

Anterior Components Separation Repair of Incisional Ventral Hernia

Richard Davis

Introduction:

This is the repair to use for very large defects. It includes division of the external oblique muscle and mobilization of the anterior rectus sheath. You can get up to 7cm of extra length per side with these steps, to bridge midline defects of up to 14cm. If the defect is wider than that, closure can still be accomplished provided the hernia sac is intact, using mesh to bridge the defect and the sac interposed between the mesh and the bowels. As described, carefully preserve the entire hernia sac and save it in case this problem arises.

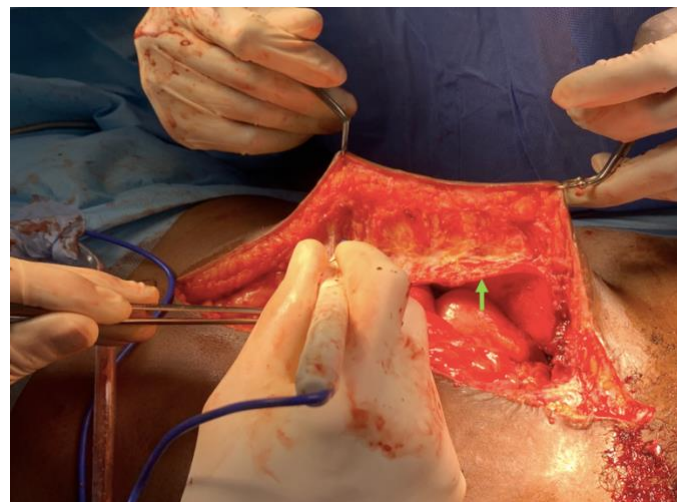
For hernias smaller than 8cm, mobilization of the anterior rectus sheath is not necessary. The retrorectus space can be developed as described in the chapter "Retrorectus Mesh Placement Repair of Midline Incisional Hernia" If after this maneuver the fascial edges do not reach comfortably, you can release one or both of the external obliques to make the closure tension-free.

The operation proceeds in the following steps:

- Mobilization and preservation of the hernia sac
- Lysis of adhesions and return of the bowels to the abdominal cavity
- Mobilization of the anterior and posterior rectus sheath
- Division of the external oblique aponeurosis.
- Closure of the fascia at the midline and placement of the mesh, including resection of the hernia sac
- Coverage of the mesh as much as possible, with anterior rectus sheath or rectus muscle
- Closure of the fascia and skin, maximizing the amount of tissue that lies between the mesh and the skin.

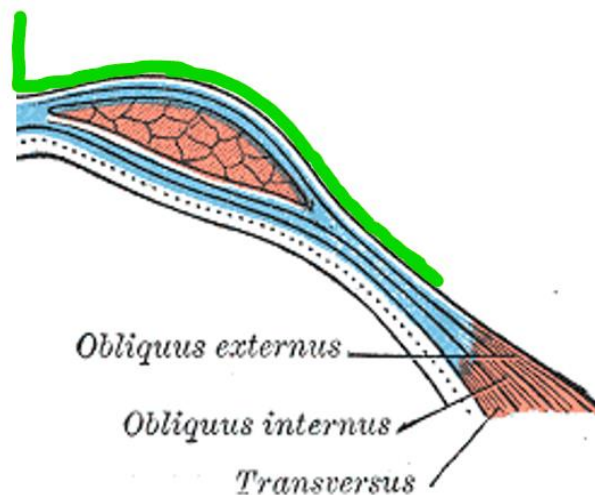
Steps:

1. Incise the skin through the previous midline scar and carefully dissect down to the hernia sac.
2. Dissect the hernia sac off the surrounding subcutaneous fat. Gentle downward traction on the sac and upward traction on the skin will allow this plane to reveal itself. Ideally you are not cutting through scar tissue, you are dissecting unscarred fat immediately adjacent to the sac. Follow this plane of dissection down until you can palpate the rectus muscle, which is the medial edge of the hernia defect.



Dissecting the hernia sac off the surrounding subcutaneous fat. Proper traction and counter-traction and careful hemostasis allow you to see the plane, dividing the uninflamed fatty tissue just adjacent to the hernia sac and pulling it downwards.

3. Extend your dissection anterior to the rectus sheath, separating the subcutaneous fat from the anterior rectus sheath until you are 2-3cm past the lateral border of the rectus muscle. This separation should extend from the costal margin to the inguinal ligament.



Plane of dissection anterior to the rectus sheath extends to 2-3cm lateral to the lateral edge of the rectus muscle.

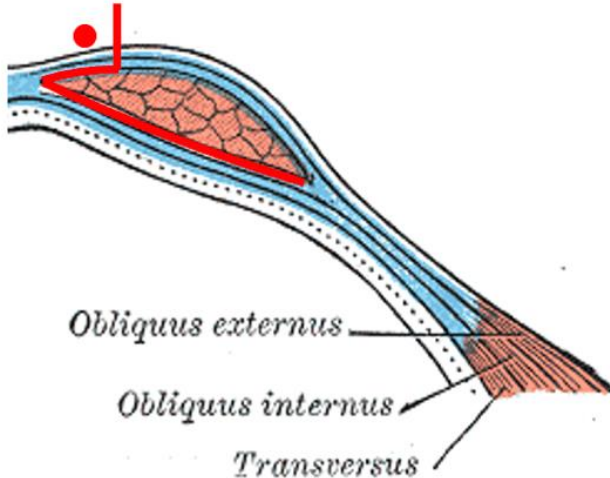
4. Enter the hernia sac at the midline(if you have not already done so inadvertently) and lyse any bowel adhesions until the intra-abdominal viscera can lie freely within the abdominal cavity. Preserve the hernia sac as much as possible.
5. Incise the anterior rectus sheath 2cm lateral to its medial edge and carry your incision to about 3cm

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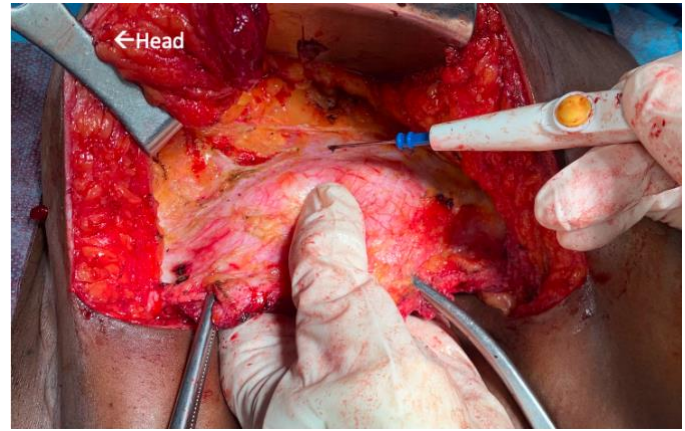
past the most cranial and caudal extent of the hernia defect.

6. Dissect the rectus muscle off the fascia, at first moving medially towards the medial edge of the muscle. Then pass posterior to the muscle, moving from medially to laterally, to the most posterolateral edge of the rectus muscle.



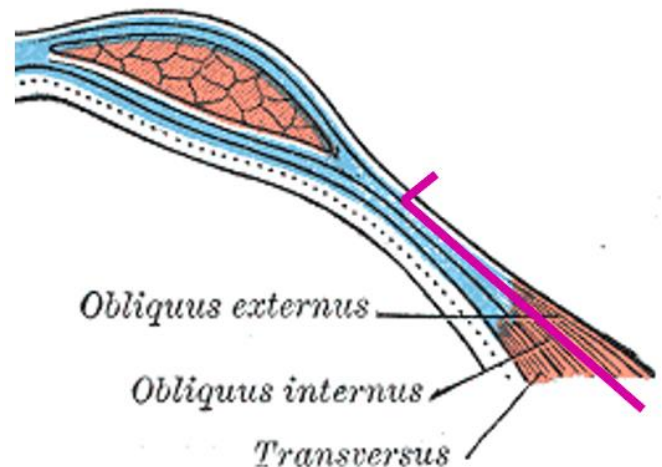
Incision of the anterior rectus sheath 2cm medial to its medial edge, then dissection of the anterior surface extending posterolaterally. This complete dissection has the effect of mobilizing the fascia adjacent to the red dot 2-3cm towards the midline. Remember that below the semilunar line, the posterior rectus sheath is not existent, you are dissecting the plane between the transversalis fascia and the muscle.

7. With your non-dominant hand, grasp the rectus sheath between thumb and index finger, feel the lateral edge, and gently pull towards the midline.
8. Make an incision through the fascia of the external oblique muscle, 2 cm lateral to where you feel the lateral edge of the rectus muscle. This fascia should separate under tension to reveal the transverse fibers of the internal oblique muscle underneath. Once you have seen this, you have confirmed that your incision is in the right place. Extend it from the costal margin to the inguinal ligament.



Dissection of the subcutaneous fat off the anterior rectus sheath has been completed. Grasping the rectus sheath in the non-dominant hand, the surgeon is able to feel its lateral edge and make an incision 2cm beyond this edge. The transversely oriented fibers of the internal oblique muscle will appear, indicating the incision is in the appropriate location.

9. Under direct visualization, with proper retraction, separate the external oblique aponeurosis from the internal oblique muscle. There will be several perforators passing through this plane, it is important to divide these with suture ligation or electrocautery to prevent a postoperative hematoma in this space. Proceed all the way to approximately the posterior axillary line.



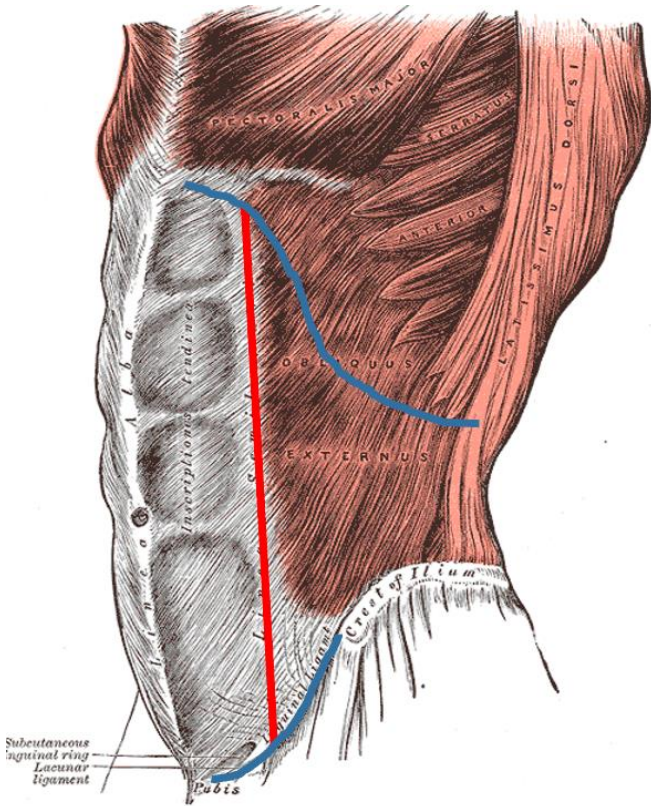
Incision of the external oblique aponeurosis. By grasping the rectus muscle and pulling it gently towards the midline, the surgeon can feel the muscle's lateral border. Incise the external oblique muscle 2cm lateral to that edge. If the incision is properly placed, the transversely oriented fibers of the internal oblique muscle can be seen underneath. Extend the incision from the costal margin to the inguinal ligament. Dissect this space under direct visualization all the way to the posterior axillary line, ligating perforating vessels as you go.

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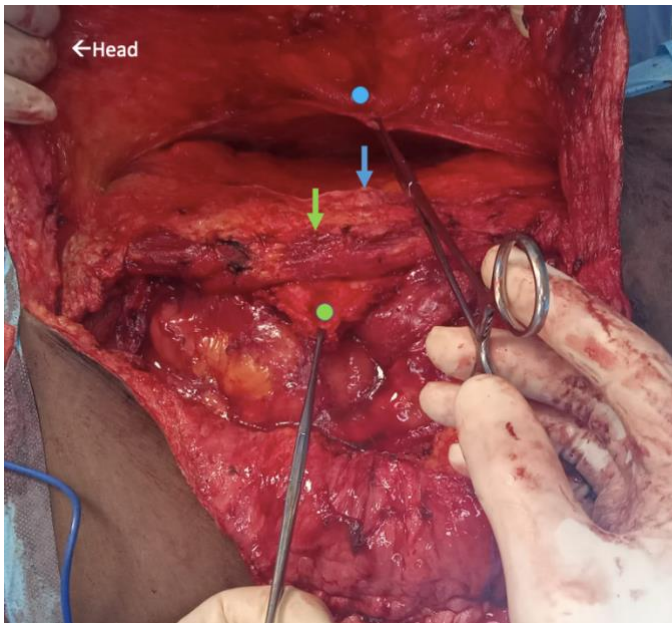
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space between the blue and green dots represents the amount of distance that has been gained by these maneuvers.

10. Once these steps have been repeated on both sides, the rectus sheath from each side can should now be loose enough to meet at the midline. Trim the hernia sac and then approximate the rectus sheath with non-absorbable suture. The posterior rectus sheath below the semilunar line will not be fascia.
11. Alternatively, if you cannot approximate the rectus sheath at this point, trim and close the hernia sac to cover the intestines. You will proceed with the remaining steps of this operation including mesh placement, and the mesh will “bridge” the defect.
12. Trim a piece of mesh into an ellipse to fit into the space behind the rectus muscles. Secure it in place with full thickness interrupted non-absorbable sutures through the lateral rectus muscle and anterior rectus sheath. Do not tighten these sutures excessively, this could endanger the neurovascular supply of the muscle.



Once the surgeon has confirmed that the external oblique aponeurosis has been incised (rather than the anterior rectus sheath) the incision (red line) is extended from costal margin to inguinal ligament (blue lines.)



Both maneuvers of the Anterior Components Separation have been completed on the patient's left side. The mobilized portions of anterior and posterior rectus sheath (green dot) have been separated from the rectus muscle and the non-mobilized anterior rectus sheath (green arrow.) The divided edge of the external oblique aponeurosis (blue arrow) has moved medially, away from its lateral edge (blue dot.) The



Mesh (yellow dot) in place over the approximated rectus sheath and behind the rectus muscles. It has been sewn in place with interrupted nonabsorbable suture, passed through the lateral rectus sheath (blue dots) which are tied loosely to avoid neurovascular injury. The rectus muscles and anterior sheath are unable to meet in this patient, so the strength of the repair will come from the posterior rectus sheath above the semilunar line, and the mesh itself. Note that the mesh is sutured on both sides at the apex, in this photo these sutures

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are obscured by skin but their position is shown by blue dots as well.

percutaneously under ultrasound guidance. Be meticulous about sterility when doing this, to avoid transforming it into an abscess.

13. Most likely it will not be possible to approximate the anterior rectus sheath. The rectus muscles themselves should be loosely approximated to cover the mesh, if possible. The goal is to have as much tissue as possible between the mesh and the skin.
14. Verify hemostasis in the space between the external and internal oblique muscles. Place drains in this space. If conditions are clean and nursing care is excellent on your ward you can place a drain over the mesh as well, but this can potentially expose the mesh to infection if the drain is not properly cared for.
15. Reapproximate the subcutaneous fat in several layers to provide more “distance” between the skin and the mesh. Then close the skin.

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Pitfalls

- Visceral injury and spillage during lysis of adhesions. Do not place a mesh under these conditions. Perform the other steps as above without placing mesh.
- Damage to the neurovascular supply of the midline structures: Avoid deep sutures between the internal oblique and transversus abdominis muscles at the posterolateral edge of the rectus.
- Inability to approximate the fascia despite complete release: confirm that all steps have been done completely, specifically that the external oblique release is complete, from costal margin to inguinal ligament, all the way to the posterior axillary line.
- Postoperative wound infection: if this is superficial, drain it completely and give antibiotics. If this becomes a sinus tract when it heals, the mesh has become infected. Removal of the mesh will be necessary. In case of a recent operation this can be deferred as long as the patient is not toxic.
- Postoperative fluid collection around the mesh: the patient will present with fullness in the area. Ultrasound will confirm the presence of fluid collection, and allow you to distinguish whether it is an abscess or a seroma. If it is a large seroma, drain it

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