

Research Article

Outcome of Transverse Abdominis Muscle Release Repair in Complex Ventral Hernia - A Single Institute Experience

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Abstract

Introduction: Large, recurring, or complex defects are the hallmarks of Complex Ventral Hernias (CVH), which continue to be a difficult surgical problem. One advanced technique for reconstructing the abdominal wall is the Transversus Abdominis Release (TAR) method. The purpose of this study is to assess the TAR procedure's feasibility, safety, and initial outcomes in a single surgical facility.

Methods: Twenty patients who had TAR for complex incisional hernias defined as having a defect width greater than 8 cm were included in this three-year retrospective observational study that ran from March 2022 to February 2025. Analyses were conducted on Patient demographics, Hernia characteristics, surgical details, and Postoperative outcomes, including recurrence and surgical site occurrences.

Results: The cohort was 75% female and had a mean age of 50.8 ± 15.6 years. The average BMI was 23.65 ± 4.79 kg/m². The majority of hernia defects (65%) were 10-12 cm wide, and most were midline (50%) or involved multiple sites (30%). Recurrent hernias accounted for 25% of the cases. Sixty-five percent of patients recovered without any problems after surgery. Seroma (15%) and superficial surgical site infection (15%) were the most frequent complications. During the follow-up period, there were notably no instances of flap necrosis, mesh infection, or early recurrence.

Discussion: When it comes to treating complicated ventral hernias, the TAR technique is very effective and safe. Our findings, which indicate no early recurrences and a low rate of severe wound morbidity, are consistent with the increasing evidence that TAR is a better reconstructive option. It has established itself as a fundamental technique for complicated abdominal wall reconstruction, providing long-lasting repair with a favourable complication profile.

Keywords: Complex Ventral Hernia, Transversus Abdominis Release, TAR, Abdominal Wall Reconstruction, Component Separation, Incisional Hernia

INTRODUCTION

Complex ventral hernia (CVH) is a challenging sequela of Open Laparotomy and remains a significant problem in General Surgery. The complexity arises from large defect sizes, multiple or recurrent defects, dense intra-abdominal adhesions, and compromised tissue planes, which complicate repair and predispose to recurrence and complications.⁽¹⁾

Due to the high risk of infection or recurrence and the inability to achieve Tension-free closure, Traditional repair techniques like primary suture closure and the placement of Overlay or Inlay mesh frequently fail in such situations.⁽²⁾

Advanced reconstructive techniques have been developed to overcome these limitations. Transversus Abdominis Release (TAR)

combined with posterior component separation has become one of the best methods for treating CVH.⁽³⁾

The TAR technique, which was initially presented by Novitsky et al. in 2012, entails splitting the Transversus Abdominis muscle in order to medially mobilise the abdominal wall. This allows for tension-free fascial closure and the insertion of a sizable prosthetic mesh in the Retro-rectus space. This method reduces wound morbidity while maintaining the neurovascular supply to the subcutaneous tissue and the skin above.⁽⁴⁾

Comparing TAR to traditional techniques, several studies have shown that it produces long-lasting results with lower recurrence rates, fewer mesh-related complications, and enhanced abdominal wall function.^(5,6)

Additionally, TAR is especially helpful for high-risk patient groups, such as those who have had several previous abdominal surgeries, Diabetes, or Obesity.

Despite the advantages, TAR has an extensive learning process and is technically challenging, requiring precise anatomical knowledge and surgical expertise. The purpose of this study is to assess the effectiveness, safety, and feasibility of TAR repair for Complex Ventral Hernias at our institution. Postoperative complications and recurrence rates will be given special consideration.

MATERIALS AND METHODS

This study, which was carried out in the Department of General Surgery at our institution between March 2022 and February 2025, involved 20 patients who had Complex Incisional Hernias repaired using the Transversus Abdominis Release (TAR) technique. Only patients deemed suitable for Elective surgery after a Preoperative Anaesthesia evaluation were included in the study. A Complex Incisional Hernia was defined as a defect wider than 8 cm, detected either clinically or radiologically.⁽⁷⁾ The study excluded patients with liver disease, Ascites, active infections, contaminated surgical fields, minor hernias that could be closed without Myofascial release, and serious systemic comorbidities like advanced cardiac disease, Uncontrolled Diabetes, or Renal failure. Along with perioperative data, demographics such as age, sex, and Body Mass Index (BMI) were gathered. Contrast-enhanced Abdominal CT was used to measure the size of the defect. Records of follow-up outpatient consultations, Operating room registers, and Case sheets were used to gather data in a retrospective manner. The surgical procedure involved Adhesiolysis of the Omentum and Small bowel and an incision made at the lateral border of the prior scar. Primary closure was not possible due to the defect's size. After identifying the Posterior Rectus Sheath, the Transversus Abdominis muscle was carefully divided lateral to the Posterior Rectus sheath using TAR so as not to damage the peritoneum. This made it possible to place the mesh widely in the Retro-rectus plane and medially advance the Rectus complex.

A 25 × 20 cm Prolene mesh was positioned after the Posterior Rectus Sheath was closed in the midline. The Anterior Rectus Sheath was then closed, and a drain was inserted. Operative time, blood loss, and the degree of adhesion were evaluated, as

were postoperative complications like Surgical site infection, Seroma, Haematoma, Flap necrosis, re-intervention, and hernia recurrence. Patients were questioned about recurrence in both clinical and telephonic follow-up, including whether they had bulges, lumps, pain, or recommendations from other doctors regarding hernia recurrence. Microsoft Excel and SPSS software were used to conduct statistical analysis on the gathered data.

RESULTS:

Table 1: Sociodemographic Profile

The demographic details and preoperative risk factors of the 20 patients who were part of the study are compiled in this table. The average age was 50.8 ± 15.6 years, suggesting that middle-aged and older people were more likely to have complex ventral hernias. With a mean BMI of 23.65 ± 4.79 kg/m², the majority of patients fell into the normal to overweight range. With 15 women (75%) and 5 men (25%), there was a definite female preponderance. This is probably due to the increased risk of incisional hernias after gynaecological procedures like hysterectomy and LSCS. While 15% and 25% of patients were in Class I and Class III, respectively, the majority of patients (60%) were in ASA Class II, which indicates moderate systemic disease. 55% of patients had Diabetes Mellitus, and 15% reported Smoking, both of which are known risk factors for wound complications. The complexity of the cohort was highlighted by the discovery that 25% had a history of prior Hernia surgery, with one or more recurrences in these cases.

Table 2: Characteristics of Hernia Defects

Table 2 outlines the characteristics of hernia defects. Midline defects accounted for 50% of all defects, with multiple-site defects (30%) and lateral defects (20%) following closely behind. About 65% of patients had defects that were between 10 and 12 cm in size, 25% had defects that were between 8 and 10 cm, and only 10% had defects that were larger than 12 cm. These results underline how large and complicated the hernias treated in this study were, which usually made primary closure impossible and supported the use of the TAR technique for sufficient repair.

Table 3: Etiology and Types of Hernia

The aetiology of the Hernias is described in Table 3. The most common primary surgeries were Bowel perforation repair (65%), followed by Multiple LSCS (10%), Hysterectomy (5%), Open Cholecystectomy (5%), and Perforated Appendectomy (15%). The majority were

Incisional hernias (75%) & 25% of the cases were recurrent hernias. These findings demonstrate that TAR was frequently recommended for large, recurring, or Post-infectious Incisional hernias.

Table 4: Postoperative Complications

Postoperative results are shown in Table 4. Thirteen patients (65%) experienced no complications, suggesting that the TAR procedure is safe and well tolerated. The most common complication was Seroma formation, which occurred in 3 patients (15%), followed by superficial wound infections in 3 patients (15%) and haematoma in 1 patient (5%). Crucially, during the follow-up period, no instances of mesh exposure, deep wound infection, flap necrosis, or early recurrence were noted.

DISCUSSION:

Complex Ventral Hernia (CVH) management is still a major challenge in General Surgery, and conventional repair techniques frequently result in less than ideal results because of high rates of recurrence and wound morbidity.⁽¹⁾ Novitsky et al.'s development of the Transversus Abdominis Release (TAR) technique has given abdominal wall reconstruction a reliable alternative.⁽⁴⁾ Our study's results, which show positive results with TAR, are in line with and corroborated by an expanding corpus of research confirming the technique's effectiveness and safety.

With a mean age of 50.8 years and a significant female predominance of 75%, our results are consistent with the demographic profiles found in other studies. A higher incidence of prior Obstetric and Gynaecological surgeries was cited by Kachoria et al. as the reason for the cohort's female predominance (58.3%). In contrast to Kachoria et al., who reported a younger mean age of 38.64 years, our study's mean age represents a middle-aged and older population, indicating that complex hernias can affect a wide range of demographics and that TAR is appropriate for all age groups.⁽⁵⁾

A significant finding in our series was the size of the defect, as 25% of hernias were recurrent and 65% of them measured 10–12 cm. This is consistent with the challenging cases that have been chosen for TAR in previous research. With TAR, Oprea et al. were able to successfully manage an even greater mean defect width of 18.3 cm in their cohort.⁽⁸⁾ Likewise, Gala et al.'s study comparing the Anterior Component Separation Technique (ACST) and TAR revealed that the TAR group had defects with a mean area of 131.9 cm², highlighting the technique's

usefulness for extensive hernias where primary closure is impractical.

Our study's postoperative complication profile was noticeably favourable. Seroma and Superficial Surgical Site Infection (SSI) were the most frequent problems (15 percent each), but 65% of our patients showed no complications. Compared to other methods, this compares remarkably well. Gala et al. directly compared TAR and ACST and discovered that although the total number of wound complications was comparable, they differed significantly in severity.⁽⁹⁾ While all wound complications in the TAR group were treated with bedside interventions, five patients in their ACST group needed surgical debridement and one mesh explantation.⁽⁹⁾ This demonstrates a key benefit of TAR, which is that it reduces severe wound morbidity like skin flap necrosis, which was not present in our series and has been consistently reported to be lower in TAR cohorts, by avoiding extensive subcutaneous dissection and maintaining neurovascular perforators.^(8,9)

Additionally, our patients' lack of flap necrosis, deep SSI, or mesh infection at follow-up supports the technical advantages of the Retro-rectus Sublay Mesh placement. According to the surgical technique outlined by Oprea et al., this plane is well-vascularized, which facilitates mesh integration and serves as a barrier to prevent infection from superficial wounds. Eighth Basukala et al.'s case study also found that TAR's low infection profile is a result of its large, well-vascularized mesh placement area.⁽⁶⁾

Recurrence is arguably the most important outcome measure. There were no early recurrences in our study, which had a follow-up period until February 2025. The literature supports this outstanding short-to-mid-term outcome. At an average follow-up of 21.8 months, Gala et al. found that their TAR group experienced no recurrences, while their ACST group experienced one recurrence.⁽⁹⁾ Despite 75% of their cases being recurrent hernias, Oprea et al. also reported no recurrences in their 24 patients at a mean follow-up of 11.8 months.⁽⁸⁾ At one year, Kachoria et al. found a very low overall recurrence rate of 11.1%, with recurrences substantially linked to postoperative complications, comorbidities, and advanced age.⁽⁵⁾

Our study's findings mostly agree with those of Appleton et al.'s first UK experience using Transversus Abdominis Muscle Release (TAMR) for complex ventral hernia repair. Both studies

show that the TAR/TAMR technique produces acceptable morbidity and long-lasting fascial closure with low recurrence rates. At a median follow-up of 24 months, all twelve patients in Appleton et al.'s series experienced primary fascial closure with no recurrences, and the only wound complications noted were superficial infections and seroma formation. Similarly, of the 20 patients in our series, 65% recovered without any postoperative complications, 15% experienced seroma and 15% experienced superficial surgical site infection, and no early recurrences were noted.⁽¹⁰⁾

The fact that TAR is a technically challenging process with a steep learning curve must be acknowledged. Gala et al. observed that 4 patients (16%) in their TAR group underwent Intra-operative Enterotomies during Adhesiolysis, a known risk in complex re-operative surgery, despite the fact that our study did not report significant intra-operative complications.⁽⁹⁾ As highlighted in the technical description by Oprea et al., this emphasises the need for precise anatomical knowledge and surgical expertise.⁽⁸⁾ A strong repair with excellent postoperative results is the reward, but the technical difficulty is a legitimate consideration.

In conclusion, TAR results of our facility for Complex Ventral Hernia repair are in accordance with the encouraging findings in the literature at this time. TAR exhibits clear benefits over historical controls and alternative methods such as ACST, such as a reduced severity of wound complications, a very low rate of recurrence, and the capacity to efficiently manage large, complex defects. Our experience confirms the increasing body of evidence that TAR is a very dependable and successful procedure for intricate abdominal wall reconstruction.

CONCLUSION

Based on our institutional experience, the Transversus Abdominis Release (TAR) technique has been shown to be a very dependable and successful procedure for the repair of complex ventral hernias. According to our research, TAR makes it easier to successfully reconstruct large abdominal wall defects with a favourable postoperative outcome profile, which includes a manageable rate of minor complications and no early recurrence or severe wound morbidity.

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Table 1: Sociodemographic Profile

Variable	Percentage
Age (years)	50.8 ± 15.6
BMI (Kg/m²)	23.65 ± 4.79
Gender Category	
Male	5
Female	15
ASA Class	
Class I	3
Class II	12
Class III	5
History of Diabetes Mellitus	11
Smoking	3
H/o Previous Hernia Surgeries	
One	4
Two	1

Table 2: Hernia Defects

Hernia Defect	Frequency
Location of Hernia Defect	
Midline	10
Lateral	4
Multiple	6
Defect Size	
8-10 cm	5
10-12 cm	13
>12 cm	2

Table 3: Type of Hernia

Type of Hernia	Cause / Primary Surgery	Number of Cases	Percentage (%)
Incisional Hernia	Bowel Perforation	13	65
	Multiple LSCS	2	10
	Hysterectomy	1	5
	Open Cholecystectomy	1	5
	Perforated Appendectomy	3	15
Recurrent Hernia	-	5	25

Table 4: Postoperative Complications

Postoperative Complication	Number of Cases (N=20)	Percentage (%)
None	13	50
Hematoma	1	5
Seroma	3	35
Wound Infection - Superficial	3	15

Figure 1: Postoperative Complications

