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Initial experience with transvaginal incisional hernia repair

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Abstract

Introduction Natural orifice surgery has evolved from a preclinical setting into a common occurrence at the University of California San Diego (UCSD). With close to 40 transvaginal cases, we have become comfortable with this technique and are exploring other indications. One of the perceived advantages in natural orifice surgery is the potential reduction in the incidence of hernia formation. Patients with abdominal wall hernias may be at increased risk of forming additional hernias at incision sites. In addition, patients with recurrent incisional hernias may, likewise, be at increased risk. We believe that reducing or eliminating abdominal wall incisions may be of benefit in the repair of abdominal wall hernias. Here, we describe what we believe to be the first natural orifice transluminal endoscopic surgical (NOTES) approach to the repair of an abdominal wall hernia.

Methods The patient is a 38-year-old female with a painful recurrent umbilical hernia, previously repaired 8 years prior with a polypropylene-based mesh. The patient underwent a transvaginal recurrent umbilical hernia repair with one other 5-mm port in the abdomen for safety.

Results The patient had no intraoperative or postoperative complications. At 5 months follow up, the patient had no complaints, no evidence of hernia recurrence, and was very pleased with her result.

Conclusions The repair of primary and incisional hernias of the ventral abdominal wall via a transvaginal approach is

technically feasible, and the result of our initial case was exceptional. However, there are still significant obstacles which must be addressed before this approach can be widely utilized. These obstacles include safe entrance into the abdominal cavity via a transvaginal approach, the proper mesh to be placed during the repair, and the risk of infection.

Keywords Transvaginal · Incisional hernia · NOTES · Natural orifice · Hernia

Introduction

Natural orifice surgery has evolved from a preclinical setting into a common occurrence at the University of California San Diego (UCSD). With close to 40 transvaginal cases, we have become comfortable with this technique and are exploring other indications. The laparoscopic repair of recurrent umbilical defects, or defects greater than 3 cm in size, has been shown to decrease recurrence rates [1]. We have chosen to further investigate the benefits of laparoscopy by applying a natural orifice approach. One of the perceived advantages in natural orifice surgery is the potential reduction in the incidence of hernia formation. Patients with abdominal wall hernias may be at increased risk of forming additional hernias at incision sites. In addition, patients with recurrent incisional hernias may, likewise, be at increased risk. We believe that reducing or eliminating abdominal wall incisions may be of benefit in the repair of abdominal wall hernias.

To this end, a preclinical research protocol in transvaginal incisional herniorrhaphy was undertaken in a porcine model. After obtaining comfort with the technical procedure, the work was translated into the clinical arena. Here,

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we describe what we believe to be the first natural orifice transluminal endoscopic surgical (NOTES) approach to the repair of an abdominal wall hernia.

Methods

The patient is a 38-year-old female with a painful recurrent umbilical hernia who was repaired 8 years prior with a polypropylene-based mesh. The patient has had three children since the time of her repair and had a recurrence of her umbilical hernia, which was approximately 2×2 cm in size. The patient denied any obstructive signs or symptoms, but rated her daily pain at the site as 5/10. Her past medical and surgical history is only pertinent for a cesarean section and the aforementioned hernia repair. The risks, benefits, and alternatives to a transvaginal incisional hernia repair were explained to the patient in detail and she agreed to proceed. She was consented under an approved UCSD transvaginal incisional hernia repair institutional review board (IRB) protocol. Importantly, all current UCSD NOTES protocols stipulate that an abdominal port be utilized for visualization of the transvaginal access.

The patient was brought to the operating room, sequential compression devices applied, 1 g of cefazolin was given, and general anesthesia induced without complication. The patient was placed in the lithotomy position and prepped and draped in standard sterile fashion. This included a vaginal prep with betadine. A lower left quadrant 5-mm trocar was placed below the pubic hairline using optical assistance. The abdomen was then insufflated and the peritoneal cavity inspected. A well incorporated mesh was noted in the umbilical region with a small herniation of falciform material through a 2-cm defect superiorly. Given that the mesh was well incorporated and peritonealized, it was left in place.

The cervix was then sequentially dilated and a uterine sound placed. A uterine retractor was then placed and a 15-mm dual-lumen trocar (Applied Medical) was placed through the retrocervical cul-de-sac. A sterile endoscope was placed into the abdomen (Fig. 1). The dual-lumen trocar allows for placement of the scope, as well as another 5-mm rigid or flexible instrument. The herniated falciform was then dissected free of the fascial edges using a combination of endoscopic and flexible instrumentation delivered through the vaginal port. Next, the peritoneum was cleared superiorly approximately 4 cm using the same method. Having dissected the fascial edges free, the defect was then re-approximated primarily in the manner of Franklin et al. [2]. This was done transcutaneously using a suture passer through the center of the skin overlying the defect, and sequentially passing an 0-Ethibond suture approximately 1 cm lateral to each fascial edge. Next, a 7×7 -cm Flex HD



Fig. 1 Entrance of the vaginal trocar



Fig. 2 Final view of the hernia repair

acellular human dermis mesh (Johnson & Johnson) was inserted through the vaginal trocar once four anchoring Ethibond sutures were tied to the corners. A needle passer was passed in four quadrants, tacking the mesh in a trans-fascial manner. Lastly, a ProTack (Autosuture) device was used to anchor the remainder of the material to the patient's anterior abdominal wall at approximately 1-cm intervals circumferentially (Fig. 2).

The abdomen was inspected and had good hemostasis; the 5-mm abdominal port was removed. The gynecology team then closed the patient's vaginal access site with a 2-0 Vicryl suture in a running fashion. The 5-mm trocar was removed and the skin closed with a 4-0 Monocryl suture. The patient was extubated and taken to recovery in a stable condition.

Results

The patient was admitted to the hospital for observation as per the IRB and was discharged on postoperative day 2 in good health. At 6 weeks postoperative follow up, the

patient was doing well without complaints. She was then seen at 3 and 5 months and is still completely satisfied with her repair.

Discussion

The repair of primary and incisional hernias of the ventral abdominal wall via a transvaginal approach is technically feasible, and the result of our initial case was exceptional. However, there are still significant obstacles which must be addressed before this approach can be widely utilized.

The primary concern of the surgical team is for the safety of the patient. Some have suggested that blind or primary access of the vagina for natural orifice surgery is safe [3, 4]. We do not agree. At this time, we still believe that visualization of the trocar insertion through the vagina is necessary. Though all of the key steps of the described operation were performed utilizing the vaginal access port, we still believe that blind access to the abdomen with a trocar through the vagina may put the patient at risk for visceral or vascular injury.

An additional concern in the application of natural orifice surgery to the repair of ventral hernias is the selection of the proper material for the hernia repair. Several authors have described the preclinical technical aspects of NOTES hernia repair in a cadaver or animal model, and most have questioned whether a prosthetic material can be used in regard to potential mesh infection [5, 6]. We believe this to be a very valid point. Additionally, many recurrent ventral hernias have also had prior implantation of prosthetic materials, as did this patient. Her mesh was firmly incorporated and peritonealized. Given this, we decided to progress with the operation. Had the initial mesh been exposed or not incorporated, we would have abandoned the NOTES approach in favor of a more traditional method. We do not believe that there is sufficient preclinical data from our own laboratory, or others, to advocate the placement of a prosthetic device in the face of transvaginal or transgastric abdominal access. Therefore, we used a biologic material for the repair. The use of biologic materials for abdominal wall reconstruction in contaminated or infected fields is well established [7]. However, there is increasing concern that the re-herniation rate will be unacceptably high if the material is used to bridge the defect, rather than to buttress an appropriately re-approximated fascia [8]. Fascial re-approximation was fairly simple with this small defect, but this severely limits the patient population which may benefit from a natural orifice approach to ventral hernias. For the procedure to have widespread utilization, prosthetic devices will have to be used. Further work in the preclinical area is necessary to evaluate potential infectious complications.

One of the main benefits that we have seen in our transvaginal cholecystectomy population has been the reduction of postoperative pain. While our patient was fairly comfortable postoperatively, she still experienced some pain (5/10) at the transfacial fixation sutures on postoperative day 1. Whether or not these sutures are still necessary when using a material that is ultimately absorbed or incorporated is questionable. There are no large case series from which to draw observations in regard to the laparoscopic placement of biologic materials for the repair of ventral hernias. Given the minimal penetration of the abdominal tacks into the posterior fascia once passed through biologic material, we still believe them to be necessary.

Conclusion

The initial application of natural orifice techniques to the repair of an abdominal wall defect was technically feasible and clinically successful. The patient presented here did very well postoperatively, with minimal complaints of pain or any signs of infection. She has no signs of recurrence at 5 months. The outcome from this operation was encouraging and we look toward further investigation to answer the aforementioned questions noted in this paper.

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