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A transverse abdominis release and posterior component separation for large incisional hernia

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Abstract
Incisional hernias are a common complication of abdominal surgeries. About one third of all abdominal surgeries are prone to develop incisional hernias. An incisional hernia occurs at / or in close proximity to the surgical incision through which the contents of the abdomen may protrude. The incidence further increases in emergency procedures. This is one such case of a large incisional hernia in a patient who underwent emergency laparotomy for ileal perforation and presented with a large incisional hernia 3 months later. Transverse Abdominis Release with Posterior Component Separation was done and the patient was discharged on 11th postoperative day. Transverse abdominis release is a durable and reliable surgical repair for large incisional hernias.

Keywords: incisional hernia, transverse abdominis release, component separation, epigastric swelling

Introduction
A 37 year old male was admitted with complaints of swelling over the midline scar of abdomen for the past eight months. The swelling increased in size on coughing, straining and gradually progressed to attain the present size. One year ago the patient had been admitted for complaints of abdominal pain, vomiting in a hospital and was diagnosed to have ileal perforation. He was resuscitated and underwent emergency laparotomy with primary closure of the ileal perforation. Immediate Post-op he developed surgical site infection and gradually wound gaping. The wound was managed conservatively initially and later mass closure of the abdomen was done. He was then discharged on the 11th post-operative day. After three months the patient developed swelling over the laparotomy scar in the anterior abdominal wall.

Materials and Methods
On examination, a swelling of size 11*7 cm in the epigastrium and another swelling of size 6*4 cm was seen over the suprapubic region alongside a vertical midline scar extending from the epigastrium to the suprapubic region. The swelling is partially reducible and cough impulse is present. The defect is about 16*11 cm. The skin over the swelling is grossly thinned out.
Contrast enhanced Computed tomography of the abdomen and pelvis showed a defect in the anterior abdominal wall of length of 20cm and transverse diameter of 15 cm with small bowel and omentum as content. Pre operatively the patient was advised to reduce weight and to perform incentive spirometry regularly. After optimising the patient in terms of weight and pulmonary reserve, he was posted for transverse abdominis release with Posterior Component Separation.
Intra operatively, dense adhesions are noted between the small bowel, hernia sac and the skin. After complete adhesiolysis, the rectus sheath is identified and opened along the medial edge of the wound. The posterior rectus sheath is then separated from the rectus muscle and retro rectus space is created by dissecting the rectus muscle from the underlying rectus sheath. Neurovascular bundles are preserved. Then Posterior rectus sheath is incised on its lateral border 1cm lateral to the linea semilunaris to expose the transverse abdominis muscle.
Division of transverse abdominis is done on either side and this plane is deepened till the mid axillary line on either side. The rectus sheath is medially mobilised. Both the ends of the posterior rectus sheath are now approximated in the midline. A large mesh of size 30*30 cm is placed in the retro muscular space created on either side.

The Anterior rectus sheath is reapproximated. Excess skin with the previous scar is excised and Skin suturing is done. Post operatively the patient was extubated on the 1st post-operative day. Oral feeds are started on the second post-operative day. The patient is discharged on the 8th post-operative day.

Discussion

Complex abdominal wall defects represent one of the more challenging dilemmas faced by general surgeons [1]. The difficulty seen in repairing these defects depends on a multitude of factors. These include the location, size, depth, and the condition of the surrounding tissue associated with the defect [2]. There is sufficient evidence that abdominal hernias with time will worsen a patient's quality of life Obesity greatly affects the formation of hernias, hernia recurrence, and hernia repair morbidity. Hence weight reduction forms a key component in the pre-operative preparation of these patients [3].

During the preop evaluation for surgical repair, the patient should be assessed for comorbidities and medically optimized before the surgical repair. Because the presence of these co morbidities are associated with higher recurrence and complication rates. The presence of coronary artery disease, chronic obstructive pulmonary disease, corticosteroid use, and low preoperative albumin levels were found to be significant independent predictors of wound infection and hospital length of stay [4]. If presurgical evaluation detects any substantial comorbidity or disease process, surgeons should consider consultation with an internal medicine physician to facilitate optimization [5].

The Transverse Abdominis and internal oblique muscles are key contributors to intra-abdominal tone throughout the thoracolumbar space. Mobilization of the Transverse Abdominis off the underlying fascia removes its contribution to the lateral abdominal wall leaving the Internal Oblique's contribution intact. This allows for expansion of the abdominal cavity and thus myofascial advancement to the midline of both the lateral and medial components of the abdominal wall [6].

During the procedure, for hernias where the sac closely approaches the skin, care should be taken to avoid injury to the bowel as viscera would be shallow to the incision. Once inside the abdominal cavity, we focus on completing the midline laparotomy before addressing the adhesions that may be found laterally. However, generous lysis of adhesions should be completed to free the undersurface of the posterior abdominal wall layers to allow medial advancement and free any attachments that could lead to internal hernias [7]. After incising the medial border of the rectus sheath, the rectus abdominis muscle is dissected off the posterior rectus sheath and the Transverse Abdominis Release (TAR) procedure is begun.

The TAR can be started cephalad first ("top-down" approach) or from the caudal aspect ("bottom-up" approach),The "top-down" approach starts in the upper aspect of dissection where the TA muscle is more medial to the linea semilunaris and is generally thicker [8]. It is important to remember that the lateral neurovascular supply to the rectus muscles penetrate the posterior lamina of the Internal Oblique at the lateral rectus border; care must be taken to start the TAR medial to these bundles to prevent denervation of the rectus itself [9]. Once the upper fibres are cut open, the Transverse Abdominis release should continue inferiorly. Once the entirety of the retro muscular plane is developed, the posterior rectus sheath is mobilized and closed in the midline. A large mesh is placed in the retro rectus plane created and fixed. The anterior rectus sheath and the skin are then closed in layers. Larger defects or areas that are extremely thin may not be closable primarily. In such circumstances, a piece of autologous tissue (hernia sac and omentum) can be used to patch the graft. Bilateral TAR should provide enough myofascial advancement to allow the posterior sheaths to meet in the midline.

Fig 1: CT abdomen and pelvis

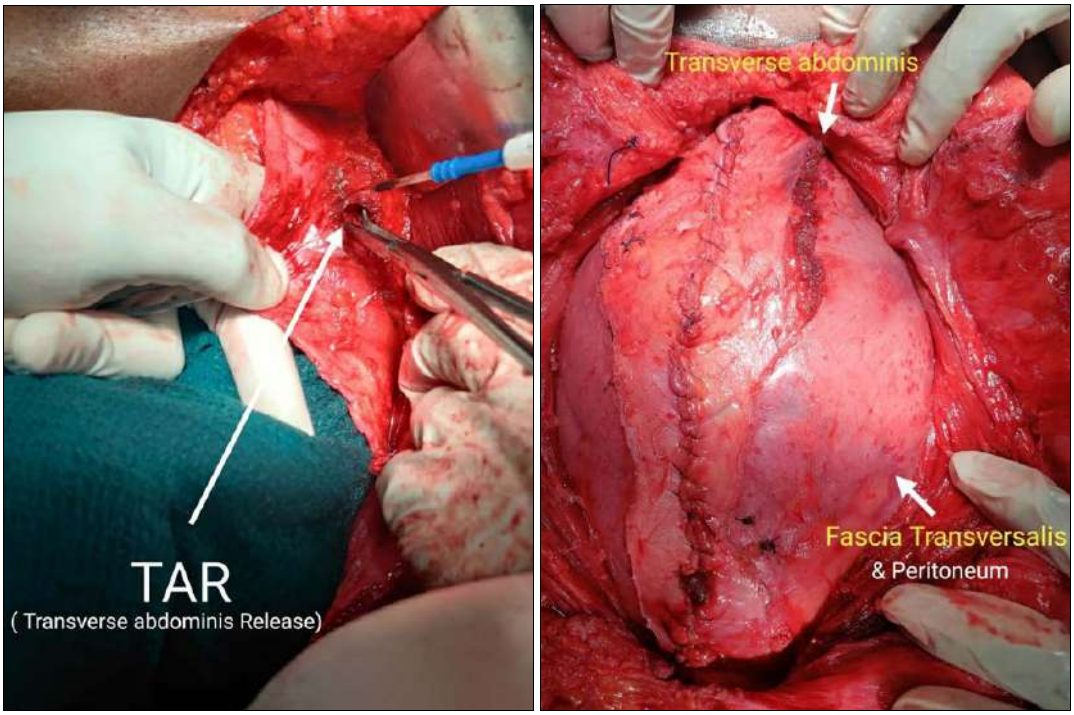

Fig 2: Transverse abdominals release

Conclusion

Large complex incisional hernias are difficult to manage by conventional techniques due to high risk of recurrence, large defects and tension closure. In such cases, the transverse abdominis release technique is durable and reliable in treating them by providing a well vascularised space for mesh and tension free closure. The technique of TAR carries a long learning curve and should be performed only by surgeons with sufficient experience in the field for better results.

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