

# Sublay and overlay mesh repair in paraumbilical hernias– which surgery you will prefer??



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Submission: 26-12-2021

Revision: 05-03-2022

Publication: 01-04-2022

## ABSTRACT

**Background:** Paraumbilical hernia accounts for 33.9% of anterior abdominal wall hernia. Mesh can be applied onlay; on the anterior fascia, inlay; in the hernia defect, sublay; to retro-rectus or preperitoneal space or underlay; in the intraperitoneal position. **Aims and Objectives:** The objectives of the study are as follows: 1) To compare the efficacy between sublay and onlay mesh repair for paraumbilical hernia. 2) To compare the safety between sublay and onlay mesh repair for paraumbilical hernia. **Materials and Methods:** A prospective study was conducted on 120 patients (60 in each group) patients. The patients were randomly allocated in two groups by lottery method. Patients in Group-A were subjected to sublay mesh repair procedure and patients in Group-B were subjected to onlay mesh repair procedure for paraumbilical hernia repair. Postoperatively, every patient was kept under observations for 3–4 days in ward and observed for complications. Postoperatively, all patients were followed at 10 days, 3 months, and 6<sup>th</sup> month to confirm efficacy and safety of the procedure. **Results:** The average age of Group-A was 39 years and 32 years in Group-B. In Group-A, 55% patients were female and 45% patients were male; whereas in Group-B, 60% patients were female and 40% patients were male. More over sublay mesh repair was effective in 82% patients on the bases of recurrence while this procedure was safe in 90% cases on the bases of complications whereas onlay mesh repair was effective in 90% patient's cases on the bases of recurrence while this procedure was safe in 93% cases on the bases of complications. **Conclusion:** Onlay mesh repair technique is more effective, quick, and safe as compared to sublay mesh repair technique for the treatment of paraumbilical hernia.

**Key words:** Lottery method; Mesh; Onlay; Paraumbilical; Sublay

## INTRODUCTION

Paraumbilical hernia is a protrusion of the intestines or gut through a weak point of the muscles or ligaments in the linea alba near the navel, either superiorly or inferiorly. <sup>1</sup> There are different techniques of paraumbilical hernia repair. Most popular are Mayo's, onlay, sublay, and inlay mesh repair. A tension free mesh technique has drastically reduced the recurrence rates for all kinds of hernia compared to tissue repair. <sup>2</sup> The introduction of mesh repair in the modern management of paraumbilical hernia has led to fewer complications. <sup>3</sup> Mesh can be applied onlay; on the anterior fascia, inlay; in the hernia defect, sublay; to retro-rectus or preperitoneal space or underlay;

in the intra-peritoneal position. <sup>4</sup> The procedure of sublay hernia repair was first described by Renesola, Jean Rives and Wantz. <sup>5,6</sup> Underlay repair is when mesh is placed in the intraperitoneal position and secured to the anterior abdominal wall. <sup>4</sup> This study was conducted in our center to evaluate applicability of sublay mesh repair and their outcome in comparison to onlay mesh repair.

### Aims and objectives

The objectives of the study are as follows:

- 1) To compare the efficacy between sublay and onlay mesh repair for paraumbilical hernia.
- 2) To compare the safety between sublay and onlay mesh repair for paraumbilical hernia.

### Access this article online

**Website:**

<http://nepjol.info/index.php/AJMS>

**DOI:** 10.3126/ajms.v13i4.41815

**E-ISSN:** 2091-0576

**P-ISSN:** 2467-9100

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## MATERIALS AND METHODS

### Type of study

This study was a prospective study.

### Duration of study

The duration of the study was 2 years (June 2018–May 2020).

### Inclusion criteria

Age between 15 and 64 years and either gender with defect size more than 4 cm were included in the study.

### Exclusion criteria

Patients of age group below 15 years and above 64 years, hernial defect size <4 cm, recurrent hernia, obstructed/strangulated hernias on clinical examination, with debilitating diseases such as COPD and chronic liver, renal, or cardiac impairment (diagnosed on the basis of medical records and history) were excluded from the study.

### Sample size

The sample size was 120.

### Method of distribution of patient

This study was used Lottery method. By this method, 60 patients were divided in each group. Patients in Group-A was subjected to sublay mesh repair procedure and patients in Group-B was subjected to onlay mesh repair procedure for paraumbilical hernia repair.

### Procedure of sublay mesh repair

The principles of the retrorectus or sublay mesh repair included two main steps; which is mesh placement deep to the recti muscles and mesh extension well beyond the hernia defect. The medial edge of each rectus muscle was identified by palpation, and the extreme medial edge of each rectus sheath was incised along its length to enter the submuscular space. This relatively bloodless plane could be created to the lateral edges of the rectus muscle on each side primary “peritoneal” closure that was obtained using posterior rectus sheath above the arcuate line, the peritoneum itself, or excess sac below the arcuate line. The posterior rectus sheath along with the peritoneum is closed with zero prolene sutures. Then, mesh fashioned/fitted well beyond the around the defect (about at least 5 cm). The center point of the mesh was assigned by stitch to avoid malposition of the mesh and edges of the mesh can be fixed to the posterior rectus sheath by multiple stitches. Organs within the abdomen are isolated from injury by the mesh by a layer of posterior rectus sheath and peritoneum. Adhesions to viscus are thereby prevented. The edges of muscular sheath were sutured over the mesh by non-absorbable nylon suture

### Procedure of onlay mesh repair

The onlay repair was done with skin incision over the bulge or the defect. Using blunt dissection, both the rectus sheath and the defect containing the hernia contents were identified. The hernia sac was clearly dissected and the contents were reduced and the margins of the defect were held by Kocher forceps. The sac was dealt with and its contents were reduced into the abdominal cavity. With non-absorbable suture, the defect in the linea alba was repaired and a prolene 2.0 mesh of adequate size was placed on the rectus sheath and fixed with anchoring sutures.

### Post-operative follow-up

Postoperatively, every patient was kept under observations for 3–4 days in ward and observed for complication and was given injection ceftriaxone iv 12 hourly to cover Gram-positive bacteria and injection amikacin 24 hourly to cover Gram-negative bacteria. Postoperatively, all patients were followed at 10 days, 3 months, and 6<sup>th</sup> month to confirm efficacy and safety of the procedure.

## RESULTS

Total 120 patients were included in the study. They were divided in two groups. Sixty patients in Group-A was subjected to sublay mesh repair procedure and 60 patients in Group-B was subjected to onlay mesh repair procedure for paraumbilical hernia repair (Table 1).

The average age in Group-A was 39 years. In Group-A, 13(22%) patients were in age range 20–30 years, 18(30%) were in age range 31–40 years and 14(23%) were in age range 41–50 years, 15(25%) were in age range 51–64 years. Average age was 32 years in Group-B. In Group-B, 14(23%) patients were in age range 21–30 years, 16(27%) were in age range 31–40 years and 10(17%) were in age range 41–50 years, 20(33%) were in age range 51–64 years.

From Table 2, males undergoing both the hernia repair were more as compared to females. About 55% males had undergone sublay mesh repair while 60% onlay mesh repair.

Complication between two groups was analyzed as in Group-A, 3(5%) patients had seroma, 3(5%) patients had hematoma, and 8(13%) patients had wound infection while

**Table 1: Age distribution in patients undergoing onlay and sublay mesh repair**

Age	Group A	Group B
21–30 years	13 (22%)	14 (23%)
31–40 years	18 (30%)	16 (27%)
41–50 years	14 (23%)	10 (17%)
51–64 years	15 (25%)	20 (33%)
Total	60 (100%)	60 (100%)

the recurrence rate was 10(17%) where as in Group-B 2(3%) patients had seroma, 1(2%) patients had hematoma, and 3(5%) patients had wound infection while the recurrence rate was 5(8%). Patients having seroma, wound infection, and hematoma had early recurrence (Table 3). Infection rate and recurrence was more common in sublay mesh repair as we do not put drain in it while in onlay mesh repair, drain is usually kept at the site. This will lead to collection of serous fluid and pus at the site in case of sublay mesh repair.

## DISCUSSION

In our study, maximum patients undergoing sublay and onlay mesh repair were in 31–40 years age group. Similar study was conducted by Ismail *et al.*, in which they also divided study in two groups and 63 patients in each group.<sup>7</sup> In their study, in Group-A, 14(22%) patients were in age range 21–30 years, 22(35%) were in age range 31–40 years and 19(30%) were in age range 41–50 years, 8(13%) were in age range 51–65 years. Mean age was 30 years with standard deviation  $\pm 2.16$  in Group-B. In Group-B, 13(20%) patients were in age range 21–30 years, 22(35%) were in age range 31–40 years and 19(30%) were in age range 41–50 years, 9(15%) were in age range 51–65 years. Mean age was 32-years with standard deviation  $\pm 3.71$ .<sup>7</sup> In the study of Ismaeil, which included 58 patients, age ranged between 18 and 85 years, with mean age of  $(45.1 \pm 13.6)$  years.<sup>8</sup> In the study of Alobaidi and Alammars study which included 120 people, youngest patient was 20-years-old and oldest patient was 78-years-old, mean age of the patients was  $48 \pm 5$  years.<sup>1</sup>

In our study, males undergoing both the hernia repair were more as compared to females. About 55% males were affected in sublay mesh repair while 60% in onlay mesh repair. In study conducted by Alobaidi and Alammars also, males were more affected as compared to females.<sup>9</sup> In study of Ismail *et al.*, Group-A (sublay repair) 30(48%)

patients were male and 33(52%) patients were female where as in Group-B (onlay repair) 28(45%) patients were male and 35(55%) patients were females.<sup>7</sup> In the study of Akhil *et al.*, females (61.8%) were more affected as compared to males (39.2%).<sup>10</sup> In the study of Kumar and Thakur also, females (58.33%) undergoing hernioplasty were more as compared to males (41.67%).<sup>11</sup>

In present study, complication between two groups was analyzed; as in Group-A, 3(5%) patients had seroma, 3(5%) patients had hematoma, and 8(13%) patients had wound infection while the recurrence rate was 10(17%); where as in Group-B, 2(3%) patients had seroma, 1(2%) patients had hematoma, and 3(5%) patients had wound infection while the recurrence rate was 5(8%). In study conducted by Akhil *et al.*, Polypropylene mesh repair had 11.8% and composite mesh repair had 21.2% complications.<sup>10</sup> Most common complication in their study was seroma followed by pain. In the study by Kumar and Thakur, 10% patients undergoing hernioplasty had post-operative wound infection, and 15% had seroma.<sup>11</sup> In the study conducted by Ismaeil and Jani also, seroma, wound infection, and recurrence were most common complications.<sup>8,12</sup> In study by Ismail *et al.*, in patients undergoing sublay repair, 3(5%) patients had seroma, 4(6%) patients had hematoma, and 6(10%) patients had wound infection while the recurrence rate was 11(18%); where as in onlay repair, 2(3%) patients had seroma, 1(2%) patients had hematoma, and 4(7%) patients had wound infection while the recurrence rate was 6(10%).<sup>7</sup> Results similar to our study were also found in study of Saber *et al.*<sup>13</sup> In study by Alobaidi and Alammars, seroma formations was noticed in 2 patients (3.33%) in sublay group while 12 patients (20%) of onlay group had same complication. Wound infection was seen in one patient (1.66%) in sublay technique group while in onlay group 6 patients (10%).<sup>9</sup>

In present study, sublay mesh repair was effective in 82% patients on the bases of recurrence while this procedure was safe in 90% cases on the bases of complications whereas onlay mesh repair was effective in 90% patients cases on the bases of recurrence while this procedure was safe in 93% cases on the bases of complications. In study by Ismail *et al.*, showed that onlay mesh repair was effective in 90% patients and was not effective in 10% cases on the bases of recurrence while this procedure was safe in 93% cases on the bases of complications. On the other hand, sublay mesh repair was effective in 82% patients and was not effective in 18% cases on the bases of recurrence while this procedure was safe in 90% cases on the basis of complications.<sup>7</sup> Similar results were observed in study done by Godara *et al.*, as onlay mesh repair was effective in 88% patients and was not effective in 12% cases on the bases of recurrence while this procedure was safe in

**Table 2: Gender distribution in patients undergoing onlay and sublay mesh repair**

	Male	Female
SUBLAY MESH REPAIR	55%(n=33)	45%(n=27)
ONLAY MESH REPAIR	60%(n=36)	40%(n=24)

**Table 3: Complications associated with sublay and onlay mesh repair**

Post-operative complications	Group A	Group B
Seroma	3 (5%)	2 (3%)
Wound infection	8 (13%)	3 (5%)
Hematoma	3 (5%)	1 (2%)
Recurrence	10 (17%)	5 (8%)
Total	24 (40%)	11 (18.33%)

87% cases on the bases of complications. On the other hand, sublay mesh repair was effective in 80% patients and was not effective in 20% cases on the bases of recurrence while this procedure was safe in 81% cases on the bases of complications.<sup>14</sup>

All the patients having complications such as seroma and hematoma usually resolved by itself as the size was small. In case of patients having post-operative wound infection, higher antibiotics were given. Few patients, which did not recover by higher antibiotics, resurgery was done. In case of patients showing long-term recurrence, resurgery was advised. Some patients underwent repeat surgery but most of them refused for it.

### Limitations of the study

The duration of study could have been increased and more number of patients could have been taken in each group.

## CONCLUSION

Maximum patients undergoing mesh repair surgery belonged to 31–40 years age group. Onlay mesh repair technique is more effective, quick, and safe as compared to sublay mesh repair technique for the treatment of paraumbilical hernia.

## ACKNOWLEDGMENT

We are thankful to entire nursing staff of Department of Surgery for constant support while carrying out the procedure.

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**SP**- Concept and design of the study, prepared first draft of manuscript, statistical analysis, and interpretation; **PC**- Interpreted the results; reviewed the literature, and manuscript preparation; and **VM**-Concept, coordination, preparation of manuscript, and revision of the manuscript

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**Source of Support:** Nil, **Conflicts of Interest:** None declared.