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Original article

Posterior component separation by transversus abdominis release-current paradigm in management of large complex hernias: Our initial experience

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ABSTRACT

Background: Repair of large complex ventral hernia repair presents many difficulties to the hernia surgeon owing to large wide defects that are difficult to appose in the midline. PCS- TAR is one novel reconstructive technique that addresses the goals of hernia repair without tension and placement of extraperitoneal large mesh without tension.

Method: The retrorectus plane is entered by incising the posterior rectus sheath as in the modified Rives-Stoppa technique, the transversus abdominis muscle is released at its attachment medial to the linea semilunaris. This plane is dissected laterally to the psoas muscle in the retro-peritoneum preserving the neurovascular bundles supplying the recti. A large polypropylene mesh is placed with a large overlap. The posterior sheath and the linea alba is reconstructed in the midline creating a functionally physiological abdominal wall.

Results: Our patient was a 62 year old lady with a BMI of 29 with a large incisional hernia following multiple surgeries and loss of domain. The size of the defect was 7×8 cm in the midline with another defect laterally. PCS- TAR was performed under General anaesthesia and took slightly more than 4 h. There were no intraoperative complications. Follow-up at 5 weeks showed no wound infection, seroma or recurrence.

Conclusion: TAR is a novel but effective technique in dealing with large complex hernias with loss of abdominal domain and gives good postoperative outcomes.

1. Introduction

Surgeons are facing increasingly larger and more complex abdominal wall hernias, some with significant loss of domain.[1] These hernias pose a challenge to hernia surgeons owing to the large defect and the contents of the sac being persistently outside the abdominal cavity. Repair of such large hernias becomes mandatory to prevent complications and also to improve the quality of life for the patient. Many techniques have been devised to tackle such hernias. It goes without saying that closure of the sheath under tension in such situations results in Abdominal Compartment Syndrome, large seromas and invariably high recurrence rates.

Over the years, surgery for ventral hernias has evolved from simple primary closure of fascial defects to tensionless repairs, to meshes and then to laparoscopic repair. Better techniques were designed, with the aim of decreasing morbidity and recurrence rates. The difficulty in repairing these defects depends on many factors including location of the defect, size of defect and condition of the surrounding tissue. Laparoscopic techniques of hernia repair brought advantages like faster recovery, lower wound complications and similar recurrence rates for comparable hernia defects.[2] However large hernias with loss of domain and previous multiple surgeries are situations where laparoscopy may not be feasible, and midline closure in open repair becomes impossible. Here is where other techniques were gradually developed. One of them was myofascial advancement of the tissue to close the midline without tension, later coined as 'Component Separation'. Anterior component separation (ACS) techniques allowed medial mobilization to some extent, but were associated with significant wound

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morbidities.[3,4] Several modifications of the Retro-rectus 'Rives-Stoppa' technique and extending laterally to Posterior Component Separation (PCS) techniques was devised to allow midline apposition without tension. A variant of the PCS technique, called Transversus Abdominis Release (TAR) with retromuscular mesh placement started as an excellent method of repairing such large complex hernias. Early results showed it to be an excellent technique for surgeons undertaking major abdominal reconstructive repairs.[5] This novel technique offered a reliable durable solution in reconstruction of a variety of complex ventral hernias.[6] Defining 'Large Complex hernias' however became necessary to set the criteria and guidelines for such repairs. Loss of domain and hernia volumes greater than 30% of abdominal contents are now considered mandatory characteristics to define large, complex abdominal wall defects. Posterior myofascial release helps bring the fascial edges together in such situations.

TAR is a complex and time taking surgery where extensive dissection in the preperitoneal space is necessary followed by placement of a large although inexpensive mesh. This reconstructive technique that preserves neuromuscular bundles and hence the functionality and vascular supply of the abdominal wall, was first described by American surgeon Yuri Novitsky in 2012. PCS-TAR has the advantages of avoiding unnecessary extensive skin and subcutaneous flaps as in open repairs (with or without ACS) thereby preventing large seromas. This preserves a significant portion of the abdominal wall blood supply, improves healing and decreases wound morbidity. Patient with large recurrent abdominal wall incisional or ventral hernia (defects larger than 10 cm in width, loss of domain), large eccentric subxiphoid, subcostal hernias that could not be addressed by open ACS techniques are the candidates for such hernia repairs.[7] The aim is to place mesh extraperitoneally over the fascia with a large overlap of the defect and obtain tensionless primary fascial closure in two layers with a large mesh sandwiched in between.

Component separation is an excellent surgical technique in selected patients which involves release of the different layers of the abdominal wall and in turn helps accomplish primary fascial approximation. This is in a way the goal of ventral hernia repair, that is restoration of the functional anatomy of the abdominal wall by midline approximation and placement of synthetic mesh with a wide overlap. This also avoids the use of expensive meshes and painful fixation techniques used in laparoscopic repair. Although this technique is gaining popularity worldwide, we believe that this repair was done for the first time in Sir Gangaram Hospital and believe it is worthy of publication.

2. Material and methods

Our patient was a 62 year old lady, with a BMI of 29 who came with a large incisional hernia in her midline lower abdomen, following multiple midline laparotomies and an ileostomy. This was followed by ileostomy closure in the right iliac fossa 3 years back. She had recurrent Sub Acute Intestinal Obstruction (SAIO) over the past couple of years. C T Scan of the Abdomen showed multiple defects with small bowel and omentum as contents going into a large 7 × 8 cm defect in the midline and a 3 x 4 cm defect in the ileostomy site. A lot of redundant skin was present over the hernia site which however was healthy but thinned out (Fig. 1). Operative Planning was extremely important in this case. After proper evaluation of her cardiopulmonary status by the anaesthetist she was advised active physiotherapy and breathing exercises for a week before surgery. Low molecular weight heparin (LMWH) was given subcutaneously12 h prior to her surgery.

We planned a Rives Stoppa retrorectus repair combined with unilateral TAR on the right side. A mid-line large laparotomy incision with preservation of the peritoneal sac was undertaken.

Fig. 1. The patient in the lateral position showing the large hernia.

The umbilicus was excised as per protocol. Complete adhesiolysis of the bowel and omentum from the undersurface of the abdominal wall (AW) was done to allow preperitoneal dissection later and to prevent bowel injuries at the time of reconstruction. Creation of the Right retrorectus space was initiated at the level of the umbilicus. An incision was made on the right posterior sheath 0.5–1 cm lateral to the incised midline extended cranially and caudally along the entire length of the RA sheath. The retro-rectus space was developed by both blunt and sharp dissection. Laterally the dissection was extended to the semilunar line. Care was taken to prevent damage to the neurovascular branches that perforate the posterior lamina of the Internal Oblique muscle at the Linea-semilunaris. Incision was taken on the posterior lamina of the Internal Oblique 0.5 cm medial to the perforating neurovascular bundles to expose the underlying TA muscle whose fibers were then divided along its entire medial edge (Fig. 2). Dissection below the TA muscle resulted in creation of the pre-peritoneal plane laterally as far as the psoas muscle. Retrorectus space was similarly created on the left side by bluntly lifting off the Left Rectus Abdominis by blunt dissection. This allowed easy approximation of the edges of the posterior rectus sheath in the midline without tension. Closure was commenced with apposing both the posterior rectus sheaths with a 2-0 slowly absorbable suture (Polydioxanone) recreating the visceral sac. The mesh was then placed in this wide pre-peritoneal space. A large 30 × 30 cm heavyweight polypropylene mesh was used and anchored inferiorly to both Cooper's ligaments. Lateral wide overlap and intra-abdominal pressure helped maintain the mesh in position without fear of lateral recurrence. Two closed suction drains were placed on the ventral surface of the mesh. Anterior fascial closure with a running No.1 polypropylene suture recreated the linea-alba followed by

Fig. 2. TA muscle being divided to get to the preperitoneal plane.

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