly relevant in the context of the Indian population, where there is a high prevalence of risk factors for hernia recurrence such as obesity and multiparity [5]. Therefore, the purpose of this study is to compare the outcomes of Mayo repair versus mesh repair for paraumbilical hernias in the Indian population, with a focus on recurrence rates and patient outcomes.

This study aims to address the following gaps and controversies in the literature:

- * The optimal surgical approach for paraumbilical hernia repair in the Indian population
- * The comparative effectiveness of Mayo repair and mesh repair in reducing recurrence rates and improving patient outcomes
- * The potential advantages and disadvantages of each surgical technique in the context of the Indian population

The results of this study may contribute to optimizing surgical decision-making and improving outcomes for patients undergoing paraumbilical hernia repair in India. By providing evidence-based recommendations, this study may help reduce healthcare costs associated with hernia recurrence and complications.

MATERIALS AND METHODS

SOURCE OF DATA

This was multicentric study conducted at two centres (Institute of Gastroenterology Sciences & Organ Transplant (IGOT Hospital), Bangalore and al ameen medical college, Bijapur) through a combined prospective and retrospective method, conducted between June 2020 to June 2022. A total of 50 patients were included in the study.

Inclusion criteria

- a. Patients with a diagnosis of Paraumbilical Hernia

Exclusion criteria

- a. Paraumbilical Hernia with Incisional Hernia
- b. Strangulated Hernia.
- c. Recurrent Hernia.

Ethical consideration: Institutional Ethical committee permission was taken from both the institute prior to the commencement of the study.

METHODS OF COLLECTION OF DATA

Patients meeting inclusion criteria were enrolled. Their clinical history encompassed hernia duration, size progression, associated symptoms (pain, vomiting, etc.), reducibility, chronic cough, constipation, urinary difficulties, ascites history, pregnancies, and prior surgeries. Physical exams evaluated & emphasized on obesity, hypertension, abdominal distension causes, rectal masses, prostate enlargement, and urethral issues (males). Respiratory exams targeted COPD signs. Local exams assessed hernia characteristics and abdominal muscle tone. All cases underwent preoperative investigations including Hb%, BT, CT, FBS, PPBS, urea, creatinine, urine analysis, ECG, chest X-ray, and abdominal/pelvic ultrasound.

Surgical approach (Mayo's or mesh repair) was determined by defect size and abdominal wall tone.

Among the 58 patients with a paraumbilical hernia:

- 28 patients underwent Mayo's anatomical repair.
- 30 patients underwent polypropylene mesh repair.

Patients with preexisting conditions like anaemia, hypertension, diabetes, and local skin issues underwent preoperative correction. Informed consent was obtained pre-surgery. All received a single IV dose of 1 gm 3rd generation cephalosporin antibiotic during or after anaesthesia induction.

Surgical procedures

Both procedures were conducted under spinal or GA.

Mayo's Repair:

- Patients lying in supine positioned parts painted and draped in a standard procedure (fig no: 1).
- Infraumbilical smiley incision (fig no: 2) made, deepened to aponeurosis.
- Sac neck cleared, opened, contents assessed.
- Sac turned inside out, adhesions released, contents returned.
- Aponeurosis, posterior rectus sheath, peritoneum grasped (fig no: 3), sutures placed.
- Non-absorbable polypropylene used for suturing (fig no: 4).
- Triple-layer, double-throw knots tied, ends cut.
- Suction drain placed, subcutaneous tissue and skin closed (fig no: 5).



Figure no 1: pre-op picture of paraumbilical hernia



Figure no 2: “Smiley” incision



Figure no 3: Upper flap approximating with lower flap.



Figure no 4: Complete mayo repair.



Figure no 5: Drain placed, and the skin sutured

Mesh Repair:

- Similar steps until sac management.
- Polypropylene mesh (commonly 6x11cm) used(fig no: 6), adjusted for defect size.
- Mesh fixed with prolene sutures(fig no: 7).
- Suction drain inserted and Abdomen closed in layers(fig no: 8).



Figure no 6: Polypropylene Mesh.



Figure no 7: Mesh placed and secured



Figure no 8: Drain placed, and the skin sutured

Postoperative Care:

- all Patients kept NPO for 24-36 hrs.
- IV fluids, 3rd generation cephalosporin, Diclofenac, and Pantoprazole administered.
- Oral liquids allowed after 24-36 hrs, followed by a soft diet.
- Suction drain quantity and nature noted, removed after 48 hrs.
- Wound inspected on postoperative day 3 for inflammation and discharge.
- Soft swelling aspirated; serous or bloody fluid aspirated with same needle, purulent collection drained for culture.
- Postoperative infection criteria: erythema >1 cm from wound margin, tenderness, seropurulent or purulent discharge.
- Seroma defined as serous fluid collection.
- Recurrence defined as reappearance of hernia symptoms post-wound healing.
- Sutures removed 8-10 days post-surgery.
- Follow-up every 2-3 months for symptom review.
- Postoperative wound complications and recurrence recorded and compared between procedures.

Follow up period:

The patients under study would be followed up for a period of 2 months to 2 years.

RESULTS

A total of 60 patients met the inclusion criteria for our study. However, 2 patients were lost during follow-up, resulting in a final count of 58 patients from both institutes. Among them, 38 (65.5%) were females and 20 (34.5%) were males, predominantly observed between the 4th and 6th decades of life. All 58 (100%) patients presented with reducible swelling around the navel, with a cough impulse noted in 54 (93.1%) patients. Other symptoms observed in our study included pain in 29 (50%) patients and skin changes in 6 (10.3%) patients.

Among the 30 women, multiple pregnancies were observed in 33 (87%) patients, while 13 (34.21%) were obese. Among the male patients, 12 (60%) had a history of chronic smoking, and 8 (40%) were diagnosed with or had a history of COPD. Associated conditions included Diabetes Mellitus in 12 (20%) patients. Among the 58 patients, 30(60%) patients underwent mesh repair and 28(40%) patients underwent Mayo's repair.

Intraoperative observations revealed that 30 (51.72%) patients had a defect size of less than 4cm, 23 (39.65%) patients had a defect size between 4-6cm, and 5 (8.6%) patients had a defect size greater than 6cm. The average defect size treated with Mesh repair was 4.88 ± 1.77 cm, and with Mayo's repair, it was 4.08 ± 1.32 cm. However, this difference was not statistically significant in our study, likely due to the limited sample size.

Regarding complications, among the patients undergoing mesh repair, 3 (10%) developed surgical site infections (SSI), and 1 (3.33%) developed a seroma. Among those undergoing Mayo repair, seroma formation was seen in 4 (14.28%) patients, and SSI in 1 (3.33%) patient. All SSIs were superficial and successfully managed with local debridement and antibiotics.

One recurrence (3.33%) was observed among the 30 cases treated with Mayo's repair, while no recurrences were noted following Mesh repair. Although there was no significant difference in recurrence rates between Mayo's repair and Mesh repair, (p value = 0.207), a statistical trend suggests a potential difference in recurrence rates between the two procedures, which could become significant with an increase in sample size and follow-up duration.

Parameter	Mesh Repair (n=30)	Mayo's Repair (n=28)
Sex		
- Female	22 (73.33%)	16 (57.14%)
- Male	8 (26.67%)	12 (42.86%)
Age (years)		
- Mean \pm SD	45.7 \pm 9.6	46.2 \pm 8.2
Symptoms		
- Reducible swelling	30 (100%)	28 (100%)
- Cough impulse	28 (93.33%)	26 (92.86%)
- Pain	15 (50%)	14 (50%)
- Skin changes	3 (10%)	3 (10.71%)
Hernia Defect Size (cm)		
- < 4 cm	17 (56.67%)	13 (46.43%)
- 4-6 cm	11 (36.67%)	12 (42.86%)
- > 6 cm	2 (6.67%)	3 (10.71%)
Complications		
Surgical Site Infection (SSI)	3 (10%)	1 (3.57%)
Seroma	1 (3.33%)	4 (14.29%)
Recurrence	0	1 (3.57%)

Table no : 1 – Results.

Discussion

The results of your study demonstrate that paraumbilical hernia is more prevalent in females compared to males (Fig no : 9). This finding aligns with previous studies that have reported a higher incidence of paraumbilical hernia in these age groups due to factors such as multiparity, obesity, aging, and lifestyle habits such as smoking [1][2][3][4][5][7].

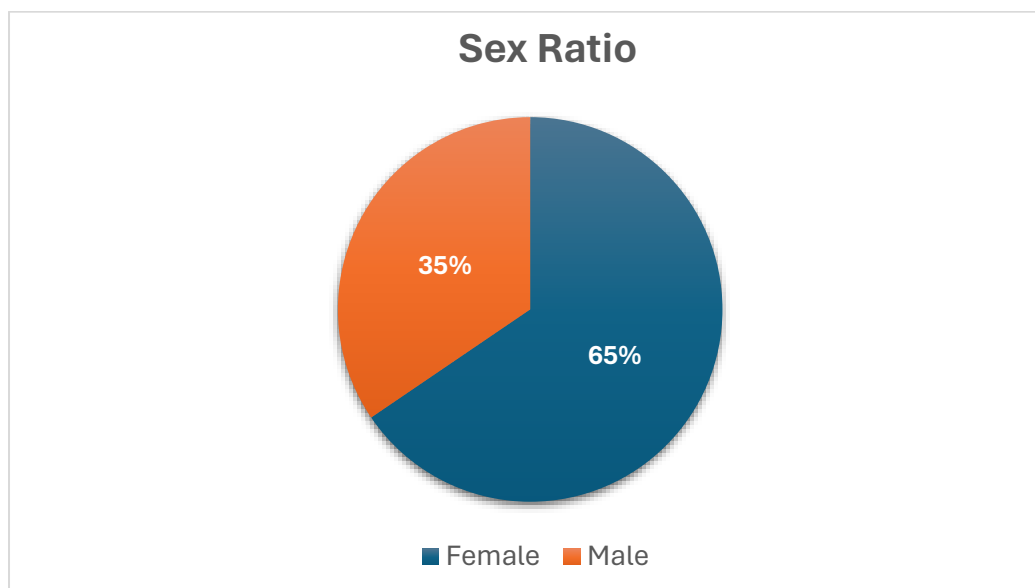


Fig no : 9 – Sex Ratio .

In your study, multiparity and obesity were observed in 87% and 34.21% of female patients, respectively. These factors can weaken the abdominal muscles and increase intra-abdominal pressure, leading to the development of a hernia [4][5][6][7][8]. In male patients, chronic smoking and COPD were observed in 60% and 40% of patients, respectively, which can impair collagen synthesis and wound healing, increasing the risk of hernia development [2][5][8].

Regarding the surgical repair methods, the study found no significant difference in defect size between the Mayo's repair and mesh repair groups. However, the average defect size treated with mesh repair was slightly larger than that treated with Mayo's repair (4.88 ± 1.77 cm vs 4.08 ± 1.32 cm, respectively). This finding suggests that surgeons may choose mesh repair for larger defects, which is consistent with previous literature [5][7].

The study also reported postoperative complications such as surgical site infections (SSI) and seroma formation in both repair groups. The incidence of SSI was higher in the mesh repair group (10% vs 3.33% in the Mayo's repair group), while the incidence of seroma formation was higher in the Mayo's repair group (14.28% vs 3.33% in the mesh repair group). These findings suggest that the use of mesh in hernia repair may increase the risk of SSI, while the Mayo's repair may increase the risk of seroma formation.

The recurrence rate was higher in the Mayo's repair group (3.33% vs 0% in the mesh repair group), although this difference was not statistically significant. This finding suggests that mesh repair may be more effective in preventing recurrence, which is consistent with previous literature [5][7].

In summary, your study findings support previous literature on the risk factors and surgical management of paraumbilical hernia. The study highlights the importance of considering patient factors such as multiparity, obesity, and smoking history when selecting a surgical repair method. The study also suggests that mesh repair may be more effective in preventing recurrence but may increase the risk of SSI. The Mayo's repair, on the other hand, may increase the risk of seroma formation but may be a viable option for smaller defects.

Conclusion

In conclusion, your study provides valuable insights into the management of paraumbilical hernia with Mayo's and mesh repairs, and its findings are largely consistent with existing literature. Further research with larger sample sizes and longer follow-up durations may help to clarify the potential differences in recurrence rates between the two surgical approaches.

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