

COMPARISON OF ONLAY AND SUBLAY MESH HERNIOPLASTY IN PATIENTS WITH VENTRAL HERNIA IN TERMS OF SURGICAL SITE INFECTION AND SEROMA FORMATION

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Abstract

Objective: To compare and sublay mesh hernioplasty in patients with ventral hernia in terms of surgical site infection and seroma formation.

Study Type: Randomized Controlled Trail

Study Place and Duration: From January 2024 to June 2024. Department of General Surgery, Combined Military Hospital, Lahore

Material and methods: There were 76 individuals who participated in the study, of both sexes, ranging in age from 18-70 years, undergoing surgery to correct a ventral hernia. After informed written consent, demographic data was recorded. Group 1 and Group 2 were equal in number. Thirty-eight patients in Group 1 underwent onlay mesh technique, while thirty-eight patients in Group 2 underwent sublay method of hernia repair. A number of outcomes, including wound infection and seroma development were noted in order to compare the two groups' performance. SPSS 25.0 was used to analyze the data. Mean and Standard Deviation was calculated for quantitative variables and frequency and percentage was calculated for qualitative variables. The Chi-square and student t-tests were used. The threshold for a meaningful difference was set at $p \leq 0.05$.

Results: Both groups were comparable in terms of age, BMI and gender. During follow up, surgical site infection was observed in 26.3% patients of group A and 5.3% patients of group B ($p=0.47$). Seroma formation was observed in 21.1% patients of group A and 2.6% patients of group B ($p=0.028$).

Conclusion: In comparison to on-lay mesh, surgery done by the sub-lay mesh method for repair of ventral hernias was proved to be more safe, effective, and required a shorter hospital stay in terms of wound infection, seroma formation, and discomfort following the procedure.

INTRODUCTION

A hernia is an abnormal protrusion of the viscera, or some of its portion, through a natural or artificial opening, covered by a sac. Technical competence and a thorough understanding of anatomy are necessary for hernia repair surgery.

Anterior abdominal wall hernias are another name for ventral hernias. It comprises epigastric, incisional umbilical, paraumbilical, and spigelian herniated disk. A ventral incisional hernia in abdominal wall is a defect in the musculoskeletal

layers of the abdominal wall near the surgical scar (1). Incisional or primary ventral hernias are the most common surgical intervention performed worldwide (2). In the United States, an estimated 250 thousand ventral hernia surgeries are performed each year (3). The prevalence of incisional hernias varies from 2 to 11 percent to 10-20 percent in the worldwide literature (4). General surgeons face a lot of difficulties when it comes to incisional hernia surgery because of the substantial likelihood of recurrence, cost, and morbidity while using prosthetic mesh i.e. sublay and onlay techniques during open surgery (1, 5, 6). Epigastric hernia was first reported in literature by Arnault de Villeneuve in 1285 A.D. and first successful surgery that was documented was done in 1805. While opinions differ about the benefits of suture or open mesh surgery for hernia by the surgeons. Incisional hernias have been increasingly common since the eleventh century, when anesthesia, asepsis, and anti-sepsis were developed. This led to an increase in the number of abdominal procedures performed. This has encouraged surgeons to give this topic more careful thought (3). Ventral hernias are among the most common problems that surgeons encounter nowadays. Between 15 to 18 percent of all surgical procedures involve the repair of ventral hernias, with incisional hernias being the most common long-term effect of midline laparotomy incisions (4-7).

There are still some post-operative complications after hernia repair and advancements are being made in reducing the frequency of these complications. Recurrence and complications after surgical procedure are influenced by the graft's placement. However, earlier studies were unable to prove that one technique was better than another (8). The two methods of ventral hernia repair that are most commonly used are onlay and sublay mesh repair. No significant variations in the rates of infection and recurrence were found in the systematic reviews of the documents related to the "sublay" and "onlay" graft procedures (9). Mesh is placed to the exposed anterior fascia in the onlay method and placed between the peritoneum and the rectus sheath in the sublay method (4, 7). Following

ventral hernia repair, wound infections, recurrence, mesh infections, seroma or fistula development are often reported problems (10). In comparison to onlay repair, sublay method has been demonstrated to offer several advantages, including a decreased incidence of wound complications and recurrence. Furthermore "sublay" grafts are thought to reduce seroma formation (11). Sublay method, however, demands more deft hands, takes longer during surgery, and occasionally is linked to persistent stomach pain (12-14).

It is asserted that "onlay" graft repair leads to reduced recurrences while carrying a significant risk of complications (15). Recent papers state that there is still much to learn about the long-term effects of insertion of grafts in different levels of the abdominal wall (16). There is significant disagreement over the best strategy for treating ventral hernias despite several research comparing the effectiveness of onlay and sublay mesh repair. The current study was carried out with the objective of comparing the results obtained from the onlay and sublay mesh approaches.

Material and Method:

This is a retrospective and observational study done for a duration of six months, From January 2024 to June 2024, Department of General Surgery, Combined Military Hospital, Lahore. There were 76 individuals who participated in the study, of both sexes, ranging in age from 18-70 years, undergoing surgery to correct a ventral hernia. After informed written consent, the patient's age and gender were recorded. Patients under the age of eighteen, those who did not sign the consent form, ascites patients, and liver cancer patients were not allowed. Group A and Group B were the two equal groups of patients. Thirty eight patients in Group A underwent onlay mesh technique while under general anesthesia, while thirty eight patients in Group B underwent sublay method of hernia repair while under general anesthesia. A number of outcomes, including wound infection and seroma development were noted in order to compare the two groups' performance.

Any intraperitoneal adhesions, particularly those pertaining to the inner portion of the anterior abdominal wall, were separated after the sac was opened. Both the outer oblique aponeurosis and the rectus sheath were exposed. The hernial sac remained closed in group A patients if the contents could not be reduced. Under these circumstances, the sac was opened, its contents were reduced and dissected, and then it was closed. The sac central defect was repaired en-mass with continual proline 1/0 stitches after the sac had opened. A polypropylene mesh overlay was instilled. The mesh edges were rotated by at least 1 cm in all directions, and their size was determined to extend for at least 6 cm in all directions from the margin of the flaw. Next, a continuous line of proline 2/0 secured both the top and bottom edges of the mesh. In order to perform a sublay procedure in Group B, a midline laparotomy incision must be made. If an incisional hernia is present, the prior scar must be removed. The entire incision was opened again and covered by the mesh since an incisional hernia is an error in the creation of scar tissue. Finally, the hernial sac was opened. Laparotomy was necessary to properly dissect the retro muscular, pre-peritoneal region at the placement of the mesh. The rectus sheath was divided cranially and caudally, opening at the umbilicus. On both sides, the preparation was continued abruptly on the posterior rectus sheath, which is located behind the rectus muscle. Dissection is only done when overlap was up-to 5 to 6 cm to both lateral sides. When dealing with paramedian hernias, the rectus sheath was left dorsally in order to continue the preparation laterally to it. The transverse abdominis and internal oblique muscles were used for the preparation. To prevent any damage, the rectus sheath's lateral nerves and arteries were treated with extreme caution. In order to prevent recurrence at the margins owing to prosthesis shrinkage, a significant mesh overlap was supplied, with a subduction of tissue that is healthy of at least 6 cm across every direction. In order to guarantee adequate overlap in cranial (epigastric) hernia instances, the linea alba was removed without

causing damage to the anterior fascial layer. The preparation stretched behind the xiphoid and the posterior rectus sheath was sliced along the linea alba. It assured a proper overlap. Preperitoneal preparation was done in back of the pubic bone for infraumbilical hernias. When required, Cooper's ligament was used to secure the bottom portion of the mesh to guarantee attachment. The prosthesis was placed in the preperitoneal region beneath the arcuate line. Following preparation of mesh, which included the peritoneal layer, the mesh was sealed using a vicryl 2/0 absorbable running suture. In order to avoid the formation of fistulas, direct contact between the mesh and the intestines was avoided. Bowels were encased with more omentum when it was feasible. The muscle fibers between the posterior rectus sheath and rectus abdominus were then in touch with the mesh. Only a small number of 3/0 absorbable sutures were employed as anchors due to the mesh's self-fixation. Following placement, proline 1/0 continuous stitches were used to seal the anterior rectus sheath. In the subcutaneous tissue over the outer sheath, two drains were inserted. A one-month follow-up was conducted in each group at intervals of seven, fifteen, and thirty days.

SPSS 25.0 was used to analyze the data. Mean and Standard Deviation was calculated for quantitative variables and frequency and percentage was calculated for qualitative variables. The Chi-square and student t-tests were used. The threshold for a meaningful difference was set at $p \leq 0.05$.

Results:

Both groups were comparable in terms of age and BMI. Group A comprised of 36.8% males and 63.2% females. Group B comprised of 44.7% males and 55.3% females. Table-I

During follow up, surgical site infection was observed in 26.3% patients of group A and 5.3% patients of group B, with statistically significant difference ($p=0.47$). Seroma formation was observed in 21.1% patients of group A and 2.6% patients of group B. The observed difference was statistically significant ($p=0.028$). Table-II

Table-I

Demographic details of the patients

Variable	Group A (N = 38)	Group B (N = 38)	P value
Age, years	44.53 ± 11.81	46.00 ± 10.84	0.573
Gender			
Male	14 (36.8 %)	17 (44.7 %)	0.484
Female	24 (63.2 %)	21 (55.3 %)	
BMI, kg/m ²	28.68 ± 4.65	27.31 ± 4.28	0.186

Data is entered as mean±S.D. or number (%). Independent t test and Fischer’s exact test applied.

Table-II

Outcome data of the patients

Variable	Group A (N = 38)	Group B (N = 38)	P value
Surgical Site Infection	10 (26.3 %)	2 (5.3 %)	0.047
Seroma Formation	8 (21.1 %)	1 (2.6 %)	0.028

Data is entered as number (%). Fischer’s exact test applied.

Discussion:

In clinical practice, ventral abdominal wall hernias are a frequently observed surgical problem. Besides the technique used, the outcome of the surgery also depends on the operator's skill, meticulous dissection, repair that is tension-free, and other considerations. According to Chien and colleagues (17), there are many approaches to treating these hernias. Most hernia repair techniques involve mesh, either in an onlay or sublay format (18). The enhanced sublay technique, which had a lower rate of recurrence and an overall better result, has been called the standard for treating ventral hernias. Increased rates of unacceptable recurrence are associated with initial tissue repair. The greatest hernia repair technique available now is tension-free mesh repair (19).

There were 76 patients, both male and female, presented in the current investigation. Group A was made up of 63.2% females and 36.8% male overall. Group B was made up of 55.3% females and 44.7% men. Two groups of patients were evenly split. The mean age of group A was 44.53 ± 11.81 years, whereas the mean age of group B was 46.00 ± 10.84 years. The mean body mass index (BMI) for group A was 28.68 ±

4.65 kg/m², while the average BMI for group B was 27.31 ± 4.28 kg/m².

Our study's results were similar to those of the earlier investigation (20). Para-umbilical was the most common type in both groups, followed by umbilical, incisional, and epigastric hernia (21). The mesh is inserted beneath the skin. Because the mesh is inserted subcutaneously, onlay hernia repair process is more prone to wound infection, which also adds to discomfort. The results of studies conducted by Rajsiddharth et al. in Telagana, and by Thangamani et al. in Tamil Nadu, both in India, support the conclusions of our investigation. However, the study conducted by Baracs et al. in Hungary did not find any appreciable difference in the perception of pain (22, 23).

In our study wound infection was higher in onlay group i.e. 26.3% (10 patients) as compared to sublay group i.e. 5.3% (2 patients) (P< 0.05). Seroma was identified in 2.6% (1 patient) of Group B patients and 21.1% (8 patients) of Group A patients (p< 0.05). Seroma was found in onlays and sublays by Furat Shani at 12% and 1%, in Aly Saber's research at 6% and 2%, and in

Kharde K et al.'s study at 16% and 12% in onlays and sublays, respectively (14, 24, 25).

Since onlay mesh repair requires dissection all the way down to the front abdominal fascia, where the mesh is attached, it is logically easy to complete. The mesh is positioned more superficially, which raises the possibility of infection at the site of surgery and formation of seroma (26, 27). A potential dead spot that forms once the planes are disassembled and raised planes creates an area where seroma development might occur. This area is always larger in the onlay method of surgery, when the skin and subcutaneous fat make up the overlaying layer. Compared to onlay dissection, sublay dissection may result in a narrower gap between the posterior rectus sheath and the rectus muscle. According to our assessment, the onlay group's rate of seroma production was noticeably greater than that of the sublay group. In other study, Perletti et al. (28) discovered that the onlay group had a noticeably higher incidence of seroma cases. In that evaluation, the use of drains after surgery was present in just two research. The primary goal of a drain placement is to stop any accumulation in the dead area, which will lessen the growth of seroma. In their review, Timmerman et al. (10) could not identify a statistically significant difference in surgical site infection between the two groups.

Conclusion:

In order to minimize postoperative complications, mesh implantation is being assessed as the preferred course of therapy for ventral hernia repair. In comparison to on-lay mesh, surgery done by the sub-lay mesh method for repair of ventral hernias was proved to be more safe, effective, and required a shorter hospital stay in terms of wound infection, seroma formation, and discomfort following the procedure.

Conflict of interest:

There was no conflict of interest.

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