

Short-Term Outcomes of Sublay Mesh for Ventral Hernia Repair

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Abstract: ***Background:** Ventral hernia is a prevalent condition in clinical settings. Many surgeons face difficulties in managing ventral hernia, which can be treated by various methods of abdominal wall reconstruction, such as open and laparoscopic approaches. Different techniques of mesh placement for open abdominal wall reconstruction have been proposed, such as onlay, sublay, inlay and IPOM. The sublay technique is reported to have a low recurrence rate and a low incidence of postoperative complications for open abdominal wall reconstruction. However, the sublay technique is not widely adopted. The aim of this study is to assess the feasibility, safety, and early outcomes of this technique. **Methods:** This paper presents a retrospective analysis of 35 patients who underwent sublay ventral hernia repair at Cho Ray Hospital between June 2022 and February 2023. The early postoperative outcomes of these patients were assessed within 30 days after the surgery. **Results:** The study population consisted of 35 patients with a female-to-male ratio of 3:1 and a mean age of 56.2 years. The types of ventral hernia were epigastric (11.5%), umbilical (51.4%) and incisional (37.1%). The body mass index (BMI) of the patients was categorized into normal (18-24) in 51.4% of cases, overweight (>25) in 20% of cases and obese (>30) in 28.6% of cases. The size of the hernia sac ranged from small (< 4 cm) in 62.9% of cases to medium (4 – 10 cm) in 37.1% of cases, with no large (>10 cm) cases. The mean operative time was 90 minutes, and the mean hospital stay was 3 days. The only postoperative complication was seroma formation in one case (2.9%). No cases of bleeding, wound infection or bowel injury were observed. **Conclusions:** Sublay meshplasty in ventral hernia is feasible, safe and effective.*

Keywords: ventral hernia, sublay, retrorectus sublay mesh

1. Introduction

Ventral hernia (VH) is a condition in which abdominal organs protrude through a defect in the anterior abdominal wall, either spontaneously or following an incision. VH affects approximately 25% of the global population and is a common surgical problem. The incidence of VH is rising in Western countries, due to factors such as obesity, aging, liver disease, kidney failure, diabetes mellitus, and previous abdominal surgery. Moreover, complex VH cases are also increasing significantly, posing a surgical challenge that requires a tailored plan for optimal patient outcomes. However, the recurrence rate after VH repair surgery ranges from 15 to 40% [1]. VH encompasses umbilical, epigastric, and incisional hernias. According to the literature, there are two main approaches for VH treatment: open and laparoscopic surgery. Open surgery has the advantages of being a classical technique, having a long history, being easy to perform in small and medium centers, and being low-cost. Laparoscopic surgery, on the other hand, requires a high level of surgical expertise and expensive equipment. Repair VH with mesh placement is becoming more popular and is considered the gold standard. Compared to abdominal wall suture technique, mesh placement reduces the recurrence rate significantly, as evidenced by many large studies and accepted worldwide[2-4]. The mesh can be placed in different positions: onlay (anterior to the fascia), sublay (posterior to the rectus muscle or preperitoneum), intraperitoneal (IPOM), or inlay (at the junction of the bilateral abdominal wall muscles). IPOM is less frequently

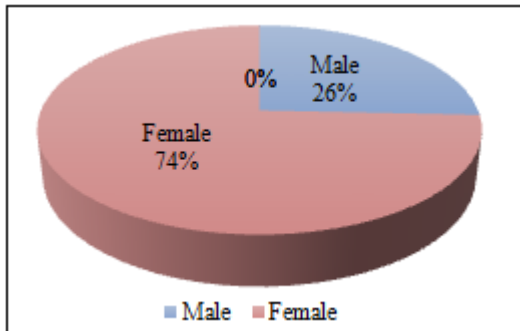
used due to the high cost associated with the anti-adhesion property of the mesh, which is preferred in laparoscopic surgery. For the other mesh positions, most surgeons often choose onlay because of its ease of implementation and simplicity of technique. Therefore, the role of sublay mesh for VH repair is still not widely recognized, mainly due to the surgeon's professional experience and the relatively difficult dissection technique [5]. The issue of early complications after surgery during the patient's hospital stay has not been fully assessed. The aim of this study was to evaluate the efficacy and safety of sublay technique by determining the rate of early postoperative complications such as wound infection, fluid accumulation, bleeding, and intestinal injury.

2. Material and Method

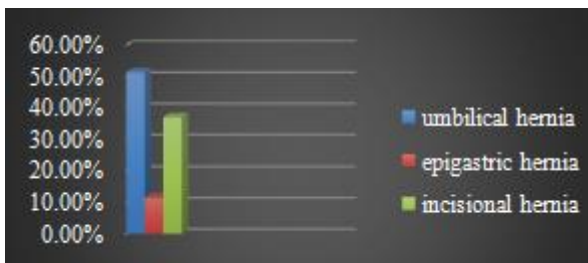
We conducted a cross-sectional, descriptive retrospective study on 35 patients who underwent sublay meshplasty for ventral hernia over a 30-day period at the Department of Digestive Surgery, Cho Ray Hospital, from June 2022 to February 2023. The study population consisted of patients with ventral hernias, including umbilical, epigastric, and incisional hernias. We analyzed the patients for factors such as age, gender, type of hernia, BMI, size of hernia defect, surgery time, hospital stay, and postoperative complications. We excluded patients who had sublay meshplasty and also had life-threatening or severe medical comorbidities.

3. Results

We performed sublay meshplasty for VH repair in 35 cases from June 2022 to February 2023. The patients included 9 males (25.7%) and 26 females (74.3%) with a mean age of 56.12 years (range: 17-86 years).



The hernias were classified into three groups: epigastric hernia in 4 cases (11.5%), umbilical hernia in 18 cases (51.4%), and incisional hernia in 13 cases (37.1%).



BMI was categorized into three groups: normal (18-24) in 18 cases (51.4%), overweight (>25) in 7 cases (20%), and obese (>30) in 11 cases (28.6%). The size of the hernia defect included: small size (< 4 cm) in 22 cases (62.9%), medium size (4 – 10 cm) in 13 cases (37.1%), and no large size (>10 cm). The mean size of the hernia was 1.53 cm. The mean operative time was 90 minutes, with a minimum of 60 minutes and a maximum of 160 minutes. The mean hospital stay was 3 days (range: 1 - 8 days). Only one case (2.9%) had a complication of seroma, which was treated by aspiration with a 10 ml syringe. No seroma was detected by ultrasound at the follow-up after 3 weeks. No cases of intestinal injury, bleeding, or wound infection were observed.

4. Discussion

VH can occur as primary or secondary, with primary VH (umbilical hernia, epigastric hernia) accounting for about two-thirds of cases and secondary VH (incisional hernia) for the remaining one-third. Restoring the abdominal wall is essential to prevent complications and patient discomfort [6]. There are various approaches for VH repair in the world today, including laparoscopic and open surgery. Laparoscopic surgery is a global trend, but it requires the surgeon's skill and is costly due to the high price of single-sided non-adhesive mesh. However, open surgery is also a good option in most cases. Choosing the VH repair method is a long-standing surgical challenge, and many techniques for mesh placement have been described: onlay (anterior to

the fascia), sublay (posterior to the rectus muscle or preperitoneum), inlay (between the two fascia layers), and IPOM (intraperitoneal) [7]. Sublay has been suggested to have a low recurrence rate and postoperative complications for open surgery of VH repair [8]. Sublay is less common due to the difficulty of the surgical technique, the need for experienced surgeons, and the longer operative time. Our study was conducted on 35 cases who underwent sublay meshplasty. We reported the results on anthropometric characteristics, BMI, mean operative time, mean hospital stay, and postoperative complication rates. The sex distribution ratio in our study was female: male = 3: 1, which was similar to Santsevi Prasad [9] and colleagues who studied abdominal wall restoration by sublay technique on 57 patients with 40 females and 17 males, with a ratio of 2.13 : 1. The above results also indicated a slight increase in the incidence of VH in females, which may be related to the weakness of the abdominal wall muscles due to pregnancy or overweight and obesity. The age in our study ranged from 17 to 86 years old, with a mean of 56.12 years old. There were 6 patients < 40 years old, 13 patients from 40 to 60 years old, and 16 patients > 60 years old, indicating that older age is also a common risk factor for VH. BMI distribution showed that there were 17 overweight and obese cases, who had poor quality of abdominal wall muscle, thin abdominal wall muscle, and high risk of abdominal wall herniation. Our study included all three groups of hernias: umbilical, epigastric, and incisional hernias. Among them, umbilical hernia had the highest rate of 18 cases (51.4%), epigastric hernia had only 4 cases (11.5%), and incisional hernia had 13 cases (37.1%). The size of the hernia defect in our study was mostly small < 4cm and medium (4-10cm), with a mean size of 1.53 cm. Most of the patients in our study group had umbilical hernia with small hernia defect size. The mean operative time was 89 minutes, ranging from 60 to 160 minutes, which was comparable to other studies. According to Furat et al [10], they performed sublay meshplasty on 52 cases with a mean operative time of 65 - 120 minutes. The operative time was longer than with the onlay technique, mainly because of the patient's overweight, obesity, and the surgical technique to create the space behind the rectus muscle.

The study by Mohamed Issa et al. [6] retrospectively reviewed 79 patients who underwent sublay meshplasty and reported a postoperative seroma rate of 2%. According to Furat's study [10], the seroma rate was 5%, which was similar to our study of 2.9%. Seroma is a common complication after VH repair, especially when using mesh. The seroma rate varies from 30 to 50% after mesh placement surgery. The exact pathophysiology of seroma is unknown. However, it is thought that the presence of the mesh will act as a foreign body causing local inflammation and fluid accumulation. In addition, the larger space created by dissection of the hernia sac and the fascial defects that often occur in onlay techniques increase the risk of local wound complications such as hematoma, effusion, and infection. In the sublay technique, a space is created between the rectus muscle and the posterior rectus sheath, which is a narrow space compared to the anterior dissection of the rectus abdominis (onlay). Therefore, it will reduce the seroma rate after surgery [11].

Complications related to bowel injury such as small bowel laceration, colonic or omental entrapment are rare with an incidence ranging from 0.06% to 0.2%. It is known that all meshes form adhesions in the peritoneal cavity. In the inlay technique, the chance of bowel complications is greater, as in the sublay technique the organs in the peritoneal cavity are separated from the mesh by a layer of peritoneum and behind the posterior rectus sheath. The mesh is placed just above the peritoneum and in the retro muscular space, so the bowel is not in contact with the mesh. In our study, no bowel complications, wound infection, or bleeding were noted.

5. Conclusion

Despite the advances and approaches in abdominal wall hernia treatment, selecting an optimal method for each patient remains a matter of debate. We opted for the sublay technique as the initial approach in the context of the increasing popularity and global trend of laparoscopic surgery. However, open sublay surgery still has a significant role for patients with large and complex abdominal wall hernias. In conclusion, sublay meshplasty for ventral hernia is feasible, safe, and effective.

6. Recommendations and Limitations of the Study

The sample size was relatively small. Limited duration of follow-up (only 30 days). Long-term follow-up is recommended to monitor any control complications.

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