

Open Transversus Abdominis Release (TAR)

Key Principles and Anatomy:

Transversus abdominis release is aimed to address large ventral/incisional hernias via myofascial cutaneous advancement flaps and sublay mesh reinforcement. The goal of the procedure is to both provide for lineal abdominal restoration after rectus muscle medialization and to create a large retromuscular pocket for sublay mesh placement. The patient should be carefully counseled about the risks and benefits of repair/abdominal wall reconstruction, including bleeding, mesh/skin infection, injury to abdominal viscera, chronic abdominal pain, loss of umbilicus, excessive scarring, and recurrence.

It is essential to understand anatomy of the retrorectus space, location of the Neurovascular perforating bundles, the exact location of the junction between posterior and anterior rectus sheaths (commonly referred as “semilunar line”), the location of the arcuate line, the anatomy of the transversus abdominis muscle (TAM), interdigitation of upper TAM and anterior medial diaphragm, the preperitoneal and pretransversalis planes within the lateral abdomen, and the Space of Retzius.

The steps of the operation to be performed are:

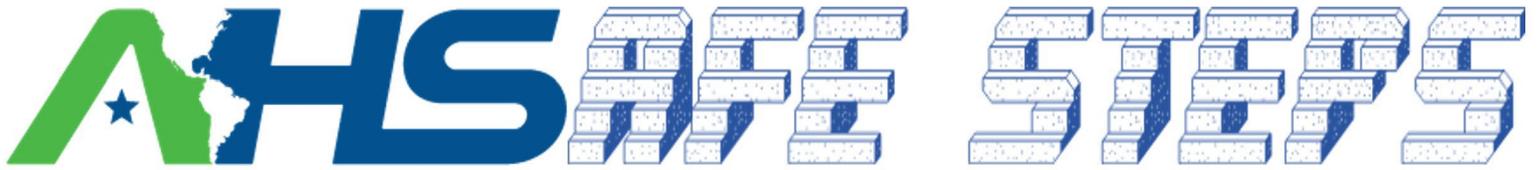
1. Exploratory laparotomy and Lysis of adhesions
2. Posterior rectus sheath release on the right.
3. Posterior rectus sheath release on the left.
4. Transversus abdominis muscle release on the right.
5. Transversus abdominis muscle release on the left
6. Repair of a recurrent/incarcerated incisional hernia.
7. Implantation of large mesh
8. Soft tissue closure

In the description of the operation, it is imperative to describe why TAR/reconstructive surgery was necessary, what was released, what was advanced medially and what was achieved.

DESCRIPTION of Open TAR for a large midline hernia:

The patient is placed in the supine position. Urinary catheter is placed routinely. Preoperative prophylactic anticoagulation and antibiotics are administered. After general anesthesia is induced, the patient's abdomen is prepped widely and draped in a standard surgical fashion. The hernia size should be measured and documented. A midline laparotomy encompassing old scars is performed. Upon entry into the abdomen, all adhesions to the abdominal wall are lysed. *In the absence of obstructive symptoms preoperatively, interloop adhesiolysis is not necessary.* The need for a component separation needs to be re-assessed and documented. A countable white towel is then placed to exclude the viscera.

Abdominal wall reconstruction is then initiated, typically starting on the patient's right side. The posterior rectus fascia is incised. The medial aspect of the Arcuate line is separated from the linea alba, exposing the upper aspect of the Space of Retzius. Cephalad, the incision is extended towards the xiphoid process. The retrorectus plane is developed to linea semilunaris. Richardson's retractors are placed under the recti



and Allys clamps are placed on the posterior fascial edge to facilitate medial traction. The neurovascular perforators are identified about 1cm medial to the semilunar line and preserved. The plane is extended cephalad to the costal margin and inferiorly into the space of Retzius. If this is confirmed to provide insufficient medialization of posterior rectus fascia and the rectus muscle, the next level of release is then performed. After re-identifying the perforators, the posterior rectus fascia (i.e, posterior lamella of the internal oblique) is incised just medial to the perforators and the underlying fibers of the TAM are identified and released in their entirety. *Care should be taken at all times to confirm preservation of the perforators and especially of the semilunar line. One can employ an “intra-operative timeout” to ensure correct anatomic dissection and absence of inadvertent injuries. The hallmark of the appropriate TAM division is visualization of a medial segment of the TAM attached to the posterior fascia WITHOUT any other muscle fibers seen posteriorly.*

TAM division allows entry into the plane deep to the lateral edge of the divided TAM and dissection into the lateral retroperitoneum. Typically, this dissection is extended to the mid-axillary line to ensure maximal release/advancement of both posterior and anterior compartments. *To facilitate this step, active traction/counteraction is essential. It is recommended to use Allys clamps on the posterior fascia, Kocher clamps on the edge of the anterior fascia and Richardson retractors for muscular retraction.*

Superiorly, the retromuscular plane is extended cephalad (and underneath) the costal margin onto the preperitoneal plane of the diaphragm. The plane is then moved medially to the retrosternal space. *It is essential to recognize and protect the fibers of the anteriomedial diaphragm. The dissection plane should be deep to the intact diaphragm and could be extended to visualize the Central tendon.*

Inferiorly, space is dissected across the myopectineal orifice into the space of Retzius, visualizing both Coopers ligaments and symphysis. Importantly, the aforementioned releases/maneuvers allow for significant medial advancement of the posterior rectus fascia and medial advancement of the vascularized rectus muscle for the purpose of subsequent restoration of the linea alba. *It is essential to verbalize/document what was released, advanced and what was the result of the advancement.*

Given the size of the large aforementioned hernia defect, the same releases had to be done on the other side. In brief, it is started with the posterior rectus sheath release and development of the retro-rectus space to linea semilunaris. The perforators are identified and preserved. The medialization is then checked and, if insufficient, the next level of release is again performed similarly to the first side. The TAM is identified and divided. A confirmation of the preservation of the perforators/semilunar line is performed and documented. A generous retromuscular pocket is again created and significant medial advancement of the posterior rectus fascia and medialization of the vascularized rectus muscle is achieved for the purpose of restoration of linea alba. The two planes are connected in the retrosternal space superiorly and in the space of Retzius inferiorly. *Fenestrations in the posterior layers are closed with interrupted or running 2-0 Vicryl sutures in the transverse direction.*

The medialized leaves of the posterior rectus sheaths are then connected in the midline using running 2-0 Vicryl suture. Excessive tension or failure of this closure may lead to serious postoperative complications. *It is essential to ensure that the visceral sac is restored completely. When the closure is*



excessively tight or incomplete, one must ensure that the retromuscular dissection is completed to psoas muscles on each side and/or employ omentum, hernia sac, or any non-permanent meshes to bridge all posterior layer deficits to achieve a COMPLETE restoration of the visceral sac.

The pocket is copiously irrigated with normal saline and a large uncoated mesh is placed. The linea alba is then restored in the midline using running #1 Maxon/PDS sutures. Two drains are typically placed on top of the mesh. If there is a significant amount of attenuated and redundant skin and soft tissue, it should all be excised sharply. A consideration to a formal panniculectomy should be given. A subcutaneous drain may also be placed.

Soft tissue and skin are closed in layers and dressing is applied.