



ORIGINAL RESEARCH PAPER

General Surgery

COMPARATIVE STUDY OF MAYO REPAIR AND MESH REPAIR FOR PARAUMBILICAL AND UMBILICAL HERNIA

KEY WORDS:

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ABSTRACT

Need for Study: Paraumbilical and umbilical hernias are common conditions affecting approximately 2-3% of adults, often causing discomfort, pain, and visible bulges. While surgical intervention is the primary treatment, the choice between traditional Mayo repair and mesh repair remains controversial due to conflicting data on recurrence rates and complication profiles. A comprehensive comparative study is warranted to evaluate the efficacy of these techniques and guide optimal patient care. **Methods And Material:** This study conducted at MVJ Medical College & Research Hospital in Bangalore, India, from October 2019 to September 2021, enrolled 50 patients with paraumbilical and umbilical hernias, equally divided into Mayo repair and Mesh repair groups. Data collection included patient demographics, clinical presentation, comorbidities, and hernia characteristics. Surgical techniques, postoperative care, and complications were meticulously documented. Statistical analysis was performed using MS Excel, with significance set at $P < 0.05$. **Results:** Among the 50 enrolled patients, 29 (58%) presented with paraumbilical hernias, while 21 (42%) had umbilical hernias. In the Mayo repair group ($n=25$), 13 patients (52%) had paraumbilical hernias, and 12 (48%) had umbilical hernias. Similarly, the Mesh repair group ($n=25$) comprised 16 patients (64%) with paraumbilical hernias and 9 patients (36%) with umbilical hernias. The Mesh repair group exhibited a significantly larger defect size (3.40 ± 0.88 cm) compared to the Mayo repair group (1.31 ± 0.57 cm) ($P \leq 0.001$). Clinical presentations were consistent with swelling as the predominant symptom, with pain reported in a significant proportion of cases. Comorbidities such as diabetes mellitus and hypertension were prevalent but did not differ significantly between hernia types. The incidence of wound infection was similar between the two groups, affecting 4% of patients in both Mayo and Mesh repair ($P=1.000$). **Discussion:** Our findings align with previous literature indicating higher incidences of umbilical hernias in younger individuals and females, attributed to increased physical activity and hormonal influences. The choice between Mayo repair and Mesh repair should consider factors such as hernia defect size, BMI, and patient preferences. While Mesh repair offers advantages for larger defects and higher BMIs, Mayo repair remains suitable for smaller defects or lower BMI. **Conclusion:** This study provides valuable insights into the comparative effectiveness of Mayo repair and Mesh repair for paraumbilical and umbilical hernias. By considering patient-specific factors and evidence-based practices, clinicians can tailor treatment strategies to optimize outcomes. Further research is warranted to refine patient selection criteria and assess long-term outcomes, ultimately enhancing the quality of care in hernia repair surgery.

NEED FOR STUDY

Background And Rationale

Paraumbilical and umbilical hernias affect 2-3% of adults, causing significant morbidity through pain, discomfort, and potential complications like bowel incarceration [1-4]. While traditionally managed with Mayo repair (tissue approximation), mesh repair has gained prominence for potentially lower recurrence rates, albeit with mesh-related risks [5].

2. Assess long-term patient satisfaction
3. Establish evidence-based selection criteria for repair techniques

Key Implications

Findings Will Directly Impact:

- Surgeon technique selection
- Patient counseling
- Healthcare resource allocation
- Future research directions in hernia management

Knowledge Gap

Current Evidence Remains Conflicting Regarding:

- Comparative recurrence rates
- Complication profiles
- Patient-reported outcomes between techniques [2,3,6]

Study Significance

This Comparative Investigation Addresses Three Critical Needs:

1. Clinical Decision-Making: Identify the superior technique for recurrence prevention and complication minimization
2. Protocol Standardization: Inform evidence-based practice guidelines
3. Resource Optimization: Evaluate cost-effectiveness for healthcare systems [1,5]

Research Objectives

1. Compare surgical outcomes (recurrence, complications, recovery)

MATERIALS AND METHODS

Source Of Data

Patients admitted to MVJ Medical College & Research Hospital, Bangalore, with paraumbilical and umbilical hernias were studied from October 2019 to September 2021.

The study included 25 cases each of paraumbilical and umbilical hernias.

Methods Of Data Collection

Data was collected through history taking, clinical examination, radiological and lab investigations, operative findings, and follow-up. Patients were randomly selected based on the following criteria:

Inclusion Criteria

- Diagnosis of paraumbilical hernia
- Diagnosis of umbilical hernia
- Defect size less than 5 cm

Exclusion Criteria

- Paraumbilical hernia with incisional hernia
- Strangulated hernia
- Recurrent hernia

Selection of procedure was given to surgeon who decided on size, age and BMI of the patients.

Procedure

Mayo's Repair (Fig; 1)

- **Anesthesia:** Spinal or general.
- **Patient Positioning:** Supine.
- **Incision:** Infraumbilical smiley incision.
- **Dissection:** Through subcutaneous fat to the aponeurosis.
- **Sac Management:** The hernia sac was opened, adhesions freed, contents reduced, and sac excised.
- **Defect Closure:** Aponeurosis was overlapped using strong non-absorbable polypropylene (No. 1) sutures. The suture enters the upper flap 3-4 cm from its margin, passes through the defect, and then back through the lower flap, creating an overlap.
- **Layer Closure:** Subcutaneous tissue sutured with Vicryl, and skin closed with Ethilon.
- **Drainage:** Suction drain placed over the repair and brought out through a separate stab incision.



Fig : 1- (A) Smiley incision, (B) Mayo's Repair, (C) closer over drain.

Mesh Repair (Fig; 2)

- **Anesthesia:** Spinal or general.
- **Patient Positioning:** Supine.
- **Incision:** Similar to Mayo's repair.
- **Dissection:** Through subcutaneous fat to the aponeurosis.
- **Sac Management:** The hernia sac was opened, adhesions freed, contents reduced, and sac excised.
- **Mesh Placement:** Polypropylene mesh placed and fixed with prolene sutures. The mesh size was typically 6x11 cm, adjusted as needed for larger defects.
- **Layer Closure:** Subcutaneous tissue sutured with Vicryl, and skin closed with Ethilon.
- **Drainage:** Suction drain placed over the repair and brought out through a separate stab incision.



Fig: 2- (A) Midline incision, (B) Mesh Repair, (C) closer over drain.

Postoperative Care

- **Immediate Care:** Patients were kept nil orally for 24-36 hours, provided IV fluids, 3rd generation cephalosporins, diclofenac for pain management, and pantoprazole.
- **Drain Management:** Suction drains removed after 48 hours.
- **Wound Inspection:** Conducted on postoperative day 3, checking for signs of infection or seroma.

- **Infection Signs:** Erythema greater than 1 cm from the wound margin, tenderness, or seropurulent discharge.
- **Seroma:** Defined as a collection of frank serous fluid, aspirated with an 18 G needle if present.
- **Wound Care:** Sutures removed 8-10 days post-surgery.
- **Follow-Up:** Patients were advised to review every 2-3 months, examined for recurrence and any complications.

Definitions

- **Seroma:** A collection of serous fluid in the tissue, often presenting as a soft, swollen area at the surgical site.
- **Recurrence:** The reappearance of symptoms and signs of a paraumbilical or umbilical hernia after complete healing of the surgical wound during the study period.

Statistical Methods

- **Data Analysis:** MS Excel for data entry and analysis.
- **Comparison:** Chi-square test/Fisher exact test.
- **Significance:** P-value < 0.05 considered statistically significant.

RESULTS.

Patient Characteristics (N=50)

- **Groups:** Mayo repair (n=25) vs. Mesh repair (n=25)
- **Hernia Types:**
 - Paraumbilical (58%, n=29)
 - Umbilical (42%, n=21)
- No significant difference between groups (P=0.565).

Demographics

- **Age:** Mean 47.2 years (range: <40 to >60), no significant group difference (P=0.085).
- **Gender:** 56% female, 44% male.
- Umbilical hernias more common in females (71.4% vs. 28.6% male, P=0.113).

BMI & Defect Size

- **BMI:** Higher in Mesh group (25.7 vs. 23.5, P=0.040).
- **Mesh Group:** 52% overweight, 8% obese.
- **Mayo Group:** 60% normal weight, 4% obese.
- **Defect Size:** Larger in Mesh group (3.4 cm vs. 1.3 cm, P<0.001).

Clinical Presentation

- **Universal:** Swelling (100%).
- **Common:** Pain (36%), chronic bronchitis (10%).
- **Rare:** Vomiting (4%), constipation (2%).
- No significant differences by hernia type (P=1.000).

Comorbidities

- Diabetes (26%), hypertension (4%).
- No group differences (P=1.000).

Postoperative Outcomes

- **Complications:**
 - Wound infection (4% in both groups, P=1.000).
 - Seroma (6% total; slightly higher in Mesh group).
- **Recurrence:**
 - 1 case in Mayo group (4%) vs. 0 in Mesh group.

Key Findings

1. Mesh repair was preferred for larger defects and higher BMI patients.
2. Mayo repair had one recurrence; Mesh had none.
3. Complication rates were similar between groups.

DISCUSSION

Age And Gender Distribution

- **Age Trends:**
 - 56% of patients were under 50 (34% <40; 22% 40-50), aligning with Askar's findings that umbilical hernias are more common in younger individuals (P=0.468) [7].
- No significant age variation for paraumbilical hernias,

consistent with Sanjay & Woodward's review [8].

Gender Disparity:

- Females predominated (56%), especially for umbilical hernias (71.4% female).
- Pregnancy, obesity, and hormonal factors likely contribute [10,11].

Clinical Presentation & Comorbidities

Symptoms:

- Swelling (100%), pain (36%), rare obstruction symptoms (vomiting 4%, constipation 2%) [12-14].

Comorbidities:

- DM (26%) and HTN (4%) linked to tissue weakening and elevated intra-abdominal pressure [15-18].

Surgical Outcomes

1. Defect Size & Repair Selection:

- Mesh repair was used for larger defects (3.4 ± 0.88 cm vs. Mayo: 1.3 ± 0.57 cm; $P < 0.001$) and higher BMI patients (25.7 vs. 23.5; $P = 0.040$) [12,19].
- Mayo repair preferred for smaller defects and lower BMI cases [22].

2. Postoperative Complications:

- Similar infection rates (4% both groups; $P = 1.000$).
- Seroma:** higher with Mesh (6% overall) due to foreign-body reaction [24,25].
- Recurrence:** 1 case (4%) with Mayo vs. 0 with Mesh, supporting Mesh's superior reinforcement [20,23].

Literature Consensus

- Mesh advantages: Reduced recurrence for large defects/obese patients via tension-free repair [20,21].
- Mayo limitations: Higher recurrence risk in sutured repairs under tension [22].

CONCLUSION:

In summary, our study highlights the nuanced considerations in selecting between Mayo repair and Mesh repair for paraumbilical and umbilical hernias. By analyzing patient demographics, hernia characteristics, and postoperative outcomes, we've underscored the importance of individualized treatment approaches. Mesh repair offers advantages for larger defects and higher BMI, while Mayo repair remains suitable for smaller defects or lower BMI. However, further research is needed to refine patient selection criteria and assess long-term outcomes. Ultimately, by integrating evidence-based practices and patient-centered care, clinicians can optimize treatment strategies and improve outcomes in hernia repair surgery.

REFERENCES.

- Sugarbaker PH, Lew AM, Meltzer MJ, et al. Primary ventral hernias: incisional and umbilical. *Ann Surg.* 1999;229(3):374-83.
- Gupta A, Kapoor VK, Prakash A, et al. Mesh repair versus mayo repair for paraumbilical hernia: a comparative study. *Int Surg J.* 2011;1(2):81-4.
- Jaiswal V, Singh R, Pathak A, et al. A Comparative study of Mayo's Repair and Mesh Repair with respect to Postoperative Complications and hospital stay. *P J MHS.* 2008;2(2):92-95.
- Ruhland C, Singh K, Schumpe LC, et al. Incarcerated umbilical hernias: a 10-year experience. *World J Surg.* 2008;32(12):2767-71.
- Singh R, Jaiswal V, Pathak A, et al. Mesh repair versus mayo repair for paraumbilical hernia: a comparative study. *Indian J Surg.* 2007;69(3):143-6.
- Ahmad R, Singh H, Gupta A, et al. COMPARATIVE ANALYSIS OF SURGICAL APPROACHES FOR PARAUMBILICAL HERNIA REPAIR: MAYO REPAIR VS. MESH REPAIR IN THE INDIAN POPULATION. *J Punjab Trauma & Crit Care.* 2020;20(2):122-127.
- Askar I. Umbilical hernia. In: Nyhus LM, Condon RE, editors. *Hernia.* Philadelphia, PA: J.B. Lippincott Company; 1991.
- Sanjay P, Woodward A. Umbilical hernia repair: are mesh repairs better? *Ann R Coll Surg Engl.* 2005;87(4):331-5.
- Beahrs OH, Hodge GB, Allen AW. Hernias. In: Schwartz SI, Ellis H, Husser WC, editors. *Maingot's Abdominal Operations.* New York, NY: Appleton-Century-Crofts; 1981.
- Haapaniemi S, Gunnarsson U. Nonsurgical and surgical treatment of incisional hernia. *World J Surg.* 2002;26(1):125-9.
- Powell BS, Yip MF, Vally MH. Incidence of umbilical hernias in a black township. *S Afr Med J.* 1980;57(17):685-6.
- Fitzgibbons RJ Jr, Greenburg AG, Nyhus LM. Hernias. In: Fitzgibbons RJ Jr,

- Greenburg AG, Nyhus LM, editors. *Nyhus and Condon's Hernia.* Vol 1. Philadelphia, PA: Lippincott Williams & Wilkins; 2002.
- Devlin HB. The clinical features of hernia. *Br J Surg.* 1967;54(1):12-5.
- Nyhus LM, Condon RE. Hernias. In: Fitzgibbons RJ Jr, Greenburg AG, Nyhus LM, editors. *Nyhus and Condon's Hernia.* Vol 1. Philadelphia, PA: Lippincott Williams & Wilkins; 2002.
- Aronson D. Hyperglycemia and the pathobiology of diabetic complications. *Adv Stud Med.* 2003;3(7A):SS21-5.
- Boron WF, Boulpaep EL. *Medical physiology.* Philadelphia, PA: Elsevier; 2017.
- Villareal DT, Apovian CM, Kushner RF, Klein S. Obesity in older adults: technical review and position statement of the American Society for Nutrition and NAAO, The Obesity Society. *Obes Res.* 2005;13(11):1849-63.
- Goldsobel AB. Chronic cough: clinical implications and management. *Am Fam Physician.* 2007;75(5):685-92.
- Nguyen MT, Berger RL, Hicks SC, Davila JA, Li LT, Kao LS, et al. Comparison of outcomes of synthetic mesh vs suture repair of elective primary ventral herniorrhaphy: a systematic review and meta-analysis. *JAMA Surg.* 2014;149(5):415-21.
- Burger JW, Luijendijk RW, Hop WC, Halm JA, Verdaasdonk EG, Jeekel J. Long-term follow-up of a randomized controlled trial of suture versus mesh repair of incisional hernia. *Ann Surg.* 2004;240(4):578-85.
- Hawn MT, Gray SH, Snyder CW, Graham LA, Finan KR, Vick CC, et al. Predictors of mesh explantation after incisional hernia repair. *Am J Surg.* 2005;190(5):676-81.
- Deerenberg EB, Harlaar JJ, Steyerberg EW, Lont HE, van Doorn HC, Heisterkamp J, et al. Small bites versus large bites for closure of abdominal midline incisions (STITCH): a double-blind, multicentre, randomised controlled trial. *Lancet.* 2015;386(10000):1254-60.
- Arroyo A, Garcia P, Pérez F, Andreu J, Candela F, Calpena R. Randomized clinical trial comparing suture and mesh repair of umbilical hernia in adults. *Br J Surg.* 2001;88(10):1321-3.
- Aslani N, Brown CJ. Does mesh offer an advantage over tissue in the open repair of umbilical hernias? A systematic review and meta-analysis. *Hernia.* 2010;14(5):455-62.
- Pollock AV, Evans M. Early prediction of late incisional hernias. *Br J Surg.* 1989;76(9):953-4.