RESEARCH PAPER

Comparative Study on Early vs Late Abdominal Binder Use in Patients Undergoing Open Ventral Hernioplasty in a Tertiary Care Hospital: A Retrospective Study

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ABSTRACT

Purpose: The aim of the study is to evaluate the differences between early and late abdominal binder use in open ventral hernioplasty and the effect of using binders on pain, wound complication, drain removal, discharge time, and recovery to determine when binders can be used to achieve better postoperative outcomes.

Methods: Retrospective study at Chettinad Hospital (Jan 2024 - Jun 2025), where 50 patients will undergo elective open ventral hernia repairs. Groups: early binder (POD 0, n=25) and late binder (POD 10, n=25). Such variables are: pain score, SSI, drain removal, wound dehiscence, hospital stay and patient comfort.

Findings: Early abdominal binder use led to a significantly lower Day 3 pain score (4.2 vs 5.8, p=0.001), earlier drain removal (4.1 vs 5.8 days, p=0.001), and decreased hospital stay (5.2 vs 7.1 days, p=0.001) than late binder use did in our study of 5. Even though the incidence of surgical site infection was lower in the early group (12% vs 28%, p=0.16) and wound dehiscence was less frequent (4% vs 16%, p=0.16) these were not significant. In general, the application of binders at an early stage was linked to better postoperative care and patient comfort.

Conclusion: The use of abdominal binders immediately after open ventral hernioplasty had a markedly better score on pain, sooner drain removal, reduced hospital stay, and patient satisfaction than when they were used late. The two groups did not have statistically significant differences in the occurrence of surgical site infections or wound dehiscence.

Keywords: Ventral hernia, abdominal binder, pain

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Introduction

A ventral hernia is a defect located in the abdominal wall which allows the contents of the abdomen to herniate through this defect; ventral hernias are one of the most frequent surgical problems treated by general surgeons [1,2]. The two types of ventral hernias are: primary and incisional. The former occurs when there is a defect in the abdominal wall without any previous surgery, while the latter occurs due to a defect resulting from previous surgery [3]. The procedure of open ventral hernioplasty is still the most common method of surgical treatment of ventral hernias, especially for large (>5 cm) and/or complex hernias. Mesh repair is considered the standard method of repair for an open ventral hernioplasty [4].

Post-operative management is critical to recovery and long-term outcome following an open ventral hernioplasty [5]. After orthopedic surgery, an abdominal binder is often used. An abdominal binder is an elastic compression garment that provides external support to the abdominal wall after a ventral hernioplasty. Binder use is associated with decreased levels of postoperative abdominal pain, improved ambulation, decreased tension within the wound, decreased incidence of complications such as seromas, hematomas, and wound dehiscence, as well as assisting individuals in breathing through the use (of) appropriate respiratory techniques such as coughing and/or controlled deep breathing [6,7,8,9].

The three main factors that play an important role in the success of a hernia repair procedure are pain management, the ability to return to mobility soon after surgery, and the prevention of complications that can arise at the site of the patient's skin incision [10]. Additionally, it is important to determine whether the use of binders impacts the patient's success in recovery, so that evidence-based principles can be applied to the care we provide. The literature indicates that the timing of binder application (i.e., either immediately after surgery or greater than 10 days after surgery) is variable and that there is limited research available to compare binder application timing following open ventral hernias [11]. A retrospective comparison of existing institutional data will be carried out to provide evidence of the effect of early binder use on the amount of postoperative pain, the occurrence of any wound-related complications, length of stay in hospital, and the patient's recovery [12]. No studies currently compare the timing of binder application (i.e., early versus late); therefore, that is what this retrospective study seeks to determine. This data adds another valuable perspective on when to use binders in relation to the patient undergoing an open ventral hernia repair procedure and may have an effect on developing postoperative care protocols and on instituting programs for early recovery after surgery (ERAS) [1,2].

Aim and Objectives:

To compare the outcomes following surgery between those patients undergoing open ventral hernioplasty who received an abdominal binder either immediately following surgery (early) or after a delay (late). The primary goal of this study was to compare the amount of pain experienced by patients at 3 days postoperatively, who received an abdominal binder early versus late.

The secondary goals of this study included:

1. To compare the amount of pain experienced by patients at 12 days postoperatively and 8 weeks postoperatively.
2. To compare the frequency of surgical site infections (SSIs), wound infections, and wound dehiscence.
3. To compare the date of drain removal to the discharge date.
4. To determine whether the timing of the binder had any correlation to either the time it takes for patients to return to activity or the time it takes for patients to begin ambulating.

Methodology

For this retrospective observational study, the Department of General Surgery at Chettinad Hospital and Research Institute was used, as were 50 Patients undergoing Ventral Hernia Repairs using the Open Technique between January 2024 - June 2025. Exclusion Criteria: Included 1/2 ASA, 3 / 4 ASA, known Diabetes (BSR > [200 mg\\dl]), COPD, Cirrhosis / Ascites, Cardiac Failure, Renal Failure, Malignancy(s), Pregnant Female(s), Obstructed Hernia / Strangulated Hernia, BMI > 45 ([kg/m^2]), patients being treated with Steroids / Immunosuppressants were not included in the study. All patients who met the inclusion criteria gave informed consent to participate. Demographic data were recorded on each participant prior to their enrolment in the study. All participants were allocated to 1 of 2 groups according to when they were fitted with their respective abdominal binders. Group A were fitted with their abdominal binders on postoperative day 0 (n=25), and Group B were fitted on postoperative day 10 (n=25). All patients were followed for 8 weeks postoperatively initially, and every 3 months thereafter in Outpatient Department (OPD). Data were obtained from patients' case sheets, nursing notes, and out patient cards.

Results

A total of 50 patients underwent an open ventral hernioplasty and were randomised to either early or late use of an abdominal binder (25 patients each). The mean ages were 45.2 ± 9.8 years for early users and 46.4 ± 10.2 years for late users ($p = 0.67$). The majority of the patients were females with a total of 7 males (4 from the early binder group; 3 from the late binder group). No statistically significant differences were found between the early and late groups. There were also no statistically significant differences in BMI, comorbidities, and types of hernia; therefore the two groups were very comparable at the time of study initiation.

A total of 50 patients undergoing open ventral hernioplasty were included, with 25 in the early binder group and 25 in the late binder group. The mean age of patients was 45.2 ± 9.8 years in the early group and 46.4 ± 10.2 years in the late group ($p = 0.67$). The study population was predominantly female, with only four males in the early binder group and three in the late binder group. Both groups were comparable in terms of BMI, comorbidities, and type of hernia, ensuring uniform baseline characteristics.

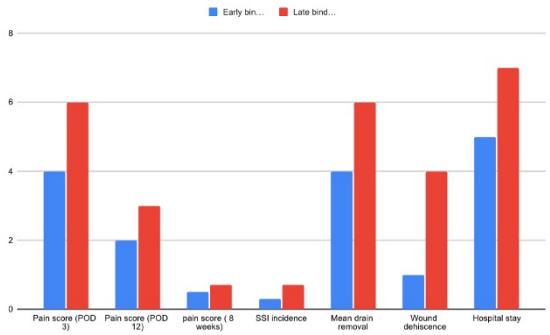
Table 1: Baseline characteristics of patients undergoing open ventral hernioplatsy

Parameter	Early binder group (n=25)	Late binder group (n=25)
Mean age (years)	45.2±9.8	46.4±10.2
Gender(male/ female)	4/21	3/22
Mean BMI (kg/m2)	28.4±3.2	29.0±3.5
Comorbidities	12 (48%)	14 (56%)
Type of hernia (incisional/para umbilical)	13/12	7/18

Early binder application demonstrated significant postoperative benefits. The mean pain score on postoperative Day 3 was markedly lower in the early group (4.2 ± 1.1) compared to the late group (5.8 ± 1.2, p = 0.001). Similar trends were observed on Day 12 (2.1 ± 0.8 vs 3.0 ± 1.0, p = 0.002), while by 8 weeks, pain scores converged with no significant difference (p = 0.07). The average day of drain removal was earlier in the early binder group (4.1 ± 1.0 days) compared to the late group (5.8 ± 1.3 days, p = 0.001). The mean duration of hospital stay was also shorter in the early group (5.2 ± 1.4 days) compared to the late group (7.1 ± 1.8 days, p = 0.001).

Table 2: comparison of outcome in both groups

Outcome variable	Early binder (n=25)	Late binder (n=25)	P-value	Significance
Pain score (POD 3)	4.2±1.1	5.8±1.2	0.001	Significant
Pain score (POD 12)	2.1 ±0.8	3.0±1.0	0.002	Significant
Pain score (8 weeks)	0.5±0.4	0.9±0.6	0.07	NS
SSI Incidence	3 (12%)	7(28%)	0.16	NS
Mean Drain Removal day	4.1±1.0	5.8±1.3	0.001	Significant
Wound dehiscence	1 (4%)	4 (16%)	0.16	NS
Hospital stay	5.2±1.4	7.1±1.8	0.001	Significant
Patient Comfort score (1-5)	4.5±0.7	3.4±0.8	0.001	Significant



Surgical site infection occurred in 12% of early binder patients and 28% of late binder patients, while wound dehiscence was seen in 4% and 16% respectively; these differences, though clinically relevant, were not statistically significant (p = 0.16). Patient comfort scores were significantly higher in the early binder group (4.5 ± 0.7) compared to the late binder group (3.4 ± 0.8, p = 0.001). These findings indicate that early binder use provides superior postoperative pain control, faster recovery, and enhanced comfort without increasing complication rates.

Discussion

As illustrated in the present study, the early use of abdominal binders after open ventral hernia repair leads to more favourable postoperative results in terms of pain relief, early removal of drains, shorter hospital stay and enhanced patient comfort as opposed to late use of abdominal binders [6,7,8]. These results are in line with the existing literature on the importance of the abdominal wall receiving early mechanical support in improving patient recovery [9,10].

One of the determinants of postoperative recovery and patient satisfaction is pain control. The current research found that early binder had far less pain rating on postoperative day 3 and day 12, which indicates that mechanical support at an early stage stabilizes the site of incision and causes less tension on sutures during the process of coughing or moving around [1,6]. Such analgesic effect probably led to a quicker ambulation and reduced hospital stay. This finding was also mentioned in the works by Szender et al., who found out that the use of early binder reduced the postoperative pain and analgesic needs in patients of abdominal surgery significantly [11]. Also, Sajid et al. established that the use of binders increased mobility and decreased discomfort, but had no negative effects on wound healing [12].

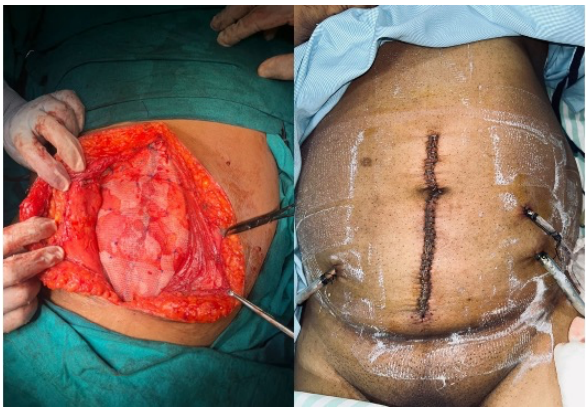
Our study observed statistically significant mean day of drain removal and hospital stay in the early binder group which could be explained by the fact that gentle

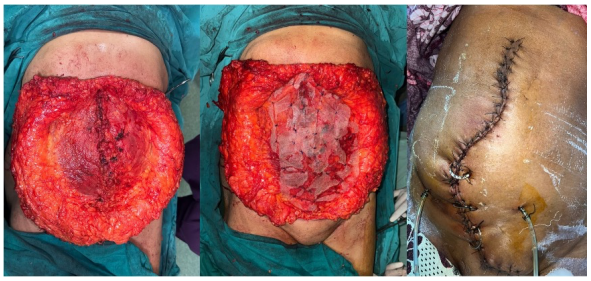
compression offered by the binder improved lymphatic drainage and minimized seroma formation [7,8]. Less hospitalization rate also has a direct effect on healthcare expenses and patient satisfaction, and early binder use is an easy but effective postoperative intervention [10]. Similar results were also shown by Gupta et al. who reported the early drain removal and reduction of postoperative morbidity due to the use of early binders after abdominal surgery [9].

In the case of wound complications, surgical site infection and wound dehiscence rates were lower in the early binder group but these were not statistically significant. This could be attributed to the small sample of 50 patients used which limits the statistical ability to find the differences in less frequent results [2,3]. However, the tendency to reduce the rates of complications that were observed suggests that the early usage of binder does not have harmful effects on wound healing [8,12]. The binder compression could be used to keep the tissues together and reduce the shear stress at the incision, thereby favouring wound integrity [7]. We found no signs of impaired perfusion or impaired healing in our cohort [11].

Comfort and psychological well-being of the patient are not taken seriously yet they are very vital elements of postoperative recovery. The early binder group in this study had significantly higher scores in their comfort. The use of a binder early on can give a feeling of protection and support and decrease anxiety related to movement and wound protection [9,10]. Greater comfort can also be associated with a quicker ambulation that is known to decrease postoperative pulmonary complications and venous stasis [1,6].

The current evidence aligns with an ever-increasing amount of study indicating that early postoperative mobility and mechanical assistance are the principles of enhanced recovery after surgery [5,12]. The application of early binder use in postoperative practice is consistent with these principles and leads to increased rates of return to function, improved pain management, and patient outcomes. Nevertheless, the retrospective nature of the study and comparatively small sample size are the weaknesses that should be interpreted with caution [2,3]. Bigger, multicenter randomised controlled studies are advisable to confirm the observed benefits and to standardise the timing, duration and patient selection criteria of binder application [11,12].





Conclusion

To sum up that preoperative use of abdominal binders in the initial 24 hours after open ventral hernioplasty is a major contributor to positive postoperative recovery outcomes. The patients in the early binder group had reduced pain, reduced time to remove the drain, reduced hospitalization and were more comfortable than those who had delayed the use of the binders. Notably, these advantages were obtained without any significant rise in the rates of surgical site infection or wound dehiscence, which means that the use of early binders is safe and effective.

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