

# Open Umbilical Hernia Repair versus Laparoscopic Hernia Repair

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**Abstract:** *An umbilical Hernia can occur in both men and women. It can occur at any age although it is often present at birth. Umbilical hernias are found in about 20% of new born, especially premature infants. Umbilical hernias are more common in male than in female infants; with regard to race, they are eight times more common in African Americans than in Caucasians (or) Hispanics. In adults the female to male ratio is 3:1. The repair used depends on the size of the hernia. The repair presents challenge even for the experienced surgeon because of high incidence of morbidity and recurrence. Laparoscopic umbilical hernia repair has grown in popularity since it was first reported in the early 1990s. Low recurrence, fewer complications and shorter hospital stay have led to believe that it sets the new standard for umbilical hernia repair. With the introduction of inert prosthetic material such as PTFE and dual sided meshes the laparoscopic repairs of ventral hernias have gained more momentum.*

**Keywords:** umbilical Hernia, Laparoscopic umbilical hernia, Open umbilical hernia repair, Primary Closure, Mesh repair

## 1. Introduction

### Embryology and Anatomy of the umbilicus

Embryologically, the fascial margins of the umbilical defect are formed by the third week of foetal life when the four folds of the somatopleurae tend to fold inward. An umbilical cord is produced in the fifth week. By the tenth week of embryonic life, abdominal contents return from their location outside the coelom into the developing abdominal cavity. The vitelline duct and the allantois regress by the fifteenth to sixteenth week. If any of these processes are defective, umbilical malformations occur. At birth, the umbilical arteries and the umbilical vein are thrombosed, and the vitelline duct and the allantois have already been obliterated. The umbilical ring then scars and contracts. The obliterated umbilical vein (round ligament) is usually attached to the inferior border of the umbilical ring along with remnants of the urachus and the two obliterated umbilical arteries. The round ligament, by crossing and partially covering the umbilical ring, may protect against herniation.

An umbilical Hernia can occur in both men and women. It can occur at any age although it is often present at birth. Umbilical hernias are found in about 20% of new born, especially premature infants. Umbilical hernias are more common in male than in female infants; with regard to race, they are eight times more common in African Americans than in Caucasians (or) Hispanics. In adults the female to male ratio is 3:1.

The pathophysiology of umbilical hernia in adults is disputed. It is generally believed that these hernias do not represent persistence from childhood but arise de novo in adult life. A retrospective review of adults with umbilical hernias found that only 10.9% recalled having hernias from childhood. In a separate series of 71 women and 82 men, it was noted that only two women had recurrence of their infantile umbilical hernias and this occurred during pregnancy. In both cases, the hernia resolved completely after delivery. None of the men followed developed a

recurrence. While the infantile umbilical hernia is a direct hernia, umbilical hernias in adults are indirect herniations through an umbilical canal that is bordered by umbilical fascia posteriorly, the linea alba anteriorly, and the medial edges of the two rectus sheaths on each side. Therefore, these hernias tend to incarcerate and strangulate, and do not resolve spontaneously. Askar suggests that they are really paraumbilical hernias that occur just above and laterally to the umbilicus. Their clinical behavior is certainly more akin to paraumbilical hernias. The incidence of incarceration of umbilical hernias in adults is 14 times than in children. In addition there is a high associated morbidity and mortality. There is a large sex difference with over 90% occurring in women, and almost all are obese and multiparous.

## 2. Aim & Objective

To study the outcome of

- 1) Open repair and Laparoscopic repair for umbilical hernias – a comparative study.
- 2) Primary closure versus mesh repair.

## 3. Methods

This is a prospective type of comparative study conducted who underwent open anatomical and mesh repair and laparoscopic anatomical and mesh repair methods of umbilical Hernia repair. The patients included in this study were randomly selected from those who underwent open anatomical and mesh repair and laparoscopic anatomical and mesh repair including elective and emergency procedures for complications. The relevant data of patients included in the study were collected recorded as follows, Name, age, sex, occupation, Nutritional Status, present history, size of defect, complications, Post operative period and complications were noted.

### Materials used

#### Open Repair

Anatomical repair: No '1' prolene

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No "1" Ethilon

**Mesh Repair:** Poly propylene mesh

**Laparoscopic Repair**

Anatomical repair - No "1" Prolene , No "1" Ethilon

Mesh Repair - ePTEE mesh

Poly tetra fluoro ethylene mesh

**Case Selection**

Type of Repair Defect Size

Laprosopic repair < 3cm & 3cm

Open Repair > 3cm

Types of umbilical Hernia Repair

**Conventional Repairs**

Mayo's Repair Primary closure

Prosthetic mesh Repair

Onlay mesh Repairs

Underlay mesh Repairs (River's stoppa wahtz)

Inlay mesh repairs (Intraperitoneal river type repair)

**Laprosopic repairs**

Primary closure

[Shoe lace technique]

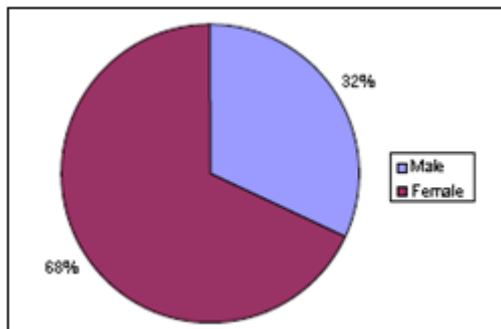
Prosthetic mesh repairs

Intraperitoneal onlay mesh repair with defect closure.

**4. Results**

**Table 1:** Sex distribution of the cases

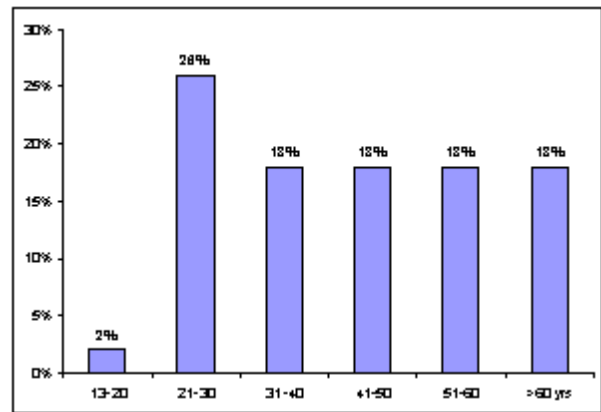
Gender	No of patients	Percentage
Male	16	32%
Female	34	68%



**Table 2:** Age wise distribution of the cases

Age in years	No. of patients	Percentage
13-20	1	2%
21-30	13	26%
31-40	9	18%
41-50	9	18%
51-60	9	18%
>60 yrs	9	18%
Total	50	100%

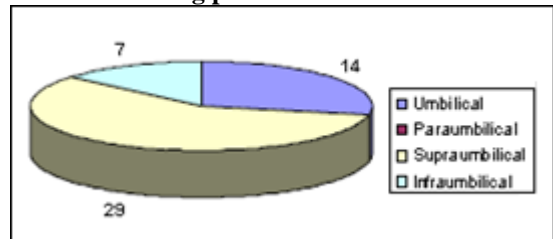
**Age distribution of patients**



**Table 3:** Type of hernia among patients

Umbilical	14
Paraumbilical	
Supraumbilical	29
Infraumbilical	7
<b>Total</b>	<b>50</b>

**Type of hernia among patients**



**Table 4:** Post operative complications

Complications	Open repair		Laprosopic repair	
	Anatomical	Mesh	Anatomical	Mesh
Wound infection	1	5	Nil	Nil
Seroma formation	1	1	1	Nil
Pain	1	2	Nil	Nil
Recurrence	2	Nil	1	Nil

**Post operative complication rate in GRH among 50 pts.**

Method	Recurrence %	Other complications %
Open repair		
a. Anatomical repair [11]	18%	27%
b. Mesh repair [18]	Nil	44%
Laprosopic repair		
a. Anatomical repair [10]	10%	10%
b. Mesh repair [10]	Nil	Nil

**Table 5**

Availability of facilities and expertise	Open repair	Lap. Repair
	More number	Less number
Effectivity	Equal	Equal
Feasible	Equal	Equal
Safe	Equal	Equal
No. of hospital stay days	More	Less
Postoperative complication	More	Less
Cosmetic & functional results	Good	Excellent
Cost effectiveness	More	Less

**5. Discussion**

In our study we selected 50 patients.30 of them subjected to open repairs. Among them 11 of them underwent anatomical

repair and 18 of them underwent open mesh repair. 20 patients were selected for laproscopic repair. 10 of them underwent primary closure. 10 of them underwent primary closure with mesh repair. The laproscopic approach to umbilical hernia has shown to be safe and effective. The benefits of laparoscopy includes;

- Reduction in postoperative pain no cases complained of pain to
- 3 cases in open repair.
- Shorter length of stay 3 days compared to 9 - 14 days.
- Seroma formation one case compared to 2 cases.
- Wound infection no cases compared to 6 cases.
- Decreased morbidity due to early bowel movements.
- Improvements in recurrence rates 10% as compared to 18% with the open procedure.
- The comesis is good.

Voeller et al. presented 407 laproscopic ventral/incision Repairs The patients were large, with a mean body mass index of 32 kg<sup>2</sup>, and 90% had previous abdominal surgery, with 136 of the hernias being recurrent. The average hernia size was 100 cm'. Length of stay was short, with few serious complications and no mortality. The mean follow-up has been approximately 2 years, with a range of up to 5 years. There were six bowel injuries and four mesh infections. The 14 recurrences (3.4%) compares favorably to the 10% to 36% described in the literature for open ventral/incisional hernia repair. The majority of recurrences were from mesh removal due to infection.

The laproscopic technique described above has been used to repair lumbar hernias as well as parastomal hernias as described via an incision by Sugar baker. The high coronary artery bypass graft ("CABG") epigastric hernia and the low juxtapubic bone hernia can present many challenging aspects laproscopically. The mesh in the low hernia must be sutured to Cooper's ligament, and in the high epigastric hernia sutured to any available tissues around the sternum and ribs. The author has laproscopically reoperated upon several patients who have had a prior laproscopic ventral/incisional hernia repair and found any adhesions to be filmy and readily taken down when PTFE mesh, especially the dual-sided mesh from W. L. Gore, is used. There is a "pseudoperitoneum" covering the mesh, and if one dissects between this and the mesh the adhesions are quickly lysed much more readily than the dense adhesions seen with polypropylene mesh. Thus, laproscopic repair of ventral/incisional hernias now appears to be a very safe technique that can give a very low recurrence rate. It is absolutely essential that suture fixation of the prosthesis be a part of the procedure to continue to yield low recurrence rates. A long-term follow-up will certainly be necessary to further evaluate the procedure.

**Complications**

	No	Percent
Prolonged ileus	9	2.21
Seroma (>6 wk)	8	1.97
Suture pain (>8 wk)	8	1.97
Intestinal injury	6	1.47
Mesh cellulitis	5	1.23
Haematoma/bleeding	4	0.98

Trocar cellulitis	3	0.75
Urinary retention	3	0.75
Fever of unknown origin	3	0.75
Respiratory distress	2	0.49
Intraabdominal abscess	1	0.25
Trocar site hernia	1	0.25

In one of the largest series of laproscopic hernia repairs, Heinfeld et al has reported a low rate of conversion, Shorter hospital stay and low risk for recurrence. In an analysis of 850 patients who underwent laproscopic ventral including umbilical hernia repairs over 9 years the following results were published: Mean operating time was 120 min, mean estimated blood loss was 49 and hospital stay averaged 2-3 days. There were 128 complications in 112 patients (13.2%). The most common complications were ileus (3%) and prolonged seroma 2.6%. During a mean follow up time of 20.2 months the hernia recurrence rate was 4.7%. The recurrence was found in larger hernias, longer operating times, previous hernia repairs and higher complication rates. Patients who were morbidly obese (BMI >40), also had recurrences. A series of comparative trials have shown persistent benefits in terms of shorter hospital stay, decreased infection and recurrence rates compared to open repairs. In review of comparison of lap and open ventral hernia studies reported higher complication rates and longer hospital stay in the open group. The conclusion from these studies was that laproscopic hernia is as effective and safe as open mesh repair in terms of recurrence.

**Causes of recurrence**

- Transfascial sutures not employed
- Use of smaller sized meshes
- Ineffective anchoring of mesh
- Steep learning curve
- Size of the defect
- Obesity
- Diabetes mellitus
- Chronic cough
- Multiparity are considered as risk factors for recurrence.

In a study by Hesselink et al hernias smaller than 4 cm, had a significantly lower recurrence rate 25% than larger hernias 41%. Careful dissection, minimal bowel handling, proper fixation with either sutures (or) anchors and selection of ideal cases will reduce rates considerably.

**6. Conclusion**

Laproscopic mesh repair produce low recurrence rate with less morbidity. The evidence available at present suggests that laproscopic repair is feasible, safe although experience with the new meshes is still limited and less cost effective. With the existing data, it will be prudent to recommend laproscopic repair as the first line treatment for umbilical hernia where the facilities and expertise are available, where it is not, open mesh repair remains a suitable alternative. As laproscopic skills improve, it is likely that laproscopic repair will be more widely performed in future.

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