

Type : Case Series

## **Transversus abdominis muscle release; a novel technique in complex ventral hernias-A short case series**

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### **Abstract**

**Introduction:** Surgical repair of complex ventral hernia repairs are difficult to perform and are associated with peri-operative complications and recurrence. Many surgical techniques have been studied to improve the outcomes of complex ventral hernia repairs and Transversus abdominis muscle release technique is one such procedure.

**Objectives:** To find out the outcome of transversus abdominis muscle release (TAR) procedure done in patients with complex ventral hernia.

**Materials and method:** A prospective study was done among 10 patients with complex ventral hernia presented to General Surgery department of Vinayaka mission's medical college and hospital, Karaikal for a period of 1 year. All the patients underwent transversus abdominis muscle release with sub-lay mesh by open method. The patients were discharged on 7<sup>th</sup> postoperative day. All the patients were followed up for a period of 6 months to identify the outcomes of the procedure and any delayed complications after discharge from the hospital. The results of the study are analysed and presented in the form of mean with standard deviation and percentage.

**Results:** Mean age of the patients was 59.4 years ranging from 45 to 76 years. Among the total 10 patients, 6 (60%) were females. Majority (40%) of the patients had incisional hernia. The most common previous surgical procedure was hysterectomy. Average duration of hernia among the participants was 3.4 years. The average size of the defect was 6.3 cm and 2 patients had multiple defects. During the stay in hospital, 2 patients (20%) developed wound related complication such as seroma formation. At the end of 6 months of follow-up there was no recurrence of hernia in the patients.

**Conclusion:** Short term follow-up of TAR procedure had shown that the technique is effective in repair of complex ventral hernia without any significant complication and recurrence.

**Key words:** ventral hernia, transversus abdominis muscle release, effectiveness, repair, outcome

## Introduction

Ventral hernia of abdomen are non-inguinal, non-hiatal defect in the fascia of abdominal wall which leads to protrusion of intestine or other tissue through the defect/weakness in the abdominal wall. Ventral hernia could be acquired or congenital and majority of the ventral hernias are acquired. The common causes of acquired ventral hernia include previous surgery which results in incisional hernia and trauma. Hernia can also occur through naturally occurring weak points of abdominal wall such as umbilicus, semi lunar line, bilateral inguinal regions, ostomy sites, and esophageal hiatus.<sup>1</sup>

Ventral hernia repairs are associated with higher rates of peri-operative complications and recurrence. The common perioperative complications include abdominal compartment syndrome and respiratory failure. Identifying appropriate surgical procedure is thus important to reduce the recurrence and the complications and to improve the quality of life of the patients.

Previous studies with traditional suture and mesh techniques for treatment of ventral hernia without relaxing the musculofascial flaps has shown that this procedure is associated with unfavorable results. Component separation technique (CST) for the management of huge primary and incisional abdominal wall hernias was developed to improve the outcomes of hernia repair.<sup>2</sup>

Novitsky et al had reported a novel and promising approach to the posterior component separation procedure by performing transversus abdominis muscle release (TAR).<sup>3</sup>

TAR procedure is lateral extension of Rives – Stoppa repair by creating a large space between transversus abdominis muscle (TA) and the fascia transversalis peritoneum complex. The present study was carried out to identify the short term outcome of transversus abdominis muscle release with sub-lay mesh fixation by open method.

## Objectives

To find out the outcome of transversus abdominis muscle release procedure done in patients with complex ventral hernia.

## Materials and methods:

- Study design: Prospective study.
- Study period: One year from October 2021 to September 2022.
- Study area: Department of General Surgery, Vinayaka mission's medical college and hospital, Karaikal.
- Study population: Patient with complex ventral hernias such as, large incisional hernia, recurrent incisional hernia, large umbilical and paraumbilical hernias.
  - Inclusion criteria:
    - Patients aged more than 20 years.
    - Patients with large incisional hernia(defect >8cms), recurrent incisional hernia, umbilical and para umbilical hernias which are large in size.
  - Exclusion criteria: Small ventral hernial defects.

A total of 10 patients were studied who fulfilled the inclusion and exclusion criteria during the study period.

- Surgical procedure:

- Transversus abdominis muscle release procedure (TAR) is an extension of the rives operation. All patients underwent TAR procedure with sub-lay mesh fixation by open method. Midline laparotomy incision was made. Hernial sac was identified and dissected to the fascial border of the hernial ring.
- Hernial sac and peritoneum are mobilized from the fascial hernial ring. Posterior rectus sheath medially incised longitudinally. Rectus abdominis muscle was completely separated from the posterior rectus sheath to the lateral edge of the rectus muscle compartment. The retro-muscular plane in the rectus muscle compartment is developed. Dissection was extended cranially approximately 4cm below xiphisternum.
- After creating the retro-rectus plane, posterior lamella of the internal oblique aponeurosis incised 1-1.5cm medial to the neurovascular bundle. Transversus abdominis muscle was exposed. Transversus abdominis fibres are divided superiorly and inferiorly to enter the pre-peritoneal space.
- Mesh pocket space created by sweeping transversus abdominis muscle laterally by exposing fascia transversalis. Posterior rectus sheath was closed in the midline using absorbable suture. Mesh placed in the sub-lay fashion- retro-rectus plane drain should be kept above the mesh. Anterior rectus sheath closed by non-absorbable suture material.

All patients were followed up post operatively for the period of 6 months.

## **Results**

The study results are presented for 10 patients who underwent TAR procedure in a period of 1 year.

Mean age of the patients was  $59.4 \pm 9.6$  years which was ranging from 45 to 76 years. Among the total 10 patients, 6 (60%) were females and the rest 4 (40%) were males. Mean age among females was  $57.83 \pm 11.7$  years and among males it was  $61.75 \pm 6.2$  years. Among the total patients, 5 did not have any co-morbidity and the remaining 5 had co-morbidity which includes diabetes mellitus in 2 patients (20%), systemic hypertension in 2 patients (20%) and diabetes mellitus and systemic hypertension together in 1 patient (10%).

Figure 1: Pie chart depicting type of hernia

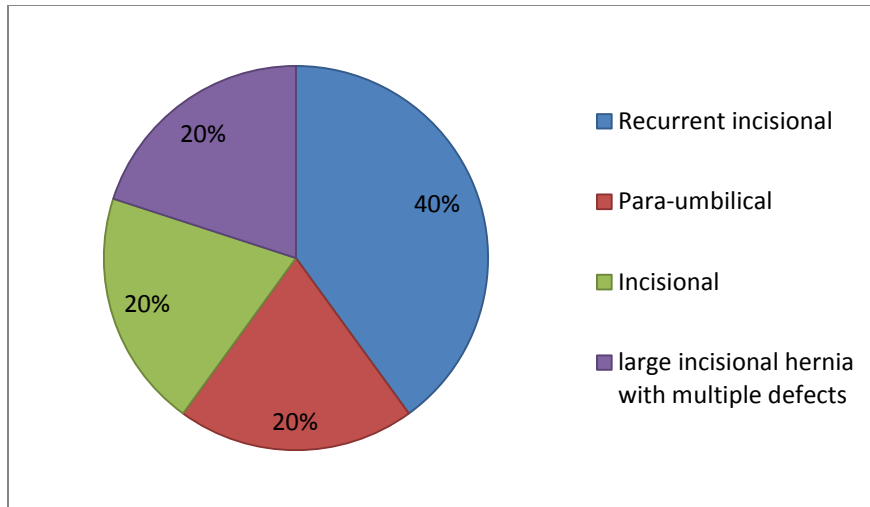


Figure 1 depicts the type of hernia among the 10 patients. Majority had recurrent incisional hernia followed by para-umbilical, incisional and large incisional hernia with multiple defects which were present in 2 patients each. Average duration of hernia among the participants was  $3.4 \pm 1.6$  years with minimum of 1 year and maximum 6 years.

Table 1: Details of previous surgeries done in the patients

| Previous surgery   | Frequency | Percent |
|--------------------|-----------|---------|
| Hysterectomy       | 3         | 30.0    |
| Laparotomy         | 2         | 20.0    |
| LSCS               | 1         | 10.0    |
| Midline laparotomy | 2         | 20.0    |
| NIL                | 2         | 20.0    |
| Total              | 10        | 100.0   |

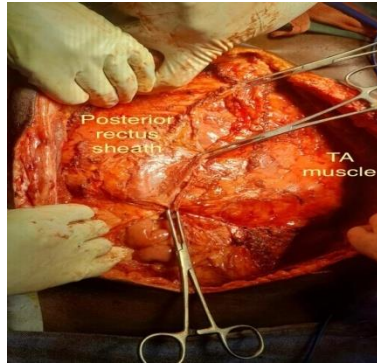
Table 1 depicts details of previous surgical procedures done in the patients. The most common procedure was hysterectomy. The average size of the defect was  $6.3 \pm 0.89$  cm which was ranging from 5 cm to 8 cm and 2 patients had multiple defects.

All the patients underwent TAR procedure with sub-lay mesh fixation by open method. The patients were discharged on the 7<sup>th</sup> post-operative day.

Preoperative picture of a patient



Intra-operative picture



Sub-lay mesh fixation



During the stay in hospital, it was found that 2 patients (20%) developed wound related complication such as seroma formation. There was no mortality in the patients and there was no deep surgical site infection or any other complication in the patients.

All the patients were followed up for a period of 6 months following surgery. Follow-up visit at the end of 6 months showed that there was no recurrence of hernia and mesh infection among the all 10 cases.

### Discussion

The current study used TAR technique with sub-lay mesh fixation in the retro-rectus plane. Since the tension is released, large pre-peritoneal space can be created which allows easy fixation of large, polypropylene mesh that helps in reducing further recurrence of hernia. Intra-operatively the large defect could be closed without any tension with this procedure. Fixing large mesh ensures better strengthening of abdominal wall.

In the present study, 20% of the patients developed wound complication in the form of seroma. Similar to our study, another study by Oprea et al reported wound complications in 21% of the patients.<sup>4</sup> In another study published by Oprea et al, wound complications was reported in 29% of the patients which included hematoma, seroma and surgical site infection.<sup>5</sup>

The duration of follow-up was 6 months in the present study and at the end of the follow-up period there was no recurrence. Similar to the current study, another study by Opera et al also reported no recurrence with average duration of 11.8 months of follow-up.<sup>4</sup> A study by Chaves et al reported the rate of relapse of 12.7% in patients who underwent TAR procedure. However, this was reported following one year of follow-up after the procedure.<sup>6</sup>

None of the patients in the present study developed deep surgical site infection (SSI). Similarly, another study report by Chaves et al also reported proportion of patients with deep SSI as 0%.<sup>6</sup>

Modified TAR procedure has also been developed and reported in few studies which are minimally invasive. These minimally invasive modified TAR procedure includes laparoscopic transperitoneal TAR technique, endoscopic extraperitoneal TEP TAR technique, endoscopy assisted mini or less open (MILOS) TAR technique, Robotic - assisted TAR procedure and Madrid TAR modification procedure.<sup>7-13</sup>

### Conclusion

Transversus abdominis muscle release technique is an effective procedure in patients presenting with complex ventral hernias. This procedure is associated with less surgical complications and it

has better outcome in terms of having no recurrence during the short term follow-up in the present study.

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