

# Comparison of Sublay versus Onlay Mesh Technique of Ventral Hernia Repair

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## ABSTRACT

**Aim:** To compare the outcomes of onlay mesh technique with ventral mesh repair for treatment of ventral hernia.

**Methods:** This study (randomized controlled in nature) was conducted from 1-April-2016 to 31-March-2017. The study setting was department of surgery Holy Family Hospital Islamabad. 200 patients of ventral hernia with hernia size 2-5 cm and age 20-65 years were selected in this trial. Patients were randomly (using draw randomization) distributed in two equal groups. Group O; in these patients onlay mesh repair was performed. Group S; in these patients sublay mesh repair was performed. Post-operative pain, seroma formation and wound infections (superficial and deep) were main study outcome measures.

We used computer software SPSS v19 for analyzing data. Seroma formation and wound infections in sublay and onlay groups were compared using Chi-square test. Students t-test was used to compare post-op pain score between groups.

**Results:** Mean age, gender and type of ventral hernia were similar between group S and group O. Mean pain score after 6 hours of surgery in group S was 2.91+0.71 versus 4.43+0.86 in group O (p-value <0.0001). Wound infections occurred in 8% patients in group S and in 17% patients in group O (p-value 0.05). Seroma formation rate was also high in group O, 6% versus 2% in group S (p-value 0.31).

**Conclusion:** Sublay mesh repair as better as compared to the onlay mesh repair for the treatment of ventral hernia repair.

**Keywords:** Ventral hernia, Sublay mesh hernia repair, Onlay mesh hernia repair.

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## INTRODUCTION

Ventral hernia repair is one of the routine surgical procedures. These may be congenital, can occur during or after pregnancy, or as a result of weakening of abdominal muscles such as after abdominal incision.<sup>1</sup> Incidence rate ranges from 10-20% after abdominal incision.<sup>2, 3</sup> Mesh reinforcement has been proved to improve surgical outcomes as compared to the suture technique alone. There are still some post-operative complications after hernia repair and advancements are being made in reducing the frequency of these complications. Sublay and onlay mesh repair are two most frequently performed techniques of ventral hernia repair. In onlay technique mesh is secured on exposed anterior fascia while in sublay technique mesh is secured between the rectus sheath and peritoneum<sup>4,5</sup>.

Wound infections, reoccurrence, mesh infections, seroma or fistula formation are common reported complications after ventral hernia repair<sup>6,7</sup>. Sublay technique has been shown to provide some benefits as compared to the onlay technique, it has

lower rate of reoccurrence and wound complications as compared to onlay repair. However, sublay technique requires more skilled hands, longer surgery time and sometimes it is associated with chronic abdominal pain.<sup>8, 9</sup> Literature has still mixed results regarding outcomes of sublay versus onlay mesh repair and most of the times choice is based on the surgeon's preferences. In our setup both these techniques are commonly used for repair of ventral hernia. In this study, we compared the outcomes of onlay mesh technique with ventral mesh repair for treatment of ventral hernia.

## METHODS

This study (randomized controlled in nature) was conducted from 1-April-2016 to 31-March-2017. The study setting was department of surgery Holy Family Hospital Islamabad. 200 patients of ventral hernia with hernia size 2-5 cm and age 20-65 years were selected in this trial. Before starting trial, approval from IRB was taken. Signature on Written consent was taken from all patients and patients were briefly informed about the objectives and confidentially protocols of the study.

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Patients were randomly (using draw randomization) distributed in two equal groups. Group O; in these patients onlay mesh repair was performed. Group S; in these patients sublay mesh repair was performed. General anesthesia was given to all patients before surgery. In onlay repair, incision was given over the bulged area, the sac was dissected and all contents were removed. After that proline mesh as secured with sutures over the rectus sheath. After securing hemostasis wound was closed and drain was placed. In sublay repair, same procedure was followed up till removal of sac contents. After that a pre-peritoneal plane was created in-between the rectus muscle and rectus sheath. Adequate sized mesh was placed and secured with sutures between the rectus muscle and sheath, drain was placed over the mesh and 2<sup>nd</sup> drain was placed between the skin and the subcutaneous plane. Skin was closed after securing hemostasis. Drains were removed when the drain volume reduced to <20 ml per hour. In all patients, 1 gram ceftriaxone sodium was given pre-operative before induction of anesthesia and continued till 5<sup>th</sup> post-operative day.

Post-operative pain, seroma formation and wound infections (superficial and deep) were main study outcome measures. We used computer software SPSS v19 for analyzing data. Seroma formation and wound infections in sublay and onlay groups were compared using Chi-square test. Students t-test was used to compare post-op pain score between groups.

**RESULTS**

There were 100 patients in each group. Mean age, gender and type of ventral hernia were similar between group S and group O (Table 1). Mean age of patients in group S was 51.4+9.8 years and in group O was 52.3+10.1 years (p-value 0.52). There were 64% female patients in group S and 60% in group O (p-value 0.56). Para-umbilical hernia were most common presented in 52% patients in group S and in 54% patients in group O. Incisional hernia were presented in 20% patients, epigastric in 15% and umbilical in 13% patients in group S and 18%, 16% and 12% in group O respectively (p-value 0.97).

Table 1: Baseline data of patients.

Variable	Group S	Group O	P-value
Age	51.4+9.8	52.3+10.1	0.52
Male	36	40	0.56
Female	64	60	
<b>Type of Hernia</b>			
Para umbilical	52	54	0.97
Incisional	20	18	
Epigastric	15	16	
Umbilical	13	12	

Outcomes data of patients in given in table 2. Mean pain score after 6 hours of surgery in group S was 2.91+0.71 versus 4.43+0.86 in group O (p-value <0.0001). Wound infections rate was significantly lower in group S patients. These occurred in 8% patients in group S and in 17% patients in group O (p-value 0.05). Seroma formation rate was also high in group O, 6% versus 2% in group S (p-value 0.31)

Table 2: Comparison of Study outcomes.

Variable	Group S	Group O	P-value
Post-op Pain	2.91+0.71	4.43+0.86	<0.0001
Wound Infections	8	17	0.05
Superficial	6	10	0.09
Deep	2	7	0.29
Seroma Formation	2	6	0.31

**DISCUSSION**

Repair of ventral hernia without complications is always challenging for the operating surgeons and advancements in basic surgical techniques have been made to prevent complications in hernia repair. Placement of mesh have been shown to be effective in reducing the risk of complications.<sup>10, 11</sup>The exact location of mesh is still controversial. Sublay and onlay are two most commonly used techniques of mesh replacement during hernia repair. Some studies have concluded that sublay technique should be declared as gold standard because there is a less risk of mesh infections and stoma formation<sup>12, 13</sup>. Onlay technique has the advantage of separating the mesh from abdominal contents but the major disadvantage of this is that mesh can become easily infected in presence of surgical site infections and there is also a higher risk of stoma formation<sup>14-16</sup>. Currently both of these techniques are routinely used not only our setup but also in many centers around the world. In this study, we compared the operative outcomes of sublay with onlay mesh technique for ventral hernia repair.

In our study, more than 60% were female patients. There were 82% females in the study of Afridi et al<sup>17</sup> There were 52% females in study of Saber et al<sup>18</sup>. Like our study other studies also found female predominance in patients of ventral hernia.

In our study, mean post-operative pain-score was less in sublay group, 2.91+0.71 versus 4.43+0.86 in onlay group. Mean post-operative pain score in study of Saber et al. was 5.5+0.7 in onlay group and 3.0+0.97 in sublay mesh<sup>18</sup>.

In our study, wound infections occurred in 8% patients in sublay group and in 17% patients in onlay group. Wound infections occurred in 6% patients in sublay group and on 16% patients in onlay group in study of Afridi et al<sup>17</sup> Saber et al found wound infections in 7% patients in sublay group and in 15%

patients in onlay group<sup>18</sup>. Another study by Saber et al.<sup>19</sup> wound infections occurred in 4% patients in sublay group and in 8% patients in onlay group. Bessa et al<sup>20</sup> found wound infection rates in 0% patients in sublay group and in 2.5% patients in onlay group but with insignificant p-value.

We did not find any significant difference in seroma formation in sublay versus onlay group (2% in sublay and 6% in onlay group). Saber et al<sup>19</sup> also found similar rates of seroma formation between the groups as like of our study. Two recent meta-analysis reports by Timmermans et al<sup>21</sup> and Holihan et al<sup>22</sup> has also concluded that sublay technique is associated with lower number of complications as compared to the onlay mesh technique for ventral hernia repair.

## CONCLUSION

Sublay mesh repair as better as compared to the onlay mesh repair for the treatment of ventral hernia repair.

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