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QUALITY OF LIFE AND PATIENT-REPORTED OUTCOMES FOLLOWING ONLAY VERSUS SUBLAY MESH REPAIR IN VENTRAL HERNIA: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background: While surgical outcomes such as recurrence and wound complications remain primary endpoints in hernia repair studies, patient-reported outcomes (PROMs) have emerged as equally important measures of success. These include postoperative pain, physical function, and health-related quality of life (HRQoL).

Objective: To compare PROMs, including pain and HRQoL, in patients undergoing onlay versus sublay mesh repair for ventral hernia.

Methods: A randomized controlled trial was conducted with 60 patients, equally allocated to onlay (n=30) and sublay (n=30) mesh repair groups. Pain was assessed using Visual Analogue Scale (VAS) at 24 hours, 48 hours, 1 week, and 1 month. Quality of life was assessed using the Short Form-36 (SF-36) questionnaire preoperatively and at 3 months post-surgery. Statistical analysis was performed using Student's t-test for continuous variables and Chi-square test for categorical variables, with $p<0.05$ considered significant.

Results: Sublay repair was associated with significantly lower VAS scores at 24 hours (5.2 ± 1.3 vs 6.4 ± 1.5, p=0.01) and 48 hours (3.8 ± 1.1 vs 4.9 ± 1.4, p=0.02). At 1 week and 1 month, pain remained lower in sublay patients but differences were not statistically significant. At 3 months, SF-36 showed significantly better scores in physical functioning (78.5 ± 8.3 vs 71.2 ± 7.9, p=0.01) and general health (74.6 ± 7.4 vs 68.1 ± 8.1, p=0.02) in the sublay group. Other domains including mental health and role emotional did not differ significantly.
Conclusion: Sublay mesh repair results in reduced early postoperative pain and improved physical aspects of quality of life compared with onlay repair, underlining its advantage not only in surgical outcomes but also in patient-centered recovery.

Keywords: Ventral hernia; Mesh repair; Patient-reported outcomes; Quality of life; VAS; SF- 36.

Introduction

Ventral hernia, encompassing both incisional and primary anterior abdominal wall hernias, significantly impairs patients' functional capacity, body image, and overall quality of life. While recurrence and wound morbidity remain standard outcome measures in surgical trials, modern evaluation emphasizes patient-reported outcomes (PROMs), which reflect how patients perceive their recovery[1,2]. Mesh reinforcement, whether in the onlay or sublay position, effectively reduces recurrence[3,4]. However, differences in pain, function, and HRQoL between these techniques remain underexplored. Onlay mesh repair, placed superficially over the anterior rectus sheath, is simpler but associated with higher seroma and infection rates, which may prolong pain and limit function[5]. Sublay repair, introduced by Rives[6], places mesh in the retrorectus plane, potentially offering a stronger, tension-free repair with less morbidity and faster return to normal activity[7,8]. Several studies have demonstrated improvement in HRQoL following hernia repair[9,10,11], but few randomized trials directly compare onlay and sublay approaches using validated PROM tools. This trial was designed to assess differences in postoperative pain and HRQoL, as measured by VAS and SF-36, between onlay and sublay mesh repair in ventral hernia patients.

MATERIALS AND METHODS

Study design: Prospective randomized controlled trial conducted in the Department of General Surgery, Index Medical College Hospital & Research Centre, Indore (Malwanchal University)
Sample: Sixty patients diagnosed with ventral hernia were included and randomized using a computer-generated sequence into two groups: onlay (n=30) and sublay (n=30).

Inclusion criteria:

- Patients aged 18–70 years.
- Primary or incisional ventral hernia with defect size 3–10 cm.
- Elective surgical candidates.

Exclusion criteria:

- Recurrent hernia.
- Emergency presentation with obstruction/strangulation.
- Contaminated/infected operative field.
- Severe uncontrolled comorbidities.

Surgical technique:

- **Onlay repair:** Hernia sac dissected, defect closed, polypropylene mesh placed over anterior rectus sheath, fixed with sutures, with drains placed.
- **Sublay repair:** Retrorectus dissection carried out, polypropylene mesh placed posterior to rectus muscles, ensuring ≥5 cm overlap, fixed with sutures, with drains inserted.

PROMs assessment:

1. **Postoperative pain:** VAS score (0–10) recorded at 24 hrs, 48 hrs, 1 week, and 1 month.
2. **Quality of life:** SF-36 questionnaire administered preoperatively and at 3 months. Domains analyzed included physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health.

Statistical analysis: Continuous variables expressed as mean ± SD and compared with Student's t-test. Categorical variables compared with Chi-square/Fisher's exact test. A p-value <0.05 was considered significant.

RESULTS

Pain assessment (VAS):

- At 24 hrs, pain was significantly lower in sublay group (5.2 ± 1.3) vs onlay (6.4 ± 1.5, p=0.01).
- At 48 hrs, sublay group continued to report lower pain (3.8 ± 1.1 vs 4.9 ± 1.4, p=0.02).
- At 1 week, pain was reduced in both groups but remained lower in sublay (2.1 ± 0.9 vs 2.7 ± 1.0, p=0.08).
- At 1 month, pain was minimal in both groups (0.9 ± 0.4 vs 1.1 ± 0.5, p=0.12).

Quality of Life (SF-36 at 3 months):

- **Physical functioning:** Significantly better in sublay (78.5 ± 8.3) vs onlay (71.2 ± 7.9, p=0.01).
- **General health:** Higher in sublay (74.6 ± 7.4) vs onlay (68.1 ± 8.1, p=0.02).
- **Bodily pain:** Improved in sublay (76.2 ± 7.1) vs onlay (73.4 ± 6.8), but not statistically significant (p=0.09).
- **Role emotional & mental health:** Both groups improved, but no significant difference between them (p>0.05).

Table 1. Comparison of VAS pain scores between groups.

Time point	Onlay (n=30)	Sublay (n=30)	p-value
24 hrs	6.4 ± 1.5	5.2 ± 1.3	0.01*
48 hrs	4.9 ± 1.4	3.8 ± 1.1	0.02*
1 week	2.7 ± 1.0	2.1 ± 0.9	0.08
1 month	1.1 ± 0.5	0.9 ± 0.4	0.12

Figure 1. Comparison of VAS pain scores between groups.

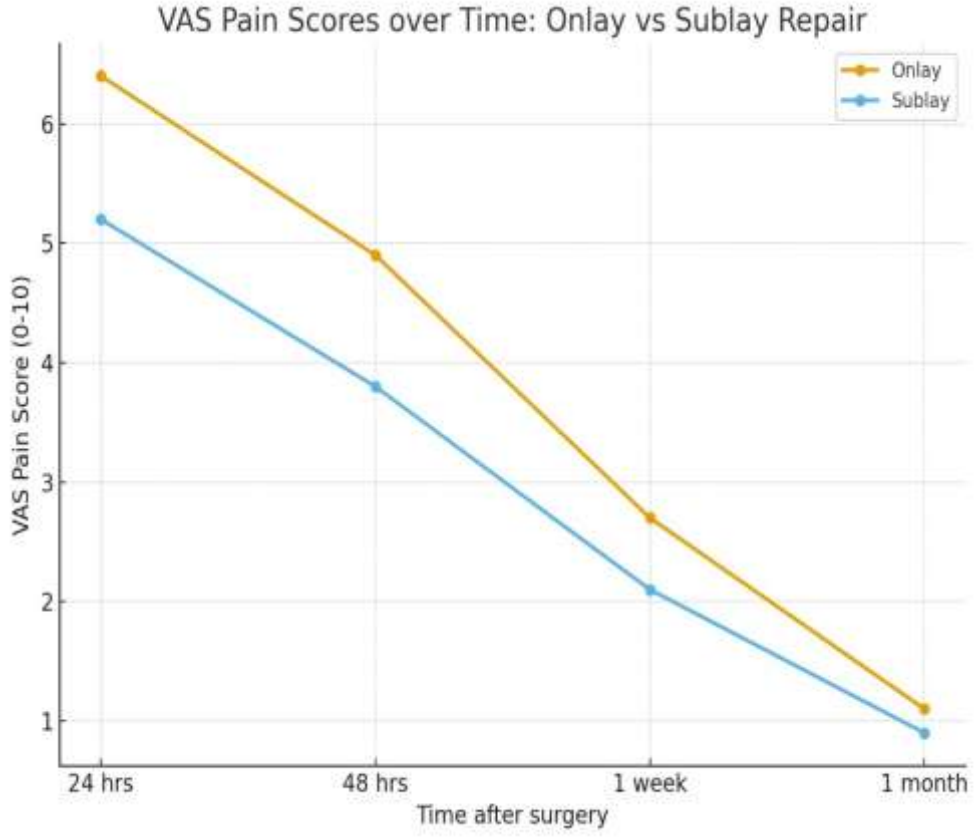
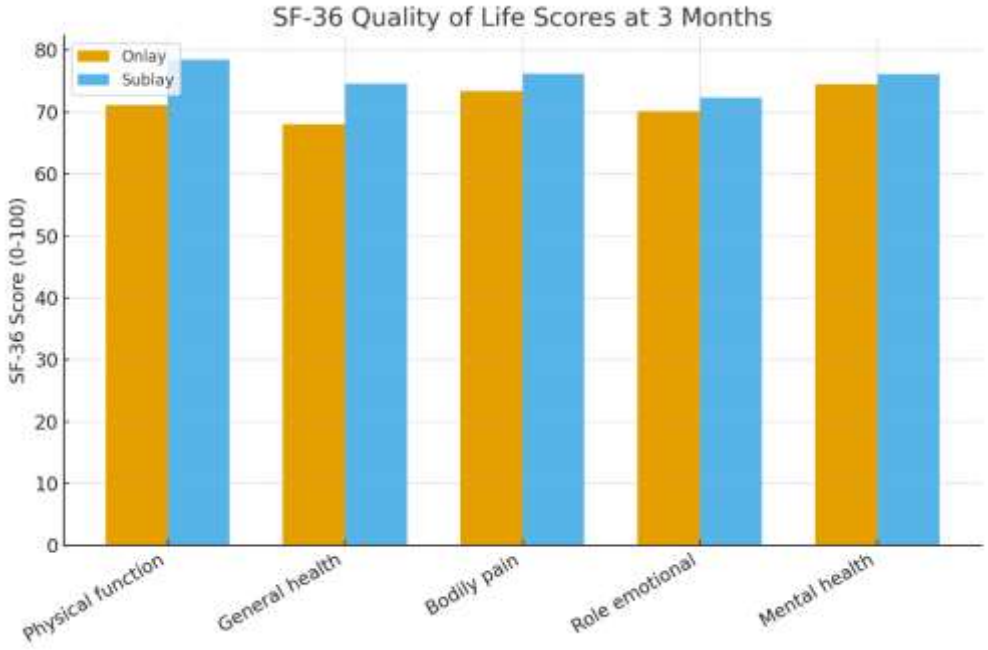


Table 2. Postoperative SF-36 domain scores at 3 months.

Domain	*Onlay (n=30)*	*Sublay (n=30)*	*p-value*
Physical function	71.2 ± 7.9	78.5 ± 8.3	0.01*
General health	68.1 ± 8.1	74.6 ± 7.4	0.02*
Bodily pain	73.4 ± 6.8	76.2 ± 7.1	0.09
Role emotional	70.2 ± 9.2	72.3 ± 8.5	0.23
Mental health	74.5 ± 7.5	76.1 ± 6.9	0.27

Figure 2. Postoperative SF-36 domain scores at 3 months.



DISCUSSION

This trial highlights the importance of incorporating PROMs in surgical outcome assessment. Sublay repair was associated with significantly reduced pain in the immediate postoperative period and improved HRQoL in physical domains at 3 months. Early pain reduction with sublay repair can be explained by reduced wound tension and minimized dead space, as also reported by Venclauskas et al[7]. and Saber et al[8]. Improved physical functioning and general health scores reflect enhanced postoperative recovery and earlier return to activities.

However, mental health and role emotional domains did not differ significantly, suggesting that psychological recovery may be less influenced by mesh position and more by other social and personal factors.

Strengths: Randomized design, validated PROM instruments, and prospective follow-up. **Limitations:** Small sample size, short follow-up for QoL, and single-centre study. Larger multicentre trials with longer follow-up are needed.

CONCLUSION

Sublay mesh repair not only reduces complications but also provides better patient-centered outcomes in terms of early pain relief and physical quality of life. These findings emphasize the importance of adopting sublay as the preferred technique for ventral hernia repair where feasible.

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