

Dumanian Technique for Repair of Complex Incisional Hernias

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ABSTRACT:

Incisional hernia is protrusion of tissue at or near the site of an incision from a previous surgery. It is a challenging procedure to repair complex incisional hernias. Most of the numerous reconstructive techniques are unable to achieve goals of hernioplasty owing to various factors being planar mesh impose the risk of pain and infection whereas conventional suture repairs can fail due to suture pull through, rupture or slipping of knot. The open components separation technique (CST) creates large undermining skin flaps especially useful in patients with complex hernias who require judicious approximation of the midline fascia. Another novel technique for repair of such hernias is the Dumanian Technique : using mesh as a suture material and has been shown to improve the ultimate tensile strength (UTS) and thus prevent surgical failure. Both the techniques are implemented in our case to achieve successful abdominal closure.

Keywords: Component separation, Dumanian technique, Incisional hernia, Mesh repair.

How to cite this Article:

Lateef S, Dawani S, Jafferi S, Aslam N, Rasul S. Dumanian Technique for repair of complex incisional hernias. J Bahria Uni Med Dental Coll. 2023;13(2):144-6 DOI: <https://doi.org/10.51985/JBUMDC2022080>

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CASE PRESENTATION:

A 27 years old male with history of gunshot and burst abdomen 2 years back. He developed a large left diaphragmatic hernia and a huge incisional hernia. For this he underwent repair of diaphragmatic hernia prior to planning for incisional hernia repair. Then after 8 month of it he was planned for incisional hernia repair by Dumanian Technique for complex hernias with significant loss of domain which may not be treated even with component separation.

He presented to our clinic with huge incisional hernia extending from xiphisternum to pubic symphysis(Fig 1). CT scan revealed a large defect in anterior abdominal wall measuring approximately 20*18 cm with evidence of herniation of omental fat, bowel loops along with mesentery

within the hernial sac.

The patient was lying down supine with arms extended on arm rest on the operating table. Preparation and draping of the field was done from the nipple line extending up to the mid-thigh and laterally up to the edge of the table. The advantage of wide prep is to allow for wide mesh fixation points, if needed. We chose open approach considering hernia orifice being large and planned for its repair using Component Separation.

Technique, Transversus Abdominis release (TAR) and Dumanian Technique for complex hernias with significant loss of domain . Successful surgery was done on 22nd June, 2021. The patient developed wound dehiscence due to poor skin condition on follow-up, which was managed conservatively, and wound was healed on this conservative management. About 5 cm from the midline, skin flaps were raised, from one lateral border of rectus muscle , the linea semilunaris, to another. External oblique was divided vertically 2 cm lateral to linea semilunaris, separating it from the Internal Oblique muscle. This was medialization of Rectus. The separation was done till midline could be brought as close as possible. In addition, Transversus Abdominis release was also done to minimize the defect as much as possible. Release of Transverse Abdominis muscle fibers was attained, extending from xiphoid process above up to and along its entire insertion line at linea semilunaris level. Inferiorly separation extended to the point where deficiency of muscles is there and only peritoneum is present, the arcuate semilunaris. Laterally, release was extended up to the bilateral psoas muscles visualization. Superiorly, extension was taken up to the diaphragm central tendon. Though the posterior rectus sheath approximation in the midline was achieved, but there was still a defect of about

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Received: 29-05-2022
Accepted: 03-02-2023

7 cm left with no further room for external oblique mobilization or transversus abdominis release.

This 7 cm defect was then repaired using Dumanian Technique. Macroporous, uncoated Polypropylene mesh of size 30*30 cm was used after cutting along blue lines and

Figure 1: Preoperative assessment (Anterior & lateral views)



Figure 2:



Figure 3: Postoperative assessment



converting it into 2 cm wide strips this way it gave the tensile strength equivalent to ultimate tensile strength of a number 1 polypropylene. The abdominal wall already brought close together using CST, was pierced with a sharp hemostat.

These were then tied as simple interrupted sutures after passing the strips of mesh through the abdominal wall. Several strips were placed and tied in interrupted fashion to attain the tensile strength and midline closure was made (Fig 2). A subcutaneous suction drain was placed. Patient was again seen postoperatively after 1 week and followed regularly further. Patient has been well without recurrence for over 6 months since last operation (Fig 3)

DISCUSSION:

Incisional hernia is defined as abdominal wall hernia occurring at the site of a previous surgical incision. More common site for incisional hernias is midline and is a type of ventral hernia.¹ For incisional hernias, it is crucial to avoid their recurrence and minimize the spread of infection which makes their reconstruction a difficult procedure. Therefore, the primary goals of the restoration of the abdominal wall are securing the visceral organs and avoiding the recurrence.

10–25% of patients suffers from incisional hernia undergoing laparotomy and is a very common complication of abdominal surgeries.² The incidence of infection in ventral hernia repair is high being 8% .³

To achieve a reliable high-tension closure, many materials have been tried and implanted including silver wire⁴ dermal autograft strips⁵ and collagen ribbon.⁶ Earlier, closure of large defects was done using procedures like free flaps or myofascial flaps with high recurrences and complications.⁷ But the novel technique of usage of a mesh as a suture material and component separation techniques reduces the above mentioned risks. Furthermore, there is added benefit of reduction in recurrence rates.

Ramirez originally described Component separation technique (CST) in 1990.⁸ Wide undermining of skin flaps causing wound-related complications was a major issue with this technique. Preserving peri-umbilical perforators reduced wound-related morbidity as evident in some recent works.⁹

This new reconstructive technique of TAR was introduced by Novitsky in 2012 and sdurable results were achieved using this technique. Another modification of the Rives-Stoppa technique, where anterior to posterior fascia, mesh is placed retromuscularly. Primary closure of the anterior fascia is then done. This new retro-rectus plane is bounded laterally by Psoas muscle, superolaterally by diaphragm central tendon, inferolaterally by the inguinal ligament and inferiorly by space of Retzius. Mesh reinforcement is aided by this plane as well as tension-free midline rectus closure is achieved.¹⁰

TAR, another new myofascial release technique in

complicated repair of ventral hernias, is a type of separation of posterior component. It facilitates significant advancement of fascia of Posterior Rectus, wide dissection laterally and neurovascular supply preservation. It also avoids subcutaneous tissue undermining with added advantage of provision of ample space for Sublay mesh. An immense retromuscular plane is created by TAR which also has benefit of bilaminar ingrowth of the mesh. Aiming low perioperative morbidity and a low recurrence rate is achieved by deploying this novel technique of posterior component separation. Overall, TAR seems to be an exquisite addition to the armamentarium of surgeons who wish for major abdominal wall reconstructions, especially those who have previously failed multiple attempts of other types of reconstruction.¹¹

A new closure technique introduced by Dr Dumanian for abdominal defect in which macro porous polypropylene mesh strips were cut from a sheet of mesh and sutured for tissue approximation. Since its introduction, this sutured repairs from mesh strips is deployed successfully in various institutions naming: Northwestern, The Ohio State University, the University of Illinois Chicago and Walter Reed. Their safety can be assessed by comparing with both the abdominal wall sutured closures and planar mesh hernia repairs done in contaminated fields.¹²

We applied these techniques for repair of our patient's incisional hernia and there is no recurrence up to date

Authors Contribution:
Sadia Lateef: Writeup
Surrendar Dawani: Case Documentation
Salman Jafferi: Writeup
Nimra Aslam: Writeup
Shahid Rasul: Case Documentation

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