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Outcomes of Two Specific Surgical Methods for Repairing Incisional Hernias: Open Retromuscular Mesh Placement (Sublay) and Onlay Mesh Placement

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ABSTRACT
Incisional hernia (IH) is the only hernia considered to be truly iatrogenic. It is defined as the diffuse protrusion of the peritoneum and abdominal cavity contents through a weak/poor scar of an operation or an accidental wound. Incisional hernia is a significant complications after laparotomy and can result in bowel strangulation, enterocutaneous fistula and affects quality of life. After documenting medical histories and obtaining informed consent, patients will undergo clinical examinations and necessary tests. They will be randomly assigned to two groups: one receiving onlay mesh placement and the other sublay mesh placement. Patients will be monitored for complications during their hospital stay and will have follow-up reviews at 1, 3 and 6 months to check for hernia recurrence. Sublay mesh repair is superior to onlay mesh repair for ventral incisional hernia, with fewer complications such as seroma formation, surgical site infections, and recurrences. Although onlay mesh repair is quicker and easier, it has more complications. Sublay repair involves more pain due to the extensive dissection required. The study reported no recurrences or hematomas during the follow-up period.

INTRODUCTION

Incisional hernia, the only hernia truly caused by medical intervention, occurs when the peritoneum and abdominal contents protrude through a weakened surgical or accidental scar[1]. This significant post-laparotomy complication has an incidence rate of 2% to 20%. IH can lead to serious issues such as bowel strangulation, enterocutaneous fistula, and a reduced quality of life. As these hernias tend to grow larger over time, they become more difficult to repair, highlighting the importance of elective repair to prevent these problems[2].

There is considerable variation in the success of different repair techniques. Anatomical repair methods are known for their high recurrence rates, with traditional suture repairs showing recurrence rates between 41% and 52%. Modern practice favors the use of prosthetic mesh, which has been shown to reduce the likelihood of hernia recurrence[3].

Among the various mesh placement techniques, the most common are onlay mesh placement, sublay mesh placement and laparoscopic intraperitoneal onlay mesh placement (IPOM). However, it remains unclear which technique is the most effective[2]. The two most widely used open surgical methods are sublay retromuscular mesh placement and onlay mesh placement.

The debate over the best technique arises because the position of the mesh affects tissue response, incorporation, and the overall strength of the abdominal wall[4,5].

This study aims to compare and analyze the outcomes of two specific surgical methods for repairing incisional hernias: open retromuscular mesh placement (sublay) and onlay mesh placement.

MATERIALS AND METHODS

The study aims to enroll 40 patients with incisional hernias who meet the inclusion criteria and are admitted to the surgical wards. Each patient will provide a comprehensive medical history, documented using a standard proforma. Following informed consent, all patients will undergo a clinical examination and relevant investigations.

Patients will be randomly assigned to one of two groups using an even-odd method to ensure similar case types in each group: those assigned an even number will undergo onlay mesh placement, while those assigned an odd number will undergo sublay mesh placement.

Throughout their hospital stay, patients will be monitored for complications such as difficulty in closing the fascial layer, post-operative pain, seroma, hematoma, and surgical site infections. Follow-up reviews will be conducted at 1, 3 and 6 months to check for any recurrence of the hernia.

Methods of Collection of Data:

Study Design: Comparative Study.

Study Period: August 2022 to January 2024.

Inclusion Criteria:

- Patients willing to give informed consent.
- Patients of either sex aged between 18 and 80yers.
- Patients admitted for anterior abdominal wall Incisional Hernia.

Exclusion Criteria:

- Patients with obstructed and strangulated hernia.
- Patients with divarication recti.
- Recurrent incisional hernia.

RESULTS AND DISCUSSIONS

When we correlated the variables between the two groups, we found that there was a significant reduction in mesh fixation and overall operative time with sublay. Table 1

Surgical Variables:

- **Number of Defects:** There was no significant difference between the ONLAY and SUBLAY groups regarding the number of hernia defects (p=0.89).
- **Operative Time:** The ONLAY technique had a notably shorter average operative time of about 53 minutes, compared to 64.5 minutes for the SUBLAY technique, with a highly significant p-value of less than 0.0001.
- **Mesh Fixation Time:** Similarly, the time required to fix the mesh was shorter in the ONLAY group, averaging about 18 minutes, compared to approximately 28 minutes for the SUBLAY group, again with a significant p-value of <0.0001[5].

Postoperative Ambulation: Most patients in both groups were able to walk by the second day following their surgery, indicating similar recovery rates in terms of mobility[6].

Duration of Hospital Stay: The length of hospital stays did not vary much between the two groups. Most patients stayed in the hospital for either 1-3 days or 4-6 days, with a few staying 7-10 days. None of the patients required a hospital stay longer than 10 days.

Return to Work: The time taken for patients to return to work was comparable between the two groups, with most resuming their duties within 6-10 days after surgery.

Table 1: Comparison of Operative Time

Variables	Onlay	Sublay	P Value
No. of Defects	1.34±0.72 (1-4)	1.33±0.68 (1-4)	0.89
Operative Time	52.6±12.1 (36-90) Minutes	64.5±20.2 (36-120) Minutes	<0.0001
Mesh Fixation Time	17.9±3.2 (9-25) Minutes	27.8±12.6 (9-60) Minutes	<0.0001

Table 2: Comparison for Post-Operative Ambulation

	1 Day	2 Day	3 Day	Total
Onlay	3	17	0	20
Sublay	4	16	0	20

This comparison shows that postoperative ambulation was similar in both groups. Table 2

The duration of hospital stay was found to be similar between the two groups. Table 3

Table 3: Comparison for Duration of Hospital Stay

No. of Days	Onlay	Sublay	P- value
1 to 3	8	9	0.922
4 to 6	6	9	
7 to 10	6	2	
>10	0	0	

There was no difference in return to work between both groups. Table 4

Table 4: Comparison for Return to work Post-Surgery

Days	Onlay	Sublay
6-10	12	12
11-15	4	6
16-20	4	2
>20	0	0

Pain was observed to be significantly lower with group B than group A. Table 5

Table 5: Comparison for Post-Operative Pain

VAS	Onlay	Sublay	P-Value
1 Hour	6.8	7.2	<0.001
12 Hours	5.2	6.6	
24 Hours	4	6.1	
7 Days	2	4	

Complications was found to be comparable between both groups. Table 6

Table 6: Comparison for Post-Operative Complications

Complications	Onlay	Sublay	P- Value
Pain > 10 days	7	6	0.991
Seroma	4	4	
Recurrence	0	0	
Bleeding	3	5	
Others	1	1	

Pain Assessment: Pain levels were assessed at different intervals post-surgery, showing that the SUBLAY group consistently reported lower pain scores:

- **1 Hour Post-Surgery:** Onlay (6.8) vs. Sublay (7.2).
- **12 Hours Post-Surgery:** Onlay (5.2) vs. Sublay (6.6).
- **24 Hours Post-Surgery:** Onlay (4.0) vs. Sublay (6.1).
- **7 Days Post-Surgery:** Onlay (2.0) vs. Sublay (4.0).

Complications: The complication rates were similar between the two groups:

- **Pain Lasting >10 Days:** Onlay (7) vs. Sublay (6).
- **Seroma:** 4 Cases in each group.
- **Recurrence:** No recurrances noted.
- **Bleeding:** Onlay (3) vs. Sublay (5) Other complications were minimal and evenly distributed between the groups.

CONCLUSION

Sublay mesh repair is a better technique with less incidence of postoperative compilations like seroma formation, surgical site infection and least recurrence rate and minimal mesh related-complication.

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