



# Subxiphoid and Suprapubic Hernia Repair

# 23

Karl A. LeBlanc

## 23.1 Introduction

Subxiphoid and suprapubic hernias represent an especially difficult subset of incisional hernias to repair. This is because they are located in anatomically challenging areas of the abdominal wall that make surgical repair very difficult. The bony structures that are associated with them and the tissues associated make the repair somewhat different to that of the traditional incisional hernias in the midline of the abdominal wall. It is oftentimes difficult or impossible to achieve fascial closure of the hernia in these locations as well. The use of the robot has represented an advance that makes this more feasible than with traditional laparoscopic methods.

The subxiphoid hernias can develop after median sternotomy or the use of a mediastinal tube during cardiac surgery or laparoscopic surgical trocar placement such as during laparoscopic cholecystectomy [1, 2]. Poststernotomy hernias are uncommon but do occur in approximately 1–4.2% of these procedures [3–5]. Rarely they can occur spontaneously or associated with diastasis recti. Most of these are asymptomatic and/or are identified during an unrelated operative procedure. They generally do not contain any intra-abdominal contents other than the omentum and/or the falciform ligament, but they can occasionally contain intestine or stomach. Preoperative testing with CT scanning is recommended to evaluate the size and contents of the hernia. Open repair with sutures alone has a recurrence rate as high as 80%; the use of a mesh lowers this rate to up to 33% [3]. The laparoscopic approach has a failure rate of approximately 10%. In my experience, this type of hernia represents approximately 4% of my incisional hernia repairs. I have had success with the laparoscopic repair but feel the robotic repair will be the best repair, but this is anecdotal opinion. There is no literature to report at this time.

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K. A. LeBlanc (✉)

Our Lady of the Lake Physician Group, Baton Rouge, LA, USA

Louisiana State University Health Sciences Center, New Orleans, LA, USA

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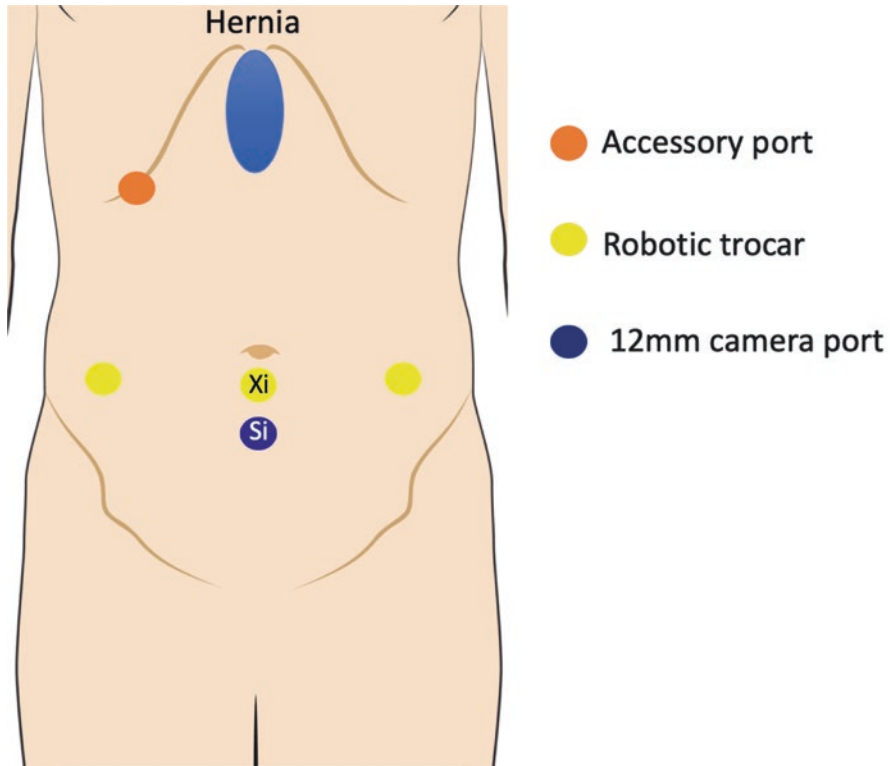
Suprapubic hernias are nearly always the result of a midline incision from prior surgery in the lower abdomen but can also occur after Pfannenstiel incisions and even after the placement of a suprapubic catheter. Most often they are an extension of a larger incisional hernia. Here, too, preoperative CT imaging will be very helpful to delineate the presence and extent of the hernia borders. The true incidence of these defects is poorly known as most of them are not reported separately from an incisional hernia. These types of hernias are generally defined as a hernia less than 4 cm from the pelvic rim in the midline of the abdomen [6, 7]. The open repair of this hernia is well described and reproducible [8]. Some authors have used bone anchors to insure a sound repair [9]. The laparoscopic repair is also very effective and is nearly identical to some of the open repairs [1, 2, 10–13]. It has been demonstrated that the presence of such a hernia increases the complexity and consequently the operative time to repair such a defect laparoscopically [14]. Bone anchors have also been applied in the laparoscopic repair as well [15]. To date, there are no reports of robotic assisted repair of suprapubic hernia although it is known to have been used for this hernia multiple times. In my practice, the incidence of a suprapubic hernia associated with an incisional hernia is 8%. I have repaired these with the robotic assisted repair since early 2014.

The methods described below will use the intraperitoneal placement of the mesh material. There are a variety of other methods such as the retrorectus repair, the transversus abdominis release and others that are described elsewhere in this textbook. While those chapters focus on the incisional hernias for the most part, the principles also can be applied to these types of hernias as well.

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## 23.2 Operating Room Set Up

The overall operating room set up is discussed in another chapter in this book. The use of either the Intuitive Surgical Si, X, or Xi will be adequate to repair all of these hernias. At the time of this writing, I am unaware of the use of any other robot to repair these hernias. As with my incisional hernias, I prefer the use of three robotic trocars plus a fourth 12 mm accessory trocar (Figs. 23.1, 23.2, 23.3, and 23.4). As noted in three of these figures, there is that additional trocar in the subcostal region. I most often use this location as my initial point of entry into the abdomen. The 5 mm optical trocar will be replaced with a 12 mm trocar after insertion of the robotic trocars. This initial site will allow the assessment of the location of adhesions and the location of the robotic trocars. This method also allows the insufflation of the abdominal cavity prior to introduction of the additional trocars. This will elevate the abdominal wall and allow an increase in the lateral distance of the intestine and the abdominal wall. The effect of this is to allow a more lateral location of the robotic trocars if needed to treat the hernia. It is not used to dock the fourth arm of the robot but is instead used to insert sutures and mesh and then to remove the needles or any excised mesh from prior operations.

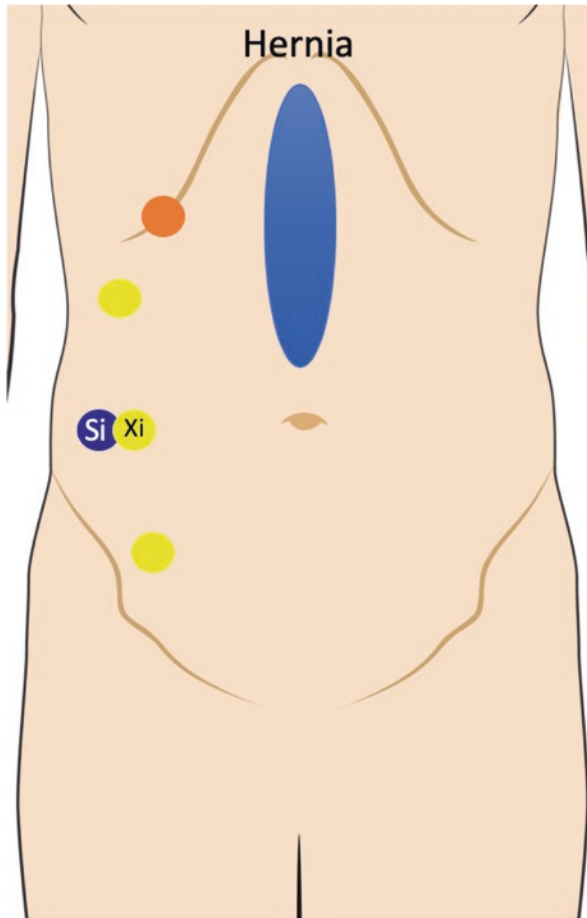


**Fig. 23.1** Port placement—subxiphoid hernia (legend applies to Figs. 23.1, 23.2, 23.3, and 23.4)

For ease of use by the scrub assistant, it is preferred to locate this trocar on that side of the table. Figures 23.1 and 23.3 exemplify the preferred locations of the trocars for the “simpler” defects. Figures 23.2 and 23.4 represent the trocar locations with hernias that are larger and/or associated with midline incisional hernias beyond the subxiphoid and suprapubic locations. The Xi and X cameras will be placed in identical locations. The Si camera is placed less in a straight line but more in a triangle type configuration as noted in these figures.

### 23.3 Surgical Technique

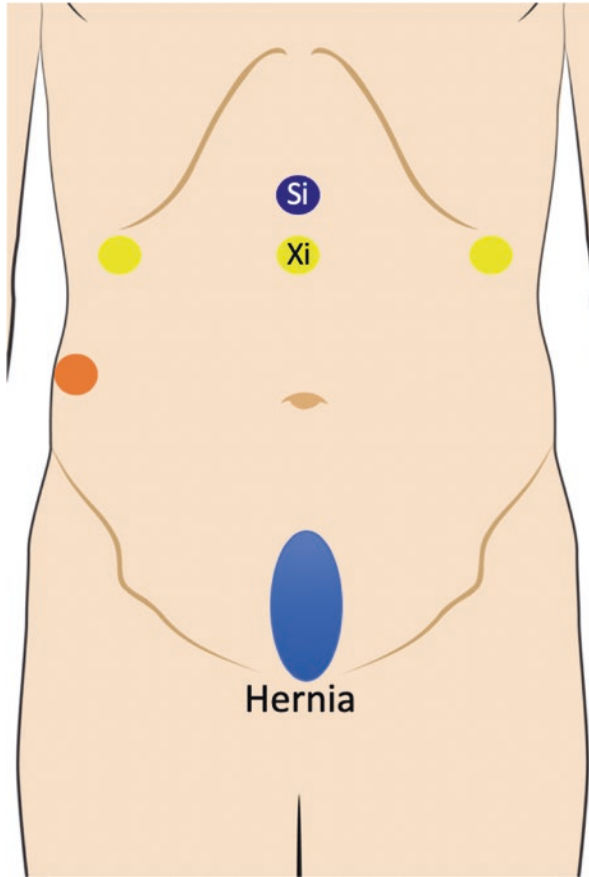
Prophylactic antibiotics and anticoagulation are given to all patients. A two-way urinary catheter is used for either hernia repair. On occasion, a three-way urinary catheter is used during the repair of the suprapubic hernias if there has been extensive prior surgical dissection in this area. This will allow the surgeon to fill the bladder with fluid to aid in identification of the organ if needed. Orogastric tubes



**Fig. 23.2** Alternate port placement—subxiphoid hernia

are also used prior to the introduction of the first trocar to decompress the stomach.

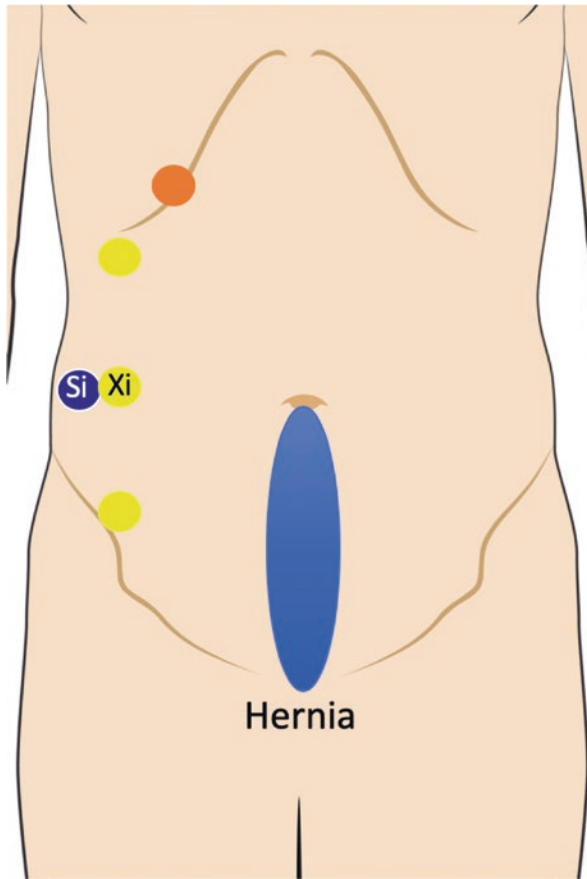
For both of these hernia types, as all ventral and incisional hernias, adhesiolysis will initiate the procedure. I prefer to use the robotic fenestrated bipolar and the robotic electrocautery scissors for the dissection. Upon completion of this step it is imperative to separate as much of the preperitoneal fat from the tissues to allow for good approximation of the intraperitoneal mesh with the abdominal wall. In the upper abdomen, this will require the dissection of the falciform ligament as much as possible. In the lower abdomen, the preperitoneal space must be entered and the bladder dissected away until the exposure of Cooper's ligament has been realized. This latter dissection will mimic that performed for the robotic assisted transabdominal preperitoneal (TAPP) inguinal hernia repair.



**Fig. 23.3** Port placement—suprapubic hernia

All dissection is done with the intra-abdominal pressure set at 15 mm Hg. A ruler is then inserted into the abdomen and used to measure the defect at its greatest dimensions. This should be done in transverse and vertical directions. If there are multiple defects rather than a single defect, the largest distance of all of the defects are used as a single measurement. It is important to emphasize that this measurement is performed *prior* to the closure of the fascial defect. In only this manner, will adequate overlap be assured in the event that the fascial closure does not remain intact at any point postoperatively. The mesh and the mesh size are then selected. As a general rule of thumb, a minimum of 5 cm overlap is used for the usual incisional hernias. Due to the complexity of the location of these hernias, these overlap considerations are modified as noted below.

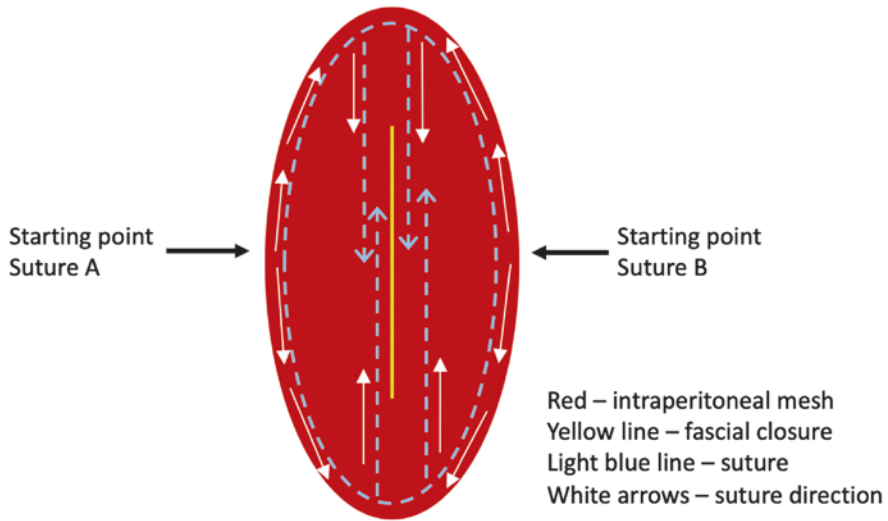
To accomplish the suture placement, the instruments are changed to a MegaSuture Cut and a MegaSuture device. During closure of the fascia, the intra-abdominal pressure will be reduced to 6–8 mm Hg to reduce the tension on the re-approximated tissue. As noted earlier, it is not always possible to re-approximate the fascia in these hernias.



**Fig. 23.4** Alternate port placement—suprapubic hernia

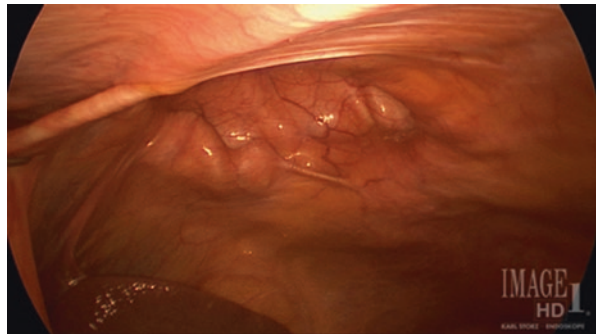
Consideration at that time to conversion to the posterior component separation procedure can facilitate this closure if deemed necessary. Alternatively, the mesh can be “bridged” across the defect as one does during the traditional laparoscopic repair.

Once the closure of the fascial defect is completed, the pressure will be brought back to 15 mm Hg. to make suturing of the mesh easier to accomplish. For all of my incisional hernia repairs and certainly for these hernias, I will place four rows of sutures (Fig. 23.5). I use two double armed polypropylene barbed sutures (#2). These are started in the middle of the mesh on either side as the starting point (A & B). As noted in the figure, there is a row at the periphery of the mesh. I continue to use these sutures from this line to place a row on either side of the closed fascia. This will bolster the fascial closure, perhaps minimizing the chance of separation of the closure, which will reduce the risk of recurrence. Additionally, the mesh will instantly contact the tissue to reduce the chance of seroma formation and increase the rapidity of ingrowth into the mesh material. A difference that will be noted below is that additional fixation will be needed to attach the mesh in the suprapubic hernia repair.



**Fig. 23.5** Typical suture pattern of subxiphoid and suprapubic hernia

**Fig. 23.6** Undissected subxiphoid hernia



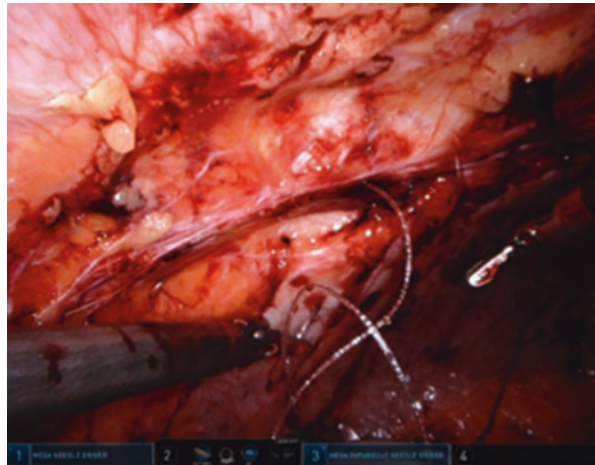
For subxiphoid hernias, the ribs and sternum are usually very near or at the borders of this hernia making fascial closure especially challenging (Figs. 23.6 and 23.7). Consequently, a larger overlap is recommended; up to 8 cm will be best during repair of these hernias. Due to the fact that surgical closure of the fascial defect is not always feasible it is especially important to adhere to this recommendation (Fig. 23.8).<sup>1</sup> Although not demonstrated in this figure, I currently prefer to insert the mesh prior to closure of the defect so that a centrally placed suture on the mesh can be used to assure the correct location of the mesh. If the ECHO or ECHO2 positioning device is used, the tubing or suture will likewise be used to locate the mesh. This can be difficult but usually there is enough room to allow for this to occur. If one pulls the central suture through the abdominal wall after closure of the fascial defect, there is a real possibility of losing the center of the fascial defect resulting in an

<sup>1</sup>The hernia in Figs. 23.6 and 23.7 are not the same as the hernia repaired in Figs. 23.8 and 23.9.

**Fig. 23.7** Fully dissected subxiphoid hernia



**Fig. 23.8** Closure of the defect (view is from the right side of the patient)



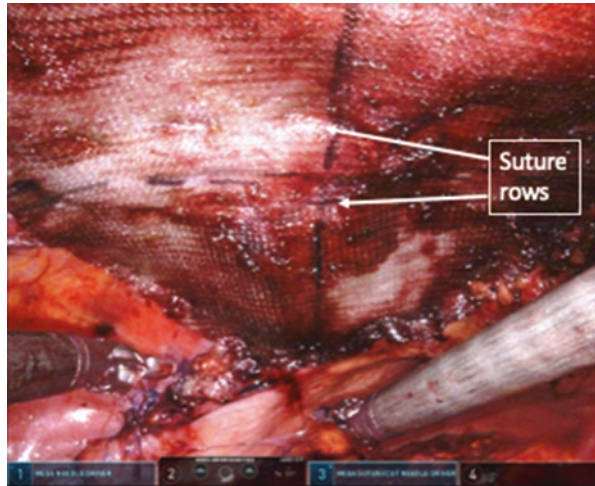
incorrect (off center) position of the mesh. The defect will then be closed with permanent barbed suture (polypropylene) when possible.

Fixation of the prosthetic material is critically important here. The significant advantage of the robotic technology is the ability to sew very effectively compared to the traditional laparoscopic technique. The prosthetic chosen should be sewn with the sutures of surgeon preference, but I prefer the use of barbed permanent sutures. The superior portion of the mesh should be sewn to the diaphragm taking care to avoid penetration into the mediastinum or chest cavity. One should assure that the mesh is taut and without any laxity (Fig. 23.9) (see footnote 1).

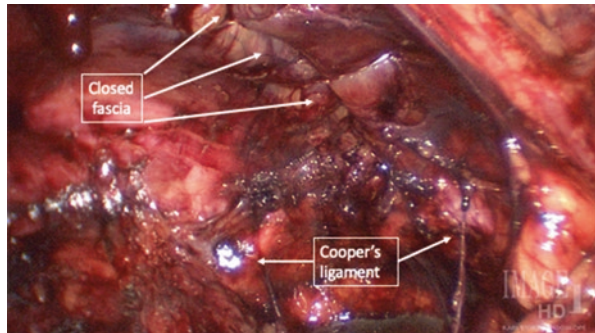
Similar considerations apply to the suprapubic hernias. If the definition of this hernia is the location at 4 cm or less from the pubic bone, then it is impossible to obtain a 5 cm overlap of the prosthetic to just tissue. The most common cause of recurrence in the repair of suprapubic hernias is inadequate dissection in the pelvis which results in inadequate overlap and inadequate fixation. To avoid this fact, the dissection should be performed similar to that of TAPP inguinal hernia repair.



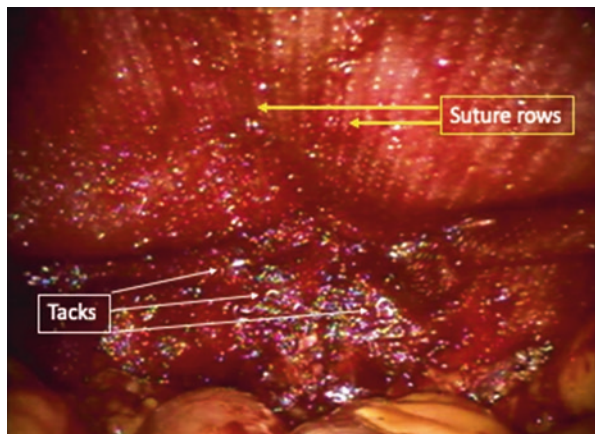
**Fig. 23.9** Mesh in place to cover the defect (view is from right side of the patient)



**Fig. 23.10** Closed fascial defect of suprapubic hernia



**Fig. 23.11** Mesh fixation with sutures and tacks to Cooper's ligament



The exposure down to Cooper's ligament will allow excellent fixation the mesh onto that structure. The fascial defect of the hernia will be closed first (Fig. 23.10). One may sew the material to this ligament and/or use permanent tacks (Fig. 23.11). If there is any remnant of tissue above the pubic bone, I will also sew this to the mesh with permanent barbed sutures. The remaining portion of the prosthetic will be sutured in place as well as described above (Fig. 23.5). It is recommended that any positioning aid such as the suture or positioning device be pulled through the abdominal wall prior to the closure of the fascia as discussed for the subxiphoid hernia.

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### 23.4 Postoperative Care

An immediate postoperative chest radiograph after subxiphoid hernia repair is frequently performed if there is concern of passage of the suture through the diaphragm. Occasionally one will see a small pneumothorax, but this is merely observed as the carbon dioxide in the chest will resorb quickly. If the patient develops symptoms from this, then appropriate measures should be undertaken, although I have never had to act on any of them.

Most of these have been performed on an outpatient basis. If there are multiple co-morbidities or extensive dissection resulting in potential medical or postsurgical adverse events, then the patients will remain in the hospital. Activities are limited for 2–4 weeks to allow sufficient time for the fascial closure to become secure and ingrowth of tissue into the mesh. These are very tenuous tissues in some cases, so caution is preferred. Higher risk patients, such as those that are diabetic, overweight or with compromised immune systems, etc., will take a much longer period of time to heal these tissues. In these cases, I will limit activities for even longer periods of time.

In these locations of the body it is virtually impossible to insure a good fit of an abdominal binder. Therefore, these are rarely used. Most individuals will not develop a seroma. Even those that do, these will resolve in nearly all cases.

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### 23.5 Conclusion

The use of the robot to repair these infrequent yet difficult hernias has allowed the opportunity to perform these repairs with more secure fixation. While more data is needed, the perception that these techniques will improve outcomes. Due to the infrequent development of these defects, more time is needed to establish the best methods of repair. In my practice, I am unaware of any recurrence of these hernias to date.

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