

## Robotic-Assisted Hernia Repair in a 76-Year-Old White Male: Case Report of a Surgical Treatment

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**Abstract:** Weakening of the abdominal wall tissue results in the inability to support the contents of the enclosed cavity and the potential for herniation. These complications are often surgically managed to improve patient quality of life. Using laparoscopic procedures for hernia repair has become a common safe option when compared to using open surgery. New methods have been developed, such as robotic-assisted hernia repair, in an effort to further improve surgical technique and post-operative patient presentation.

In this case, a 76-year-old white male patient with previous umbilical hernia repairs presents with a new-onset painful umbilical hernia. His body habitus is obese, with a BMI of 38, and his surgical history includes two previous failed umbilical hernia repairs. History revealed his current herniation occurred after increased stressors were placed on the abdominal wall after heavy lifting. Robotic surgical repair was completed successfully on this patient.

Literature currently supports the use of laparoscopic hernia repair versus open incisional hernia repair. With increased robotic-assisted surgeries performed, their benefits are now being compared to laparoscopic techniques. Previous studies have demonstrated shorter post-operative hospital stays and improved surgical outcomes with fewer complications in obese patients with the use of robotic-assisted techniques although more literature is required before robotic surgery can be the mainstay for surgical hernia repair.

In this case report, the patient's presentation, medical history, and robotic surgical repair will be detailed and compared to the clinical literature supporting robotic surgery for hernia repair. Ultimately this case warrants attention due to the promising use of robotic surgery for hernia repair when compared to the laparoscopic technique.

**Keywords:** Robotic-Assisted Surgery, Umbilical Hernia, Laparoscopic Surgery

### 1. INTRODUCTION

Abdominal wall hernias are often a resulting complication from weakened tissue that is unable to support the contents of the enclosed abdominal cavity. Congenital defects during cavity development in utero

or acquired weakening from surgical procedures can result in the weakened cavity wall tissues that can later develop into hernias. Surgical repair techniques of abdominal hernias have progressed from open incisional to laparoscopic procedures and have gained widespread adoption throughout the world due to the fewer complications and lower recovery periods of laparoscopic procedures. Technique will be continually improved upon in order to provide the maximum benefit for patients. This patient's medical history, presentation, and case will be discussed in this case report to highlight the usage of robotic surgical techniques in the umbilical hernia repair and compare them to existing laparoscopic techniques.

### 2. CASE PRESENTATION

A 76-year-old white male presented for medical evaluation of abdominal pain. The patient initially sought medical care in the emergency room after doing heavy lifting, which resulted in abdominal pain and a bulge in the umbilical region. A CT scan was performed, confirming a periumbilical hernia containing fat, but no bowel was appreciated. He was noted to have had two large umbilical hernia repairs in the past which had failed and reoccurred. The patient was subsequently referred to our care for surgical evaluation. Initially, hernia repair surgery was avoided due to his poor cardiopulmonary status; however, he presented to us four weeks after his original appointment complaining of daily, sharp pain associated with normal day to day activities. There were no alleviating factors and physical activity worsened the pain. The patient stated that the pain was now limiting his quality of life and he wished to pursue surgical intervention.

The patient's medical history was significant for chronic lymphocytic leukemia, atrial fibrillation, diabetes mellitus type 2, benign essential hypertension, and sleep apnea. The patient's significant surgical history included two hernia repairs. His family history is non-significant and social history reveals that he was a former smoker.

On physical exam, the patient is obese with a BMI of 38. All vital signs were within normal limits. He had an incisional ventral hernia appreciated at the umbilicus associated with a previous incision. He was also noted

to have profound diastasis recti. The remaining cardiac, respiratory, musculoskeletal, neurologic, abdominal, HEENT, and dermatologic exams failed to reveal any other significant findings apart from those mentioned above.

After discussing options with the patient, he consented to a robotic-assisted surgery for hernia repair. Prior to surgery, a CMP and CBC were obtained. The CMP showed hyponatremia at 128 mEq/L and mild hypochloremia at 96 mEq/L. The CBC had an elevated WBC at 13.5%, a low hemoglobin of 11.9 gm/dL, a low hematocrit of 36.0%, and a low MCV of 79.2 fl.

Preoperative antibiotics were given, and sequential compression devices were placed. General anesthesia was achieved, and the abdomen was prepped and draped in usual sterile fashion. Once adequate anesthesia was confirmed, local anesthetic was infiltrated into the skin and subcutaneous tissues in the left upper quadrant palmer's point. A 1 cm skin incision was made with Scalpen-11, and using Optiview technique direct visualization, a 10 mm port was placed into the abdomen. Pneumoperitoneum to 15 mm of mercury was achieved.

The robotic camera was introduced into the abdomen, revealing a partial failure of a large central mesh resulting in a significant ventral abdominal hernia in the epigastric region with an incarcerated omentum. Two more 8 mm robotic trocars were placed in the left lower quadrant under direct visualization. The robotic platform was brought into the operative field and docked; robotic instruments were introduced into the abdomen. The incarcerated hernia in the epigastric region was meticulously taken down and the incarcerated omentum was reduced back into the abdomen. Next, the adhesions around previously placed mesh regions were dissected out; a place of weakness at 3 o'clock was appreciated, which was causing recurrent herniation of omentum.

The remainder of the mesh appeared to be well incorporated without any problem. Subsequently, the fascia at the 3 o'clock view, around the part of the mesh that had failed, was cleared with electrocautery and exposed. Pneumoperitoneum was decreased to 10 mm of mercury and herniated omentum through this defect was taken down and removed from the hernia.

0 V-Loc suture was used to approximate this portion of the mesh to the fascia in continuous fashion. The defect was repaired, and the mesh was noted to lay well. The defect measured 1.5 cm by 1.5 cm, and subsequently was only closed primarily. Hemostasis was confirmed. Pneumoperitoneum was released; the left upper quadrant fascial defect was closed with 0 Vicryl in an interrupted fashion using port closure device and GORE Suture Passer needle. All skin incisions were

closed with 4 Monocryl in a subcuticular fashion and Dermabond was applied.

### 3. DISCUSSION

Currently, literature supports the use of laparoscopic hernia repair versus open incisional hernia repair. In a 2014 systematic review and meta-analysis of all randomized controlled trials, totaling 1,003 patients, Zhang et al. compared these two methods and found that laparoscopic repair, when compared to open incisional repair, resulted in lower infection rates, less wound drainage, and shorter length of hospital stay [1]; although of note, laparoscopic repair showed increased rates of bowel injury which was believed to be from abdominal adhesions that become problematic in the laparoscopic procedure when establishing pneumoperitoneum and also when dissecting around the neck of the hernia [1]. Neither group showed higher hernia recurrence, reoperation, or less postoperative pain [1]. In the aforementioned meta-analysis, Rogmark et al. additionally concluded that at 3 weeks post-operation, there was no difference in movement restrictions and fatigue, suggesting that there is no difference between the two groups on aspects that would define quality of life post-surgery [2].

When comparing robotic assisted surgery to open hernia repair, robotic surgery showed a significant decrease in length of hospital stay [3] and fewer complications postoperatively in the obese population [4]. Although robotic procedures were lengthier than their open counterparts in the operating room, Carbonell et al. showed the post-operative stay period for patients was reduced by multiple days [3]. A reduced hospital stay was found to lower post-operative complications, systemic and wound infections, and the need for operative intervention [3]. Kolachalam et al. noted that although laparoscopic techniques provide quicker post-operative recovery and lower chronic pain, surgeons opted for open procedures in obese patients, primarily for its lower complexity and technical difficulty [4]. When compared with open techniques, robotic assisted techniques were demonstrated to have comparable or improved outcomes, while also providing a lower learning curve than other techniques [4].

However, there are few published studies directly comparing robotic assisted surgeries to laparoscopic techniques, making it difficult to determine if a robotic approach is superior to a laparoscopic approach. Prabhu et al. compared robotic assisted hernia repair with laparoscopic repair in 454 patients and concluded that while robotic assisted hernia repair increased operative times, the length of hospital stay was shorter with less risk of surgical site occurrence with the robotic assisted surgery [5]. Charles et al. also showed increased operative times with robotic repair but did

not show a decreased length in hospital stay [6]. Higher rates of skin and soft tissue infections were noted for robotic surgery, which were attributed to the increased surgery time, calling into question of whether the additional cost associated with robotic surgery is justified, compared to lower costing laparoscopic surgeries [6]. However, Warren et al. conflicted with this finding, and showed comparable direct hospital costs for both robotic and laparoscopic hernia repair and a decreased length of hospital stay for the robotic assisted surgeries [7]. These conflicting studies demonstrate the need for additional literature on whether robotic surgeries are beneficial for patients.

#### 4. CONCLUSION

Abdominal wall hernias are complications that can be surgically managed and repaired in order to improve patient quality of life, thus it is important to document and share information on cases where the methodology has been improved. The result is an improvement in technique and procedure that can simplify hernia repair procedures and improve patient post-operative care. In this case report, the patient's presentation led to a surgical repair of an abdominal wall hernia caused by weakened mesh. Utilizing robotic assisted surgical techniques rather than standard laparoscopic techniques, the patient successfully underwent hernia repair and went through the post-operative recovery process without complication. This case supports the use of robotic techniques in the advancement of surgical repair of hernias as further evidence of reduction of patient complications and reduction of patient hospital stay.

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