

Closure of Laparotomy Wound Dehiscence

Richard Davis

Introduction:

Dehiscence of a laparotomy wound in the early stages of healing is a dreaded complication. Usually it means a return to the operating room for closure, with more surgical stress, danger of complications, and prolonged recovery.

Wound dehiscence can be caused by technical factors (surgeon error) or by patient factors. Technical factors include failing to perform the fascial closure adequately, or closing the fascia with the wrong type of suture that absorbs too quickly (such as Polyglycolic acid, also known as Vicryl®.) Another technical error is failure to consider patient factors such as those below, leading to failure to reinforce the closure appropriately when doing it for the first time.

Patient factors are many and include obesity, intra-abdominal infection, emergency surgery, high abdominal pressure on closing, chronic cough, chronic steroid use, and collagen disorders (including those that predispose to abdominal aortic aneurysm formation.) Greater than all of these, and accompanying many of them, is malnutrition. This condition accompanies many surgical and non-surgical diseases, including cancer, Human Immunodeficiency Virus infection, tuberculosis, achalasia, Zenker's diverticulum, and a whole host of others. Nutritional assessment is discussed in a separate chapter.

Wound dehiscence can present subtly. Sometimes the only clue is discharge of a large amount of serous fluid from the skin wound. If the skin wound has watery fluid discharge, gently probe the wound and feel the fascial closure underneath. If you can feel a gap in the fascia, it is dehisced. This will almost always be an indication to return to the operating room for closure, except in those situations described below.

If you do not make the diagnosis at this stage, the problem will most likely present itself in a more dramatic fashion. During mobilization or a cough, the wound suddenly bursts open and the intestines appear, sometimes protruding from the abdomen. In this case, surgical re-exploration is mandatory and must be done very soon.

Sometimes fascial dehiscence accompanies an intra-abdominal infection, either an abscess or an

anastomotic leak. Purulent discharge from the skin incision may be a superficial wound infection, but if the amount of pus is very high, consider whether it is coming from the abdominal cavity. Gently probe the wound and feel for a defect in the fascia. If one is present, it is very unlikely that the patient will recover without another operation. If you are lucky, the intra-abdominal abscess is located only adjacent to the wound and you can manage it with operative exploration, drainage, and repeat closure of the fascia. Much more likely, the abscess cavity originated elsewhere in the abdomen and spread to the fascia where it burst through. In this case, a full and careful abdominal exploration and washout is needed before fascial closure.

If feculent or bilious fluid come through the wound, the patient has an enterocutaneous fistula. This subject is covered more extensively in another chapter, but in brief the stages of management will be resuscitation, investigation, and intervention. Give IV fluids and antibiotics, then do a CT scan if you have one available. Otherwise perform bedside ultrasound yourself and try to assess where the fluid collections are. This patient will need an operation to wash out all of the abdomen, find the enterotomy, and either repair it with an omental patch or divert it through an ostomy.

In some select cases you will decide not to close the fascia and to allow the wound to heal on its own. This is acceptable if the patient is very sick or frail, the diagnosis is terminal and they are on palliative care, and if the dehiscence is very small. Debride the wound gently, keep the bowel moist, and do not expose the bowel to wet plain gauze: use petroleum jelly (Vaseline®) soaked gauze instead. A vacuum-assisted closure will help pull the wound edges together and make dressing changes less frequent, which makes bowel injury less likely. Ultimately if you do not operate, your goal is to either pull the skin together over the bowel with vacuum, or to sew the skin together once the wound is completely clean and has begun to granulate.



Closure of Laparotomy Wound Dehiscence

Richard Davis



This patient with hypopharynx cancer presented with impending airway obstruction. She was very cachectic and frail. We performed awake tracheostomy and open gastrostomy tube placement. She developed dehiscence of her abdominal wound, about 4cm in length, without evisceration of the bowel. This wound can be managed with careful debridement followed by serial dressing changes. Skin closure is done when the wound is clean, facilitated by vacuum-assisted closure if available. At all costs, the exposed bowel must be protected with petroleum jelly-soaked gauze; plain gauze dressings will eventually erode into the lumen and cause a fistula.



This patient with malnutrition due to HIV infection and an undifferentiated malignant neoplasm of the retroperitoneum developed wound dehiscence and evisceration while recovering from surgery. Despite his considerable risk factors, non-operative management would have been inappropriate and we returned to the operating room for fascial closure.

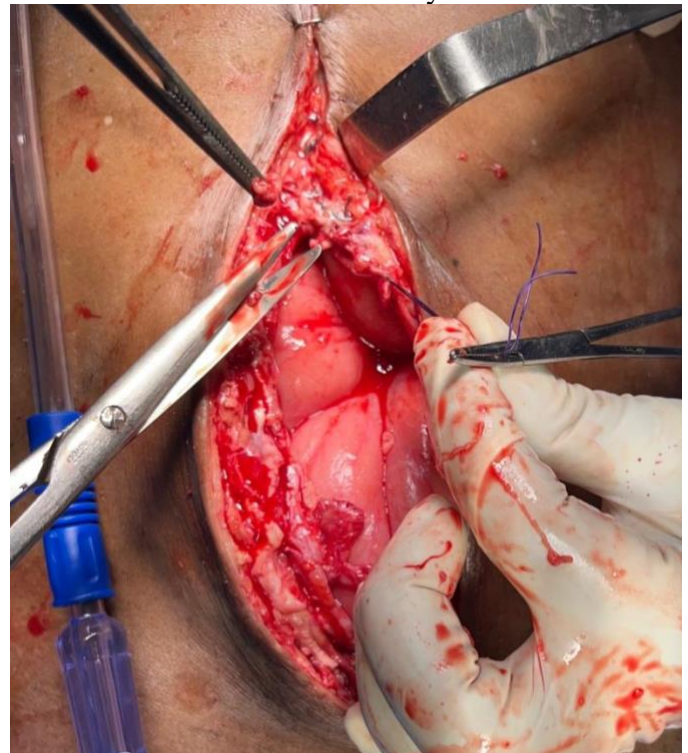
For this chapter we discuss only the steps and considerations of fascial closure; management of enterotomy and stoma formation are discussed elsewhere in this Manual. The steps of secondary closure of laparotomy wound dehiscence are:

- Careful opening of the skin wound and exploration of the fascia

- Opening all of the fascia that is not adequately closed
- Gentle intra-abdominal exploration and irrigation
- Placement of external retention sutures without tying them
- Closure of the fascia
- Tying of the retention sutures

Steps:

1. This operation is performed in the operating room under general anesthesia. You will not be able to adequately explore the abdominal cavity and reapproximate the fascia under local or spinal anesthesia.
2. All of the skin incision is opened and the fascia is inspected carefully. Locate the fascial closure suture and trace it back to part of the fascia that has not dehisced. Debride any dead tissue.



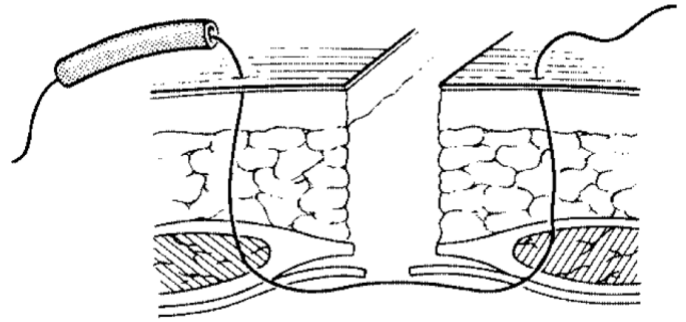
Debride any dead tissue at the fascial edges, so that the anatomy is clear here for when you close again. If some of the fascia is still approximated, find the fascial suture holding it and secure with a hemostat. You will tie your closure suture to this when you reapproximate the fascia.

3. Carefully inspect inside the peritoneum by gently pushing the bowel away from the anterior abdominal wall. This is especially important if

Closure of Laparotomy Wound Dehiscence

Richard Davis

there is purulent, feculent or bilious discharge: you must find the source. If there is no sign of infection, do not endanger the patient by exploring more than you can easily do.



Sutures are full thickness, passing through the skin and all layers of the abdominal wall. Source: WHO Surgical Care at the District Hospital

<https://apps.who.int/iris/bitstream/handle/10665/42564/9241545755.pdf?jsessionid=5FC58C4DC7F30CE58E5BB32FCDF06223?sequence=1> Accessed 13 April 2022



Gentle downwards pressure on the bowel allows limited visualization inside the peritoneum. If there is no purulent or feculent discharge this exploration should not be very thorough, to avoid iatrogenic bowel injury.



For sutures that are placed far from the fascial edge, the surgeon must bend down and look under the fascia to see the needle pass into the peritoneal cavity. The assistant retracts the abdominal wall anteriorly and holds a wide malleable retractor to protect the bowels.



Following inspection, the peritoneal cavity is lavaged with warm saline.

4. Place full thickness retention sutures using thick nonabsorbable monofilament or braided suture material. These are about 3-4cm from the fascial edge and pass through the skin, subcutaneous fat, anterior rectus sheath, rectus muscle, posterior sheath, and peritoneum. Be sure you see the needle at all times to avoid iatrogenic injury. Do not tie these yet.



Closure of Laparotomy Wound Dehiscence

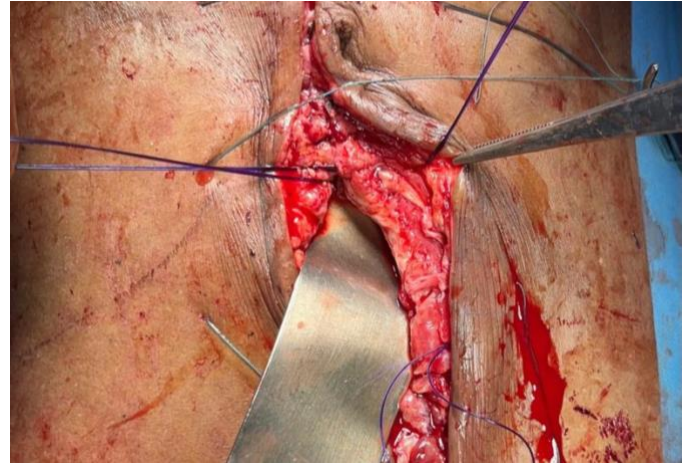
Richard Davis

It is crucial to see the needle at all times. In this case, the surgeon retracts the abdominal wall anteriorly while passing the needle through it while the assistant holds the wide malleable retractor in place underneath the abdominal wall.

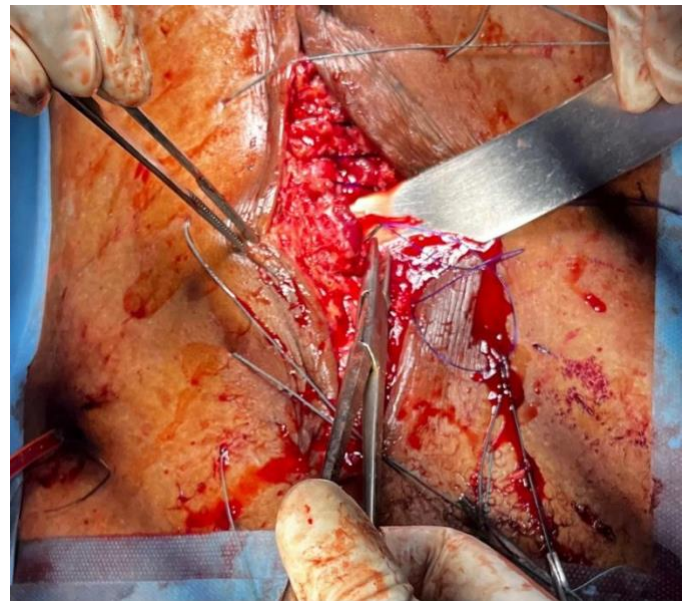


Each suture, once it is placed, is clipped with a hemostat. When all the sutures have been placed, the wound is still open and the fascial edges can still be reached..

5. Begin closing the fascia with running slowly-absorbable or non-absorbable suture. If some of the suture from the previous closure remains, place and tie your new suture adjacent to it and then tie the previous suture to the new. Make sure the sutures are through fascia, not muscle. "Travel" very little, each suture should be deep, if necessary, but close to the previous one.



Here, as the fascia has retracted, the surgeon has had to place the suture somewhat deep to get to intact fascia. As always, each suture is under direct visualization with a malleable retractor protecting the bowels underneath.



As with all laparotomy closures, begin with a suture at each end of the wound and meet in the middle. The final sutures are placed without tension on the previously placed suture to allow the needle to be seen throughout its passage through the fascia.

6. Once the fascial closure is complete, close the skin very loosely. Take sterile IV tubing and cut it into strips. Pass one end of each retention suture through a strip of IV tubing. Tie them down. You do not need excessive tension here.

Closure of Laparotomy Wound Dehiscence

Richard Davis



The suture is passed through the IV tubing.



The sutures are tied without tightening too much.

wound. Certainly the retention sutures should not be removed until this skin wound has been well healed for 3-4 weeks. Patients will complain about the retention sutures.

Pitfalls

- Retention sutures and a colostomy are difficult to manage together. It is crucial to have flat, healthy skin in a rim of at least 3cm around the ostomy for the appliance to adhere to, to prevent stool leakage. Place retention sutures with this in mind; it is acceptable to place them a little closer to the midline to preserve some space next to the ostomy. Avoid pulling these sutures too tight or they will “dimple” the skin. If you are placing the ostomy at the same setting, place it farther from the midline wound; consider not passing the ostomy through the rectus muscle at all, especially if you expect it will be temporary.
- Missed intra-abdominal injury: be absolutely certain that the dehiscence was not because of intra-abdominal infection or enterotomy. If the fluid is cloudy or purulent at all, you must completely explore the abdomen, including extending the fascial incision if necessary.
- Iatrogenic bowel perforation: this complication is more likely than during usual fascial closure, as you are taking bites farther from the edge of the wound, deeper in the abdomen. Be sure your lighting and assistance are excellent. If the patient is fighting, ask anesthesia to deepen or paralyze the patient. The anesthesia staff may be awakening the patient because they think you are almost finished; make sure they know that this fascial closure will take longer than usual.
- Failure to update the family on the patient’s prognosis: if there was no technical error, burst abdomen is an extremely bad sign for the patient’s overall recovery. It indicates the degree of their illness, likely with concurrent severe malnutrition. The long term outcome is likely to be poor even if you do everything right. You are wise to explain this fact to the family (and the patient,) who may not have appreciated how ill their loved one was.

7. During the immediate postoperative period, be as aggressive with nutrition as possible. Give a high protein diet and a multivitamin.
8. We routinely leave retention sutures in place for up to two months. The patient’s nutritional status can be assessed by the healing of their skin

Closure of Laparotomy Wound Dehiscence

Richard Davis

Richard Davis MD FACS FCS(ECSA)

AIC Kijabe Hospital

Kenya

May 2022

OPEN MANUAL OF SURGERY IN RESOURCE-LIMITED SETTINGS

www.vumc.org/global-surgical-atlas

This work is licensed under a [Creative Commons Attribution-ShareAlike 3.0 Unported License](https://creativecommons.org/licenses/by-sa/3.0/)

