

## Management of Ventral Hernias by Composite Mesh Patch Repair: An Outcome Evaluation of Novel Approach

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### Abstract:

**Introduction:** Ventral and incisional hernias of the abdominal wall are commonly encountered, pose significant medical issues, and are associated with an economic burden. A minimally invasive ventral patch repair is a relatively novel approach which is gaining popularity for the treatment for small ventral hernias. Hence this study was designed to evaluate composite mesh repair in the management of ventral hernias.

**Material and Methods:** Clinically diagnosed forty-two cases undergoing elective open ventral patch hernia repair above 21 years of age were recruited. Pre-operative, intra operative and postoperative information were collected. Postoperative pain was assessed by visual analogue scale and patient satisfaction was measure by using Carolina comfort scale. Postoperative follow up was conducted at 10 days, 1 month, and 6 months.

**Results:** Paraumbilical hernia (38.09%) was most commonly observed followed by umbilical (28.58%), incisional hernia (23.80%). Surgeons were fully satisfied (61.90%) with the surgical procedure. The postoperative pain did not show any recurrence during the follow up. Similar findings were observed in related to outcome of Carolina comfort scale. Seroma was common postoperative complication in 11.90% of cases.

**Conclusion:** Recurrence rates and major complications were both low when ventral hernia repairs were performed with the composite mesh patch prosthesis. Hence, it is effective approach for the ventral hernia repair.

**Keywords:** Ventral hernia repair, Composite Mesh, VAS score, Carolina comfort scale.

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### Introduction

Abdominal wall hernias, both primary ventral and incisional, are prevalent, cause considerable distress among patients, and drain healthcare resources [1,2]. They may influence the quality of life, physical discomfort, impede one's ability to do one's job, or both. In order to decrease the danger of blockage and strangulation, surgical treatment is often advised, even though up to one-third of hernias do not cause any symptoms [3].

A mesh prosthesis is a must-have for every ventral hernia repair procedure. The best chance for restoring abdominal wall integrity is offered by mesh, which allows for tension-free repairs whenever feasible. Between 24 and 54 percent of individuals have hernia recurrence after open surgeries that do not use mesh [4-6]. Recurrences of hernias are reduced by 24% to 32% in open repairs and by 5% to 10% in laparoscopic repairs

according to mesh implantation [6,7]. The ventral patch repair procedure provides benefits such as a reduced incision size, decreased expenses, shorter hospitalisation period, and more patient contentment. In a country such as India, where the cost of treatment and the duration of hospital stays are important factors influencing a patient's decision to have surgery, this approach has the potential to become the main surgical technique for treating small ventral hernias.

Surgical management for ventral and incisional hernia repair includes deciding the kind and method of surgery to be performed, as well as which prosthetic mesh material is most suited to provide the most optimal repair. While mesh-based abdominal wall restoration has significantly reduced hernia recurrence as compared to primary surgery, there is no consensus on whether mesh

provides the best repair [8-10]. As a result, much research has been performed to develop fresh and distinct prosthetic grafts for use in ventral hernia repair, with each new creation attempting to alleviate the shortcomings of its predecessor. With above reference the present study was designed to evaluate composite mesh repair in the management of ventral hernias.

### Materials and Methods

The present prospective study was conducted in the Department of General surgery at Apollo Institute of Medical Sciences and Research, located in Jubilee Hills, Hyderabad from September 2022 to February 2024. A source of 42 cases undergoing elective open ventral patch hernia repair above 21 years of age were recruited. Clinically diagnosed ventral hernia cases undergoing ventral patch repair were included. Cases not undergoing elective ventral patch repair, larger defective area of hernia and not willing to participate were excluded. Written informed consent was obtained from study participants and study protocol was reviewed and approved by institutional ethics committee.

The patient proforma was used to collect demographic, patient history and clinical

examination data. The intraoperative information including hernia defect size, mesh size used, status of rectus muscle closure, detail so anchoring sutures, feasibility of surgeon and satisfaction scores were collected. Post-operative parameters were reviewed according standard patient proforma with emphasis on immediate postoperative outcome managed by analgesics. Postoperative pain was assessed by visual analogue scale and patient satisfaction was measure by using Carolina comfort scale.

Postoperative follow up was conducted at 10 days, 1 month, and 6 months through outpatient consultation or telephonic communication. Parameters including pain details ease of mesh handling, duration surgical procedure, duration of hospital stay, and levels of patient satisfaction, recurrence of symptoms, and associated adverse complications were recorded.

The collected data was analysed by using SPSS version 23.0. Categorical variables were presented as frequency and percentage. Continuous variables were analysed using descriptive statistics and were represented in mean and standard deviation.

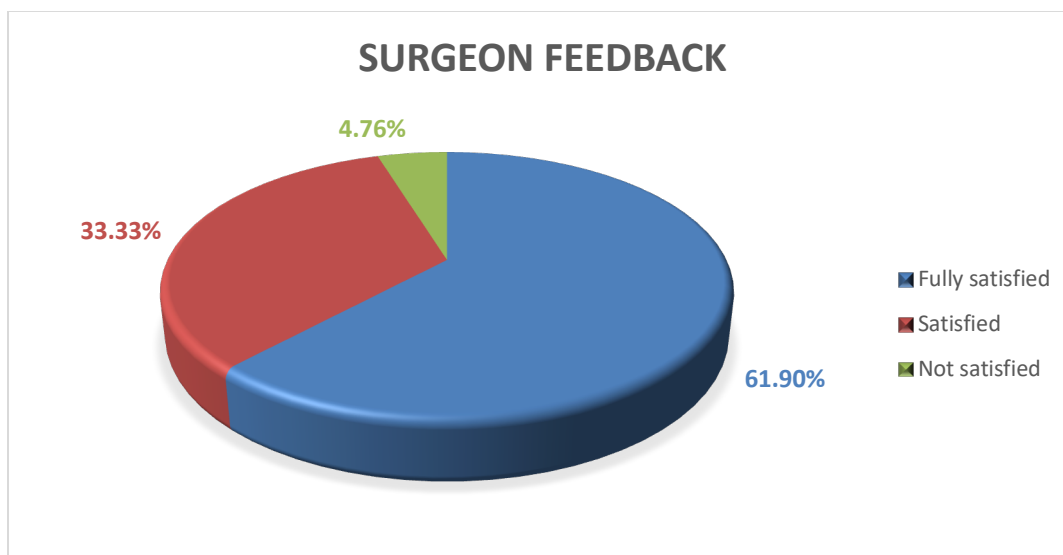
### Results

**Table 1: Demographic details of study participants**

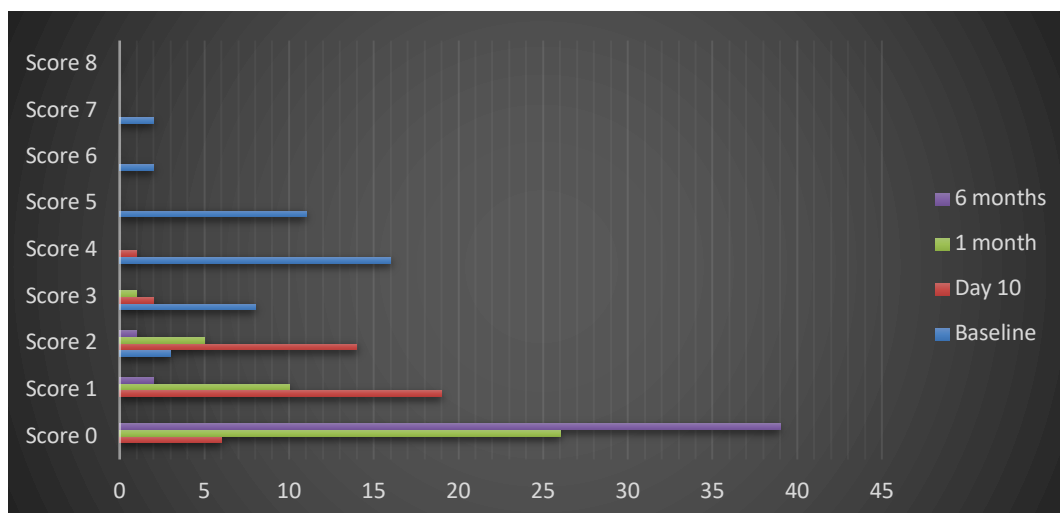
Demographic details	Total cases (n=42)	
	Frequency	Percentage
<b>Age (In years)</b>		
21-40	13	30.95%
41-60	16	38.09%
>60	13	30.95%
<b>Gender</b>		
Male	26	61.90%
Female	16	38.09%
<b>BMI (Kg/m<sup>2</sup>)</b>		
<25	09	21.42%
>25	33	78.58%
<b>ASA grading</b>		
Grade 1	10	23.80%
Grade 2	24	57.14%
Grade 3	06	14.28%
Grade 3	02	4.76%
<b>Comorbidities</b>		
Hypothyroidism	03	7.14%
Hypertension	20	47.62%
Diabetes mellitus	06	14.28%
COPD	05	11.90%
Cardiovascular diseases	03	7.14%
History of Abdominal surgery	02	4.76%
Renal complications	02	4.76%

**Table 2: Intraoperative findings of study participants**

Intraoperative findings	Total no of cases	
	Frequency	Percentage
<b>Type of ventral hernia</b>		
Umbilical	12	28.58%
Epigastric	04	9.52%
Paraumbilical	16	38.09%
Incisional	10	23.80%
<b>Size of hernia (In cm)</b>		
<1	02	4.76%
1 to 2	25	59.52%
2 to 3	10	23.80%
>3	05	11.90%
<b>Contents of hernia</b>		
Bowel	10	23.80%
Omentum	29	69.04%
Both	03	7.14%
Average duration of the surgery	33.15 min	
Average intraoperative blood loss	29.1 ml	
Average duration of hospital stay	3.14 days	
Average length of surgical procedure	2.7 days	



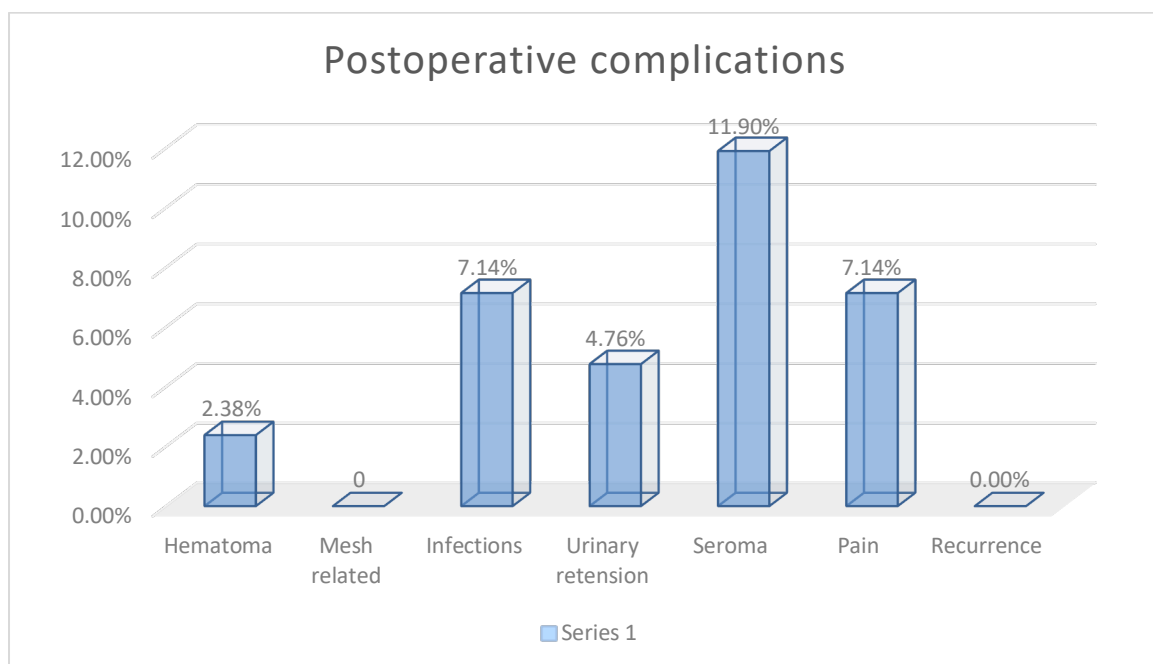
**Graph 1: Intraoperative surgeon’s feedback**



**Graph 2: Post-operative pain scores by visual analogue score**



Graph 3: Patient satisfaction levels by Carolina comfort scale



Graph 4: Postoperative complications

**Discussion**

Majority participants were aged between 41-60 years (38.09%), followed by 21-40 (30.95%) and above 60 years (30.95%) with male predominance (61.90%). The BMI was <25kg/m<sup>2</sup> in 21.42% and >25kg/m<sup>2</sup> in 78.58% of cases. 57.14% of cases had ASA grade 2 followed by 23.80% in grade 1 and 14.28% in grade 3. Hypertension (47.62%) was commonly associated comorbidity, followed by diabetes mellitus (14.28%), COPD (11.90%), hypothyroidism (7.14%), cardiovascular complications (7.14%), renal complications (4.76%) and history of abdominal surgeries

(4.76%) (Table 1). Paraumbilical hernia (38.09%) was most commonly observed followed by umbilical (28.58%), incisional (23.80%) and epigastric ventral hernia (9.52%). Majority cases had hernia size between 1 to 2 cm (59.52%). Hernial content was omentum in 69.04% of cases, bowel in 23.80% and both in 7.14% of cases. Average duration surgery was 33.15 min, average intraoperative blood loss was 29.1 ml, average length of surgical procedure was 2.7 and average duration of hospital stay was 3.14 days.

Majority surgeons were fully satisfied (61.90%) with the surgical procedure, 33.33% were satisfied

and 4.76% were not satisfied (graph 1). The postoperative pain did not show any recurrence during the follow up. Similar findings were observed in related to outcome of Carolina comfort scale (Graph 2 & 3). Seroma was common postoperative complication followed by infections in 7.14%, pain in 7.14%, urinary retention in 4.76%, and hematoma in 2.38%. The postoperative recurrence was not observed in any of the study participants (Graph 4).

Byrd JF et al. administered composite mesh to a group of 16 pigs and observed little intraabdominal adhesions, gradual growth of host tissue, and successful outcomes in open ventral hernia repair [11]. Berrevoet et al. performed a study on 126 persons who had open ventral hernia repair for umbilical (n=110) and epigastric (n=16) hernias. The study was prospective, single-arm, and multicentric in nature. The average diameter of the hernia was 1.8 cm, and the overall incidence of hernia recurrence was 3.0%. The pain ratings on the Median Numeric Rating Scale declined significantly from a baseline score of 2 (on a scale of 0-10) to a score of 0 (on a scale of 0-3) after 1 month (P<0.001). The pain ratings remained consistently low after 24 months, with a score of 0 (on a scale of 0-6). Out of a total of 103 patients, 102 of them, which accounts for 99%, expressed satisfaction with their restoration 24 months after the surgical procedure [12]. Multiple studies have shown recurrence rates of 14.8% over a period of 25 months [13-16], 12% over 16 months [17,18], and 10% over 43 months [19]. Our analysis found a recurrence rate of 0. This might be associated with a decrease in the frequency of postoperative monitoring. In a retrospective study conducted by Coelho Victor et al., it was determined that the mean duration of the surgery was 27.5 minutes, and the average period of hospitalisation was 2.275 days.

The most common defect size seen was 2 cm, accounting for 47.2% of the cases. Out of the total number of patients, 8.5% (21 patients) had a surgical site infection, whereas 10.9% (27 patients) developed seroma. There was a total of six people who had superficial cutaneous necrosis. After 24 months, the cumulative incidence of hernia recurrence was 16 persons, which accounted for 6.5% of the total [20]. Kumar HR et al. did not see any instances of mesh infections, early recurrences, readmissions, or revision operations. The research concluded with patients reporting an average Carolina comfort scale score of 4 out of 115 [21]. Hanna EM et al. discovered that the mean defect size was 13.6 square centimetres, whereas the mean mesh size was 113.6 square centimetres. Out of the twelve patients, 10.1% had complications during the perioperative period. The most prevalent issues were seroma, affecting 4.2% of the patients, and

ileus, affecting 1.7%. Two patients required further surgeries and removal of the mesh during the early postoperative period. One patient had an infection, while the other had pain at the location of the herniorrhaphy. The hernia did not reoccur, and the level of pain reduced from the beginning to the 6-month and 1-year follow-up periods [22]. Similarly, our study showed favourable outcome in terms of surgeons' satisfaction, pain scores and patient satisfaction. The present study has limitation in terms of low participants with limited postoperative follow up. Further larger scale studies with comparison of multiple approaches were required with long term follow up period.

### Conclusion

Recurrence rates and major complications were both low when ventral hernia repairs were performed with the composite mesh patch prosthesis. The success of the ventral patch repair was shown by the decreased postoperative pain and excellent satisfaction levels. It was a safe and effective approach. The repair is a very simple and less invasive procedure. It may be run efficiently and cheaply as a creche.

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