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CASE REPORT

Lumbosacral osteomyelitis after robot-assisted total laparoscopic hysterectomy and sacral colpopexy

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Abstract We report on the transabdominal resection of infected lumbosacral bone, synthetic mesh, and sinus tract following sacral colpopexy. A 45-year-old nulliparous patient who had undergone transvaginal mesh followed by robot-assisted sacral colpopexy presented with increasing back pain and foul-smelling vaginal drainage. An epidural abscess required surgical intervention, including diskectomy, sacral debridement, and mesh removal to drain the abscess and vaginal sinus tract. Recognized complications of open prolapse procedures also manifest following minimally invasive approaches. Osteomyelitis of the sacral promontory following sacral colpopexy may require gynecologic and neurosurgical management.

Keywords Osteomyelitis · Post-operative complications · Surgical procedures · Minimally invasive · Robotics · Uterine prolapse

Introduction

Sacral colpopexy is an effective surgery for post-hysterectomy apical pelvic organ prolapse. In 2004, Elliott first described utilizing a robot-assisted laparoscopic approach to attach a mesh to the periosteum of the sacrum [1]. Advocates of robotic-assisted gynecologic surgery embrace the system's wristed instrumentation and three-dimensional high-definition vision system as significant improvements over laparoscopic equipment's four degrees of freedom and two-dimensional laparoscope. Reported complications encountered in open sacral colpopexy include cystotomy, middle sacral artery injury, wound infection, and post-operative ileus or small bowel obstruction. We report the case of a patient who failed a total vaginal mesh procedure and underwent robotic-assisted total laparoscopic hysterectomy with sacral colpopexy causing an abscess within the sacrum and the vagina.

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Case

A 46-year-old nulliparous female with a history of morbid obesity, diabetes mellitus, and diverticulitis presented to the emergency department with complaints of increasing lower back pain and daily falling spells. The patient had a surgical history of anterior and posterior pelvic floor mesh placement (Prolift, Gynecare, Somerville, NJ, USA) 1 year earlier at an outside hospital for stage III pelvic organ prolapse. Following recurrent uterovaginal prolapse, the patient returned several months later for a robot-assisted total laparoscopic hysterectomy with bilateral salpingo-oophorectomy, followed by transvaginal mesh excision, and robot-assisted sacral colpopexy using Gynemesh PS (Gynecare, Somerville, NJ, USA). She was complaining of pelvic pain and an examination in the emergency department showed normal neurologic function except tenderness over the lumbosacral spine. For management, she was transferred to our tertiary care facility.

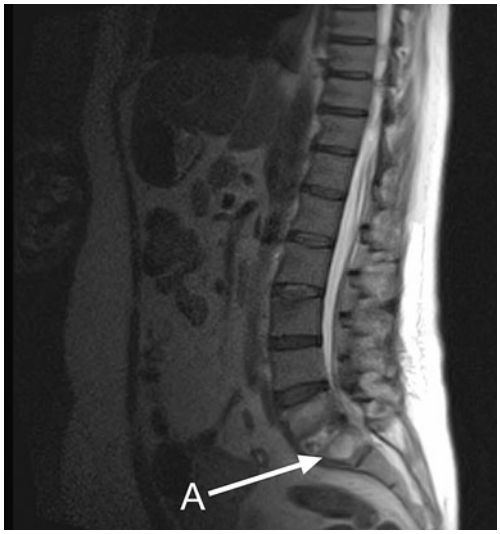

Fig. 1 Sagittal section of magnetic resonance imaging. *A*, L5/S1 diskitis with an epidural abscess

The patient was afebrile with stable vital signs, though she was unable to bear weight due to lower extremity and back pain. Copious vaginal discharge from a 1.5-cm opening in the vaginal apex was noted. At the time of admission, magnetic resonance imaging showed significant enhancement and signal changes suspicious for osteomyelitis and epidural abscess at the fifth lumbar and first sacral vertebrae (L5/S1) (Fig. 1). Compared to films from the outside hospital, the abdomen and pelvis showed a debris-filled tract extending superiomedially from the vaginal cuff and terminating at the level of L5/S1 with endplate erosions.

The patient failed conservative management after administering broad-spectrum antibiotics for 1 week without resolution of the symptoms or abscess on subsequent imaging. Neurosurgery was consulted and an open ventral approach for debridement was recommended. The patient agreed to surgical treatment.

Laparotomy revealed dense adhesions between the sigmoid colon, small bowel, sinus tract, and upper vagina. After extensive adhesiolysis, a sinus tract extending from the vaginal cuff to the sacrum was uncovered. An end-to-end anastomosis sizer placed in the vagina was visible intraperitoneally through the 1.5-cm opening in the vaginal apex. The defect opened into the peritoneum next to the encapsulated mesh. Entry into the sinus tract unveiled the purulent mesh (Fig. 2). The mesh was found to be attached at the junction of L5/S1 to erythematous, friable tissue with minimal scarring. The mesh was removed in its entirety, along with two stitches of No. 0 braided polyester permanent suture (Ticron; Tyco, Waltham, MA, USA). The pathology reports confirmed infection in indurated tissue at the vaginal apex surrounding the infected sinus. A dissection in the vesicovaginal space was completed in order to reapproximate the defect in the vaginal cuff using a two-layered closure with polydioxanone suture.

The neurosurgery service then located a palpable defect between L5 and S1 that was consistent with the patient's preoperative CT imaging. Utilizing a blunt dissection technique in the area where an intervertebral disk should have been located, the neurosurgeons removed a spongy soft tissue intermixed with purulent discharge. Various curettes were then used to complete the diskectomy and clear the endplates of the soft inflammatory tissue. Hemostasis was achieved using surgical clips, bipolar electrosurgery as well as a hemostatic matrix (Floseal; Baxter Healthcare Corporation, Deerfield, IL, USA). Estimated blood loss for the 5-h pelvic surgery was 1,200 ml with the majority of the blood loss during the sacral debridement.

Post-operatively, microbiologic cultures of blood and vaginal tissue were negative as the patient had been treated conservatively with intravenous antibiotics for 1 week prior to surgery. The mesh did grow coagulase-negative *Staphylococcus* and was susceptible to all tested antibiotics except penicillin. She was treated for a suspected methicillin-resistant S*taphylococcus aureus* lumbosacral osteomyelitis using intravenous vancomycin and ampicillin–sulbactam for 6 weeks. Ampicillin–sulbactam was added to cover prior isolates from vaginal discharge collected at the outside hospital. The patient was discharged on post-operative day 8 to a rehabilitation facility after addressing elevations in blood pressure and blood glucose levels. At a 3 month follow-up, there was Stage 0 apical prolapse and no complaints.

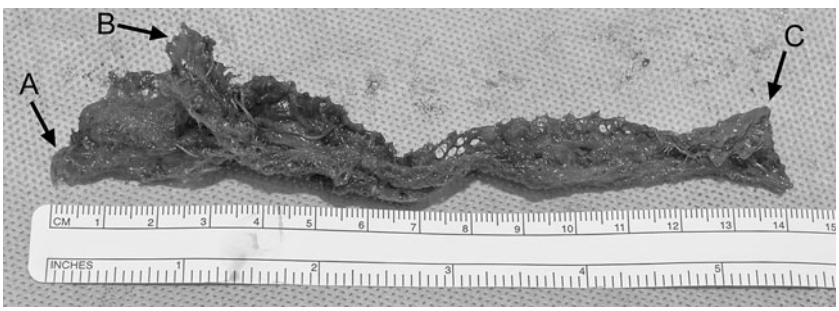

Fig. 2 Gross dissection of mesh removed. *A*, 3-cm posterior vaginal mesh arm; *B*, 1-cm anterior vaginal mesh arm; *C*, sacral mesh attachment

Discussion

Osseous infections rarely occur following sacral colpopexy. The prevalence is unknown, though several case series have been published [2, 3]. This patient presented with a potentially life-threatening case of L5/S1 osteomyelitis and epidural abscess 4 months after undergoing two recently introduced innovative surgical procedures for pelvic organ prolapse. This particular case of osteomyelitis may be related to these innovative procedures, though it is likely multi-factorial.

With the lack of haptic feedback in robotic surgery, it is possible for surgeons to place a suture deeper than the periosteum of the sacral promontory, creating a site for osseous infection. A helpful technique may include palpation of the promontory by the surgical assistant who is using conventional laparoscopy, thus directing the surgeon at the robotic console to the exact location for suture placement. In addition, the use of monofilament sutures in the vaginal fibromuscular tissue for mesh attachment may avoid wicking bacteria as may occur with braided suture.

Another reason that this complication may have occurred is concurrent placement of mesh immediately following hysterectomy [4]. One technique is to imbricate the vaginal apex following hysterectomy with multiple layers of tissue before attaching the mesh or to perform supracervical hysterectomy concomitant with abdominal sacral colpopexy. We speculate that this extra tissue barrier may prevent vaginal mesh erosion. Alternatively, the patient could have undergone a staged procedure with removal of the infected mesh and then, once healed, proceeded with hysterectomy and sacral colpopexy. In addition, this patient may be at higher risk of infection due to her medical co-morbidities.

Complications such as lumbosacral osteomyelitis after robot-assisted sacral colpopexy after a mesh kit are less well described than in open sacral colpopexy. Patients with back pain and vaginal drainage following sacral colpopexy by any route should be evaluated with a high level of suspicion for osteomyelitis. Pelvic surgeons should counsel their patients regarding the risks of these procedures.

Conflict of interest Dr. Paraiso is on the Coloplast Advisory Board. Drs. Diwadkar and Muffly have no disclosures.

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