



ORIGINAL RESEARCH PAPER

General Surgery

COMPARATIVE STUDY OF UMBILICAL HERNIORRHAPHY BY OPEN (MAYOS REPAIR) AND LAPAROSCOPIC METHOD FOR SMALL UMBILICAL HERNIAS

KEY WORDS:

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ABSTRACT

Background : A protrusion of innermost lining of the coelomic cavity through a defect in the abdominal wall with or without the contents of the abdominal cavity is known as an abdominal hernia¹. Abdominal wall hernias can be groin hernias or ventral hernias. Based on the location of the hernia, primary ventral hernias are classified as midline hernias (epigastric and umbilical) and lateral hernias (spigelian and lumbar). There are many repairs for ventral hernias; among them, "laparoscopic umbilical repair" and open umbilical repairs" techniques are the most commonly applied techniques for umbilical hernias repair. The present study was undertaken to compare the "advantages" and "disadvantages" of herniorrhaphy in cases of ventral hernias using a open versus laparoscopic approach. **Aims And Objectives :** **Aim:** To study and compare laparoscopic umbilical herniorrhaphy versus open umbilical mayos repair techniques in patients for small umbilical hernias. **Objectives:** To compare laparoscopic umbilical herniorrhaphy versus open mayos hernia repair in ventral hernias (umbilical hernias) with respect to: 1. Time taken during surgery for both techniques for hernia repair 2. Post-operative pain 3. Post-operative infections 4. Hospital stay 5. Any recurrences within 6 months. **Methodology :** The study was prospective interventional clinical study conducted in Department of General Surgery at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Hospital. A total of 100 patients diagnosed as ventral hernia were enrolled in the study. 50 patients are operated by laparoscopic umbilical herniorrhaphy repair and another 50 patients are operated by open umbilical mayos repair approach. The patients are followed for 6 months for any recurrence. **Inclusion Criteria:** 1. Patients admitted and diagnosed clinically as a case of ventral hernia in the department of General Surgery of Dr. Pinnamaneni Siddhartha institute of medical sciences and Research foundation, Hospital, Chinaoutpalli, Andhra Pradesh. 2. Patients between age group of 18-85 years. 3. Both male and female patients 4. ASA class I (normal healthy patient) and class II (patient with mild systemic disease) patients. 5. Defect size <3cms. **Exclusion Criteria:** 1. Patients of age less than 18 years and more than 85 years 2. Patients who are not willing to give informed consent. 3. Patients with ventral hernia in pregnancy 4. Obstructed/Strangulated hernias which were operated in emergency. 5. ASA class III (patient with severe systemic disease that is not life-threatening) and IV (patient with severe systemic disease that is a constant threat to life of patients) 17. **Conclusion:** Our study favors the use of laparoscopic umbilical herniorrhaphy repair of ventral hernia of small defect with less hospital stay, low duration of surgery, less rate of complications and low recurrence rate.

INTRODUCTION

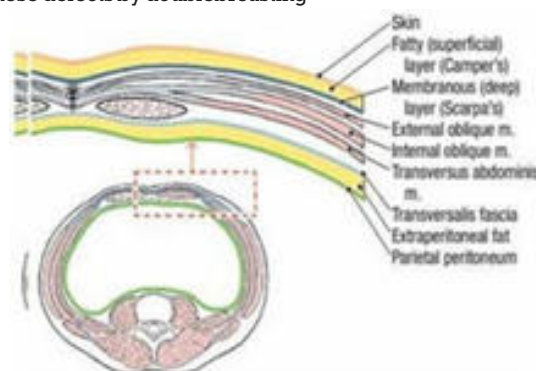
Protrusion of the innermost lining of the coelomic cavity through a defect in the abdominal wall with or without the contents of the abdominal cavities known as an abdominal hernia¹. The areas where the aponeurosis and fascia are not covered by the striated muscles are the sites for abdominal wall hernias i.e. umbilical area, linea alba and at the sites of previous incisions².

There are many types of repairs from which "laparoscopic umbilical herniorrhaphy", open umbilical mayos repair" techniques are one of the commonly applied techniques for ventral hernia repair. In 25 A.D Celsus described about earlier experiences of "Hippocratic" school. He wrote about the use of Truss, surgeries when pain is present, surgery in the young who are not having large protrusions and surgeries when strangulation present³.

Epigastric Hernia: The incidence varies from 1.6-3.6% of all abdominal hernias and accounts for 0.5-5% of all operated abdominal hernias. These are 2-3 times more common in men,

aged 20-50 years⁴.

Umbilical Hernia : Modern surgical treatment for the umbilical hernia was done by William. J. Mayo who repaired these defects by doublebreasting



The layers from outside to inside

Classification Of Ventral Hernias

A. Congenital –

1. Omphalocele
2. Gastroschisis
3. Congenital Umbilical hernia

B. Acquired –

1. Midline - Diastasis recti, Epigastric, Umbilical hernias; in adult, acquired, Paraumbilical
2. Median Supra vesical – anterior, posterior, lateral
3. Paramedian- Spigelian Interparietal - Preperitoneal, interstitial, superficial

C. Incisional-

1. midline,
2. paramedian,
3. transverse,
4. special operative sites (parastomal hernias)

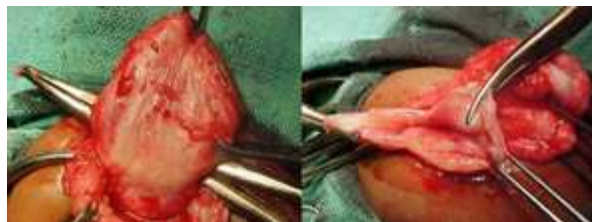
D. Traumatic

1. Penetrating
2. Blunt-focal minimal injury, moderate injury, extensive force
3. Destructive

Suture Repair- has problems in open repairs such as postoperative infection, stitch sinus, flap necrosis. But despite these complications the suture technique is still continuously used in some cases



Defect at umbilical region laparoscopic herniorrhaphy



umbilical hernia sac Anterior rectus sheath closure

Open Mayos Repair: In smaller hernias, a subumbilical incision can be used, but large hernias and incarcerated hernias, often required a large incision that may be either transverse (or) vertical. Dissection is carried around the hernia sac through the subcutaneous tissue down to the aponeurotic layer above, below and on the sides of the sac. The entire mass of skin, fat and hernia is elevated while the neck of the sac is incised because adhesions of contents are more at the fundus. After contents are reduced, excess sac excised peritoneum closed with absorbable sutures. The hernial ring is closed by a row of mattress sutures are so placed that the lower flap is drawn under the upper flap. hernia sacs with a smaller neck.

Present study was undertaken to compare “advantages” and “disadvantages” of herniorrhaphy in cases of ventral hernias using open mayos versus laparoscopic umbilical re approach.

Objectives:

1. Time taken during surgery for both techniques for hernia repair
2. Post-operative pain
3. Post-operative infections
4. Hospital stay

5. Recurrence within 6 months

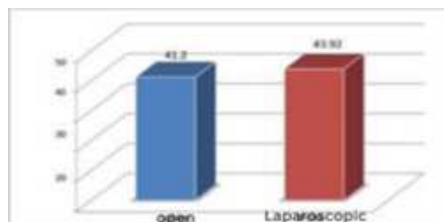
Observations And Results

Table-1: Age Distribution Between The Groups

Groups	Age in years (Mean SD)
Open mayos group	41.20±11.69
Laparoscopic group	43.92±10.39

*Unpaired t-test

There is no significant ($p > 0.05$) difference in age between the groups showing comparability of the groups in terms of age as p -value was 0.22.

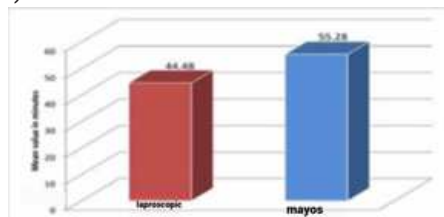


Graph:1 Age distribution between the group

Table-2: Comparison of Duration of surgery between the groups

Group	Duration of surgery in minutes mean ±Sd
laparoscopic	44.48±4.48
mayos	55.28±9.63

The duration of surgery was significantly (p value=0.001, *significant) lower among patients of laparoscopic (44.48±3.84 minutes) compared to open (55.28±9.63 minutes)



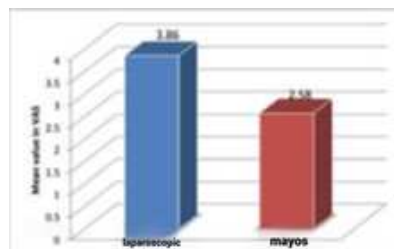
Graph-2: Comparison of Duration of surgery between the groups

Table-4: Comparison of immediate post-operative pain (VAS score) between the groups

Groups	Post-operative pain (Vas core) (Mean SD)
Mayos group	3.86±1.10
Laparoscopic group	2.58±0.70
p -value*	0.001*

*Unpaired t-test, *Significant

Visual Analogue Scale (VAS) for pain was used. In this scale 0 stands for no pain and 10 stands for unbearable pain. The immediate post-operative pain was significantly ($p = 0.001$) lower among patients of laparoscopic group (2.58±0.70) compared to open group (3.86±1.10) with usual doses of analgesics.



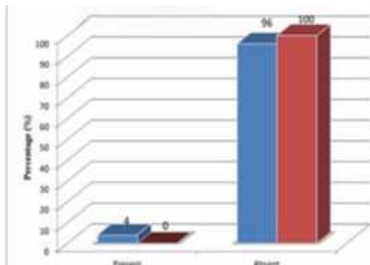
Graph-4: Comparison of immediate post-operative pain (VAS score) between the groups

Table 5 : Comparison of post-operative wound infection between the groups

Wound infection	mayos group (n=50)		lap group (n=50)		p-value [#]
	No.	%	No.	%	
Present	2	4.0	0	0.0	0.07
Absent	48	96.0	50	100.0	

[#]Chi-square test

There was no significant ($p>0.05$) difference in wound infection between the groups.


Graph 5: Comparison of post-operative wound infection between the groups

DISCUSSION

Advent of prosthetic material like “mesh” shown to be effective in postoperative recurrence^{13,12}. Sublay and IPOM are two most commonly used methods of mesh placement during ventral hernia repair. A total of 50 patients in each group are taken.

Comparative Studies:

“Ramshaw et al has done 174 open repairs and 79 laparoscopic repairs. Mean operating time for open repair is 82 minutes and for lap. Repair is 58 minutes. Length of the stay for open repair is 2.8 days and for lap. Repair 1.7 days. Post op. complication rate is 26% in open repair and 15% in lap. repair. Post operative infection rate is 3% in open repair and 0% in lap. Repair. All cases were followed upto 21 months. Recurrence rate is 21% in open repair and 3% in lap. repair

Holzman et al has done 16 open repair and 20 lap. repairs. Mean operating time is 98 minutes for open repair and 128 minutes for lap. repair. Length of stay for open repair is 5 days and for lap. repair 2 days post operative complication rate is 31% in open repair and 23% in lap. repair. Post operative infection rate is 6% for open repair and 5% for lap. repair. No seroma formation in lap repair. But in open repairs 3% of seroma formation have been reported. All patients were followed upto 19 months in open repair and 10 months in lap. “Carbajo et al had done 30 cases of open repair and 30 cases of lap. repairs. Mean operating time for open repair is 112 minutes and 87 minutes for lap. repair. Patients stayed for 9 days for open repair and 2.2 days for lap. repair post operative complication rate is 50% in open repair and 20% in lap repair. Postoperative infection rate is 3% for open repair and 0% for lap. repair. Seroma formation rate is 67% in open repair and 13% in lap repair. All patients were followed upto 27 months repair. Recurrence rate is 7% in open repair and 0% in lap. repair.

Park et al had done 49 open repair and 56 lap repair. Mean operating time is 78 minutes for open repair and 95 minutes for lap. repair. Patients stayed 6 days for open repair and 3 days for lap. repair. Post op. complication rate is 37% in open repair and 18% in lap. repair, post op infection rate is 2% and 0% in lap repair. Seroma rate is 2% in open and 4% in lap. repair. All patients were followed upto 54 months in open repair and 11% lap. repair. Carbajo et al had done 30 cases of open repair and 30 cases of lap. repairs. Mean operating time for open repair is 112 minutes and 87 minutes for lap. repair. Patients stayed for 9 days for open repair and 2.2 days for lap. repair post operative complication rate is 50% in open repair

and 20% in lap repair. Postoperative infection rate is 3% for open repair and 0% for lap. repair. Seroma formation rate is 67% in open repair and 13% in lap repair. All patients were followed upto 27 months repair. Recurrence rate is 7% in open repair and 0% in lap. repair. Park et al had done 49 open repair and 56 lap repair. Mean operating time is 78 minutes for open repair and 95 minutes for lap. repair. Patients stayed 6 days for open repair and 3 days for lap. repair. Post op. complication rate is 37% in open repair and 18% in lap. repair, post op infection rate is 2% and 0% in lap repair. Seroma rate is 2% in open and 4% in lap. repair. All patients were followed upto 54 months in open repair and 11% lap. repair.

Age Distribution:- In present study mean age of patients is 41.20 ± 11.69 years in “mayos group” and 43.92 ± 10.39 years in “laparoscopic” group. There is no significant difference in age between two groups. ($P>0.05$)

Table:8 Age Distribution

STUDY	Mean age mayos group	Mean age in lap group
“Ramshaw et al”	45.4 ± 9.8 yrs	42.3 ± 10.1 yrs
Carbajo et al”	49.46 ± 11.66 yrs	49.46 ± 11.66 yrs
Park et al”	39.13 ± 11.76 yr	39.13 ± 11.76 yrs
Presentstudy	41.20 ± 11.69 yrs	43.92 ± 10.39 yrs

Post-operative Pain: There is significant difference in post-operative pain between two groups ($p=0.001$)

Table:9: Post-operative pain (Visual Analogue Scale):

Study	mayos	laparoscopic
Ramshaw et al”	4.43 ± 0.86	2.91 ± 0.71
Carbajo et al”	5.5 ± 0.7	3 ± 0.97
“Park et al”	6.1 ± 1.97	3.5 ± 1.05
Presentstudy	3.86 ± 1.10	2.58 ± 0.70

Post- Operative Wound Infection : In the present study, ($p>0.05$) with no significant difference in wound infection between the groups.

Table:10: Wound Infection Among Patients In Post Operative Period:

Study	mayosgroup	lap group
“Ramshaw et al”	3%	0%
“Carbajo et al”	3%	0%
“Park et al”	3%	2%
Presentstudy	4%	0%

Other complications (Seroma formation): ($p>0.05$) There is no significant difference in any other complication between two groups.

Table:11: Seroma Formation Among Patients In Post Operative Period

Study	mayos group	laparoscopic group
Ramshaw et al”	3%	0%
“Carbajo et al”	67%	13%
“Park et al”	67%	13%
Presentstudy	10%	2%

Hospital Stay: In the present study ($p=0.001$) There is significant difference between two groups.

Table:12 Hospital Stay Among Patients

Study	mayos group	laparoscopic group
Ramshaw et al”	2.8 ± 1.50 days	1.6 ± 1.30 days
“Carbajo et al”	9 ± 4.2 days	2.2 ± 1.5 days
“Park et al”	6 ± 1.89 days	3 ± 1.78 days
Presentstudy	7.92 ± 1.66 days	6.02 ± 0.97 days

Duration Of Surgery

There is significant difference in duration of surgery between two groups. ($p=0.001$).

Table 13: Duration Of Surgery

STUDY	mayos group	laproscopic group
"Ramshaw et al"	82±0.72 minutes	52±0.71 minutes
"Carbajo et al"	112±9.97 minutes	87±7.25 minutes
"Park et al"	78±24.94 minutes	95±13.19 minutes
Present study	55.28±9.63 minutes	44.48±3.84 minutes

Recurrence: In the present study recurrence is observed in 2% patients of mayos and was nil in patients of laparoscopic group after six months of follow up. ($P>0.05$) There is no significant difference between two groups.

Limitations-

Are small sample size and a shorter duration of follow up. The studies with larger sample size with long duration of follow-up are required to have more robust findings.

CONCLUSION AND SUMMARY

A total of 100 patients were taken and were divided into two groups with 50 patients in each group are included in the study. The following are the conclusions of this study:

- There is no significant ($p>0.05$) difference in age, gender, diagnosis, wound infection, seroma formation in the two groups.
- The duration of surgery is much lower in laparoscopic umbilical herniorrhaphy than in open mayos group of patients.
- The immediate post-operative pain was significantly ($p=0.001$) lower among patients of laparoscopic group (2.58 ± 0.70) compared to mayos group (3.86 ± 1.10), with usual dose of analgesics.
- The hospital stay was significantly ($p=0.001$) lower among patients of laparoscopic group (6.02 ± 0.97 days) than mayos group (7.92 ± 1.66 days)

Overall

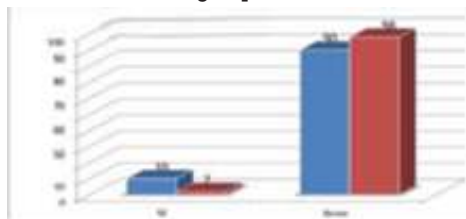
Laparoscopic umbilical herniorrhaphy repair is a better alternative to open mayos repair for repair of ventral hernias, our study favours the use of laparoscopic umbilical herniorrhaphy repair of ventral hernia as it can be used for all sites of ventral hernia, less hospital stay, less duration of surgery, there are less rate of complications and there is a low recurrence rate.

Table-6: Comparison of any other complication between the groups

Any other complication	mayos group (n=50)		Lap group (n=50)		p-value [#]
	No.	%	No.	%	
Seroma	5	10.0	1	2.0	0.09
None	45	90.0	49	98.0	

Chi-square test, Nearly significant

There was no significant ($p>0.05$) difference in any other complication between the groups.



Graph:6: Comparison of any other complication between the group

Table-7: Comparison of Hospital stay between the groups

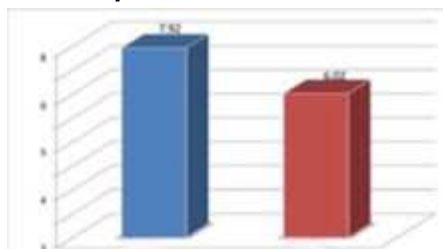
Groups	Hospital stay in days (Mean SD)
mayos group	7.92±1.66

Lap group	6.02±0.97
p-value [#]	0.001*

[#]Unpaired t-test, *Significant

The hospital stay was significantly ($p=0.001$) lower among patients of laparoscopic group (6.02 ± 0.97 days) than mayos group (7.92 ± 1.66 days)

Mean Value In Days



Graph:7: Comparison of Hospital stay between the groups

DISCUSSION

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