

A comparative study of onlay and pre-peritoneal open mesh repair in the management of umbilical hernia in adults

¹Dr. Sreekaraswamy R, ²Dr. HC Chaluvanarayana, ³Dr. Sujay C, ⁴Dr. Varun Byrappa

¹Assistant Professor, Department of General Surgery, Sri Siddaganga Medical College & Research Center, Tumkur, Karnataka, India

²Associate Professor, Department of General Surgery, Sapthagiri Medical College and Research Institute, Hesaragatta, Bengaluru, Karnataka, India

³Department of General Surgery, Chikkaballapura Institute of Medical Sciences, Karnataka, India

⁴Associate Professor, Department of Emergency Medicine, Kempegowda Institute of Medical Sciences, Bengaluru, Karnataka, India

Corresponding Author:

Dr. Varun Byrappa

Abstract

Introduction: Umbilical hernias in adults are commonly acquired hernias. These are more common in women, and in conditions like pregnancy, ascites, obesity etc. More than 1 million hernia surgeries are done annually in India. Suture repair techniques have dominated ventral and incisional hernia repair over a century. The most popular of these techniques was the Mayo duplication. In larger hernias, suture repair requires the application of tension to the fascia in order to close the orifice.

Objectives of the study: To evaluate the outcome of onlay and pre-peritoneal open mesh repair in umbilical hernias in adults regarding operative time, ease of procedure, hospital stay, complications and recurrence if any.

Methods

Source: Patients diagnosed with umbilical hernia in surgery department at A Tertiary hospital from November 2019 to October 2020 with a follow up for 1 year.

Methodology: After admission, patients fulfilling the inclusion & exclusion criteria were taken into study after obtaining written informed consent. 50 cases were divided into two groups for onlay and pre-peritoneal mesh repair. Intra operative study was done regarding operative time, ease of procedure and operative complications. Follow up was done to note the complications and recurrence for 12 months.

Results: The mean operative time was 40.6 minutes in onlay group and 63.4 minutes in pre-peritoneal group showing statistical significance. The onlay group had 22.9% and 21% of seroma formation and wound infection respectively, while the pre peritoneal group had 3.3% seroma formation and 3.3% wound infection showing statistical significance.

Conclusion: The study found that onlay repair had more complication rates like seroma and wound infection compared to pre-peritoneal mesh repair. Even though time taken for onlay repair was less, increased complications limit its use.

Keywords: Mesh repair, onlay, pre-peritoneal, seroma, wound, recurrence

Introduction

Umbilical hernia is a rather common surgical problem. Approximately 10% of all primary hernias comprise umbilical and epigastric hernias. Approximately 175,000 umbilical hernia repairs are annually performed in the US. It has been reported that the share of umbilical and paraumbilical hernia repairs among all repairs for abdominal wall hernias increased from 5% to 14% in UK in the last 25 years. A similar rise has been reported in a recent multicenter study from Turkey. In general, umbilical hernias are more common in women than men; however, there are series in which male patients are more frequent. Typically, a lump is observed around the umbilicus. Pain is the most common indication to visit a physician and undergo a repair. Recurrence may develop even in cases where a prosthetic mesh is used. Recurrent umbilical hernias often tend to enlarge faster than primary ones and may behave as incisional hernias. An umbilical hernia has a tendency to be associated with high morbidity and mortality in comparison with inguinal hernia because of the higher risk of incarceration and strangulation that require an emergency repair. Although the number of articles with the title word “umbilical hernia” increased 2.6-fold between the periods 1991-2000 and 2001-2010, there still appears to be a certain discrepancy between its importance and the attention it has received in the literature. In this paper, the nature of the umbilical hernias is reviewed, and the current options for their surgical repair are discussed. An umbilical hernia looks like a lump in the navel. It might become more obvious when the infant is laughing, crying, going to the toilet, or coughing. When the child is lying down or relaxed, the lump may shrink or go away completely.

The symptoms of an umbilical hernia will vary among cases. Regardless of the size of the hernia, if the abdominal wall constricts around it, this can cut off circulation to the protrusion, causing pain. The pain can range from mild to severe.

A person should visit a doctor if the bulge

- Becomes painful.
- Occurs alongside vomiting.
- Swells up and becomes discoloured.
- Does not decrease when lying down or under light pressure.

Initially, the repair of umbilical hernias was done with primary closure. Repair of the defect with mesh has substantially improved long term outcomes and is now accepted as the method of care. However, there is a great debate on the plane of mesh placement. Various studies have reported a range of complications like seromas, infections, mesh erosions etc. based on the plane of mesh placement.

Materials and Methods

Patients diagnosed with umbilical hernia in surgery department at Tertiary hospital from November 2019 to October 2020 with a follow up for 1 year.

Inclusion criteria

- Patients 18 years and above.
- Patients presenting with umbilical hernia.

Exclusion criteria

- Recurrent hernias.
- Patients not giving consent for the study.
- Patients less than 18 years.
- Divarication of recti.
- Patients medically not fit for surgery due to various co-morbidities.

Results

Table 1: Distribution of sex between study groups

Gender	Number of PTS	%
Male	20	40
Female	30	60
Total	100	100

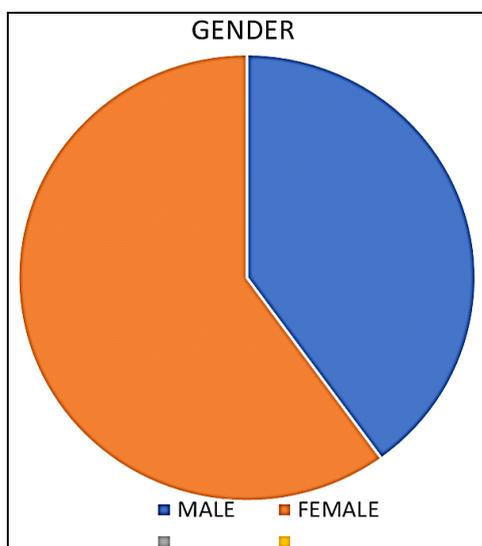


Fig 1

Table 2: Distribution of age between study groups

Age in years	Number	Percentage
<20	1	2%
21-30	5	10%
31-40	19	38%
41-50	19	38%
51-60	3	6%
>60	3	6%
Total	50	100%

Table 3: A classification of current repair techniques for umbilical hernias

A. Prosthetic repairs
1. Open approach
a. Onlay mesh
b. Sublay/Preperitoneal mesh
c. Mesh plug
d. Bilayer prosthetic devices

2. Laparoscopic approach
a. Inlay mesh
b. Defect closure and mesh placement
B. Tissue-Suture repairs
1. Primary suture
2. Mayo repair

Discussion

There are mainly two repair options for umbilical hernias: suture and mesh. Simple primary suture repair can be used for small defects (<2-3 cm). The technique of overlapping abdominal wall fascia in a “vest-over-pants” manner was described by William Mayo and remained the most renowned surgical technique for a long time. There are few clinical studies with Mayo technique in the literature. High recurrence rates up to 28% have been reported.

Prosthetic materials are widely used today in the repair of all kind of abdominal hernias. Arroyo *et al*'s randomized clinical trial revealed that the recurrence rate was lower after mesh repair than that after suture repair (1% vs. 11%) in a 64-month mean postoperative follow-up. In a retrospective clinical series of 100 patients, the recurrence rates for the suture and mesh repair groups were 11.5 and 0%, respectively (p=0.007), with similar results in the infection rates in favor of mesh repair. A systematic review and meta-analysis by Aslani and Brown revealed that the use of mesh in umbilical hernia repair results in decreased recurrence and similar wound complication rates compared with tissue repair for primary umbilical hernias. However, many surgeons still make his/her decision on the basis of the size of the umbilical/paraumbilical defect. Dalenbäck suggested a tailored repair and stated that suture-based methods for defects <2 cm can provide acceptable recurrence rates (6%) in long-term follow-up. A postal questionnaire study from Scotland revealed that surgeons preferred mesh repair for defects >5 cm, whereas similar recurrence rates for suture and mesh repairs were obtained for defects <2 cm.

Meshes can be placed via both the open and laparoscopic approaches. Surgeons in general prefer the most familiar technique or comply with the patients' preferences. Open onlay mesh placement is the easiest technique; however, it requires subcutaneous dissection that may cause seroma or hematoma and eventually result in surgical site infection in some cases. Mesh can also be placed in a preperitoneal or sublay position. This may require more surgical experience and skill but avoids extensive subcutaneous dissection and reduces seroma formation and possibly result in less recurrence. Onlay and sublay mesh placement can be done at the same time in complicated or recurrent cases to provide more reinforced repair. Some authors prefer leaving fascial margins without approximation; however, suture closure before onlay mesh or after preperitoneal mesh is recommended. Small hernias less than 2.5 cm in diameter are often successfully closed with primary tissue repairs. However, larger ones have a recurrence rate of up to 30-40% when a tissue repair alone is performed.

Repair of ventral hernias with mesh as opposed to suture has substantially improved long-term outcomes and is accepted as the standard of care. However, many studies demonstrate an increased risk for wound complications with mesh placements including infections, seromas and mesh erosions. The risks involved depends on the plane of mesh placement. While mesh repair of umbilical hernia is considered standard, there is no consensus on the best location to place the mesh.

This study compares two types of mesh repairs- onlay and pre-peritoneal in terms of duration of surgery, ease of procedure, post-operative complications like seroma, wound infection, mesh infection, chronic pain, enterotomy and recurrence. 50 patients with umbilical hernia admitted to a tertiary hospital from November 2019 to October 2020 with a follow up for 1 year were taken into our study. 25 underwent onlay mesh repair, 25 pre-peritoneal mesh

repair. The results were analyzed.

Conclusion

Seroma formation and infection are found to be more commonly associated with onlay mesh repair compared to pre-peritoneal mesh repair. In the patients presenting with umbilical hernia it is important to recognize the associated risk factors like diabetes, obesity, parity in order to carefully plan the type of repair either pre-peritoneal or onlay repair to prevent the complications like seroma formation, wound infection, chronic pain and the recurrence. Although time taken for surgery in onlay mesh repair is significantly less compared to pre-peritoneal mesh repair, complications associated with it limits its wider usage. Mesh repairs are superior to non-mesh/tissue-suture repairs in umbilical hernia repairs. Open and laparoscopic techniques have almost similar efficacy. Local anesthesia is suitable for small umbilical hernias and patients with reasonable BMI. Antibiotic prophylaxis appears to provide low wound infection rate. Considering the burden of surgeries especially in third world countries with limited number of surgeons, it could provide valuable alternative over pre-peritoneal repair. Ease of the procedure in performing onlay mesh repair over pre-peritoneal repair gives it the points over pre-peritoneal but associated complications limits its use. Finally to conclude “Pre-peritoneal mesh repair is superior to onlay mesh repair”.

References

1. Dalenbäck J, Andersson C, Ribokas D, Rimbäck G. Long-term follow-up after elective adult umbilical hernia repair: low recurrence rates also after non-mesh repairs. *Hernia*. 2013;17:493-497. <http://dx.doi.org/10.1007/s10029-012-0988-0>.
2. Witherspoon P, O'Dwyer PJ. Surgeon perspectives on options for ventral abdominal wall hernia repair: results of a postal questionnaire. *Hernia*. 2005;9:259-262. <http://dx.doi.org/10.1007/s10029-005-0331-0>.
3. Sinha SN, Keith T. Mesh plug repair for paraumbilical hernia. *Surgeon*. 2004;2:99-102. [http://dx.doi.org/10.1016/S1479-666X\(04\)80052-0](http://dx.doi.org/10.1016/S1479-666X(04)80052-0).
4. Brancato G, Privitera A, Gandolfo L, Donati M, Caglià P. Plug-technique for umbilical hernia repair in the adult. *Minerva Chir*. 2002;57:13-16.
5. Costa D, Tomás A, Lacueva J, de Asís Pérez F, Oliver I, Arroyo A, *et al*. Late enterocutaneous fistula as a complication after umbilical hernioplasty. *Hernia*. 2004;8:271-272. <http://dx.doi.org/10.1007/s10029-004-0205-x>.
6. Franklin ME, Dorman JP, Glass JL, Balli JE, Gonzalez JJ. Laparoscopic ventral and incisional hernia repair. *Surg. Laparosc Endosc*. 1998;8:294-299. <http://dx.doi.org/10.1097/00019509-199808000-00012>.
7. Nguyen NT, Lee SL, Mayer KL, Furdui GL, Ho HS. Laparoscopic umbilical herniorrhaphy. *J Laparoendosc Adv. Surg. Tech A*. 2000;10:151-153. <http://dx.doi.org/10.1089/lap.2000.10.151>.
8. Roberts KE, Panait L, Duffy AJ, Bell RL. Single-port laparoscopic umbilical hernia repair. *Surg. Innov*. 2010;17:256-260. <http://dx.doi.org/10.1177/1553350610378514>. 29.
9. Anadol AZ, Tezel E, Yilmaz U, Kurukahvecioglu O, Ersoy E. Laparoscopic primary repair of ventral hernias: early results of a new technique. *Surg. Today*. 2010;40:88-91. <http://dx.doi.org/10.1007/s00595-008-4000-7>.
10. Banerjee A, Beck C, Narula VK, Linn J, Noria S, Zagol B, *et al*. Laparoscopic ventral hernia repair: does primary repair in addition to placement of mesh decrease recurrence? *Surg. Endosc*. 2012;26:1264-1268. <http://dx.doi.org/10.1007/s00464-011-2024-3>.