Case report

An incidental opportunity for a second look laparoscopy following a unilateral hysterosacropexy in a young women with severe voiding dysfunction: a case report and description of a novel surgical procedure

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We present the findings of a diagnostic laparoscopy performed three months after a novel procedure of laparoscopic unilateral sacropexy using a narrow, needled, mesh sling with a reusable tunneling device. This is a case of a 20 year old generally healthy patient, with severe voiding dysfunction of six months. She was referred to our urogynecological clinic after an episode of acute pyelonephritis with complaints of urinary retention. The diagnostic laparoscopy that was performed during the investigation of abdominal pain had no remarkable findings; however, it gave us a rare opportunity for a second look following the unilateral hysterosacropexy procedure. Laparoscopic unilateral sacropexy has good anatomical and functional results.

Keywords: Voiding Dysfunction; Laparoscopic Hysterosacropexy; Reusable Tunneling Device; Mri Visible Mesh.

INTRODUCTION

Lower urinary tract dysfunction and urinary incontinence are common conditions and the associated symptoms are known to have a significant effect on quality of life.[1] Female voiding dysfunction (VD) is defined by the International Continence Society and International Urogynaecological Association as "abnormally slow and/or incomplete micturition based on symptoms and urodynamic investigations." and urinary retention was defined as "complaint of the inability to pass urine despite persistent effort".[2] Voiding symptoms are less common in women and include hesitancy, poor stream and incomplete emptying, although, may also be associated with symptoms of incontinence secondary to retention and overflow. Younger women may present with lower urinary tract symptoms associated with sexual intercourse or recurrent urinary tract infection.[3]

The causes of female VD could be divided into detrusor underactivity and outflow obstruction. Urogenital prolapse has been considered an independent risk factor for post-void residuals >100 ml.[4] It is possible that chronic urinary retention may lead to partial autonomic denervation of the detrusor and this may lead to further functional impairment of contractility in addition outflow obstruction may alter the contraction properties of the detrusor by changing cell-to-cell propagation of electrical activity and changing membrane potential leading to an increased cell irritability.[1]

The management of women with VD should be individualized to address the underlying cause and etiology. Many women may be asymptomatic and a conservative approach is appropriate. In those women with VD secondary to urogenital prolapse surgical correction has been reported to improve voiding difficulties. Petros and Ulmsten described the "integral theory" that proposes that the distal and mid urethra are key players in the continence mechanism, and the mid-urethral point controls the maximal urethral closure pressure.[5] This theory strengthens the notion that supporting the mid urethra may improve VD.

After we have consulted the local IRB, this manuscript was exempt from an IRB approval. The patient has however signed willingly an informed consent.

CASE PRESENTATION

A 19 year old normally healthy female presented to our urogynecology clinic complaining of an existing bladder dysfunction and urinary retention of unknown origin. The problem was so severe she used self catheterization since 05/2014. She complained about suprapubic pain fitting the diagnosis of chronic cystitis and light stress incontinence upon coughing.

In her medical history there was nothing remarkable besides acute pyelonephritis a month earlier with growth of coagulase negative *E coli* in urine culture. The patient underwent an appendectomy two years earlier. Her BMI was 23.67 and had no apparent risk factors for voiding dysfunction.

She reported using a safety pad during the day but not at night and reported 4 micturations during the day and once at night. She had normal urinary flow.

Her evaluation included a physical and gynecological examination. The vagina and perineum were unremarkable for pathological findings. The uterus was retroflected, a mild vertical descent of the pelvic organs was noted, the cervix was smooth and featureless, and she had a grade 1 cystocele. Stress test was negative. However, she had 400ml of post void residual urine.

Perineal sonography demonstrated a vertically mobile urethra. Vaginal sonography demonstrated a retroflected uterus, inconspicuous adnexas, a right ovarian cyst of 2cm was noted. Abdominal sonography demonstrated no renal congestion.

We recommended conservative treatment options for three months after which if no improvement was noted surgical treatment to repair the level 1 defect would be considered. She was offered bladder training including pelvic floor physiotherapy with biofeedback. Periodical micturation every 2-3h was suggested. For urinary tract infection (UTI) prophylaxis, we recommend taking cranberry pills twice daily. In addition, Uro-Vaxom® an extract of *E coli*, to stimulate the immune system in order to increase the body's natural defenses against a wide spectrum of urinary pathogens was administered.

Three months later there was no improvement in her condition. She was still using self catheterization and there was

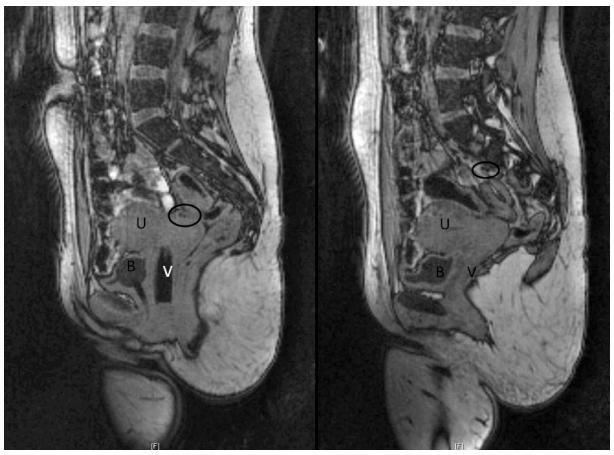

Figure 1. – MRI images of the MESH fixation points on the cervix (fig. 1a) and promontorium (fig. 1b) with regard to the location of the bladder (b), uterus (u) and vagina (v).

no improvement under Uro-Vaxom®. Physical and gynecological examinations including sonographic examination were unchanged from the previous exam. Lumbar puncture and magnetic resonance imaging (MRI) were performed to rule out Multiple sclerosis. She was asked to fill a urinary diary with a tampon test to investigate the feasibility of surgical intervention. She used tampons for two weeks and the two weeks without a tampon to verify the benefit of possible surgery. A month later she reported improvement with the tampon indicating that surgical elevation would be beneficial.

Five months after her primary presentation to our clinic since the tampon test was positive and she suffered from persistent complaints we recommended surgical treatment of prolapse. A pelvic floor reconstruction with a hysterosacropexy and Round ligament fixation to anteflect the uterus was recommended. She was scheduled to undergo a laparoscopic unilateral hysterosacropexy after a detaild conversation regarding possible complications and outcomes.

LAPAROSCOPIC UNILATERAL HYSTEROSACROPEXY

The procedure was conducted under general anaesthesia with the patient supine in semi-lithotomy and in the Trandelenburg position. A pneumoperitoneum was created, and three laparoscopic ports were placed: one 10-mm umbilical port and two 5-mm lateral ports. The uterus and right adnexa were suspended with sutures to the abdominal wall.

A small 1-2 cm peritoneal incision was performed on the right anterior area of the sacral promontory with scissors. The right ureter was identified transperitonealy, and a narrow, needled, mesh sling was introduced into the abdomen through the umbilical port. The right broad ligament at the level of the cervicouterine junction was opened at the medial aspect. Two horizontal sutures (back and forth) were made with the needled mesh sling on the posterior cervix at the level of the cervicouterine junction at the base of the sacro-uterine ligaments.

A small 0.5 cm incision was made on the abdomen suprapubicaly and a reusable helical tunnelling device with an opening in the end was inserted into the abdomen. A rotatory manoeuvre of the helical device was used to create a subperitoneal tunnel along the path of the sacro-uterine ligament between the promontory opening and the cervical opening. Both (needled and blunt) ends of the mesh sling were inserted into the opening in the end of the helical tunnelling device. The helical device was then retrieved so that both ends of the sling exited the sub-peritoneal tunnel at the promontory opening.

The sacral promontory and the cervical opening were reperitonised with absorbable sutures to completely cover the mesh. A suture was made with the sling needle on the anterior longitudinal ligament and the sling was knotted to achieve moderate tension so that the uterus was elevated and the cervix repositioned at the vaginal apex.

In addition bilateral round ligament fixation was performed using a soluble suture.

The uterus and right adnexa were released from their suspension. The abdomen was deflated and sutures were applied to the skin incisions. We left a catheter and tamponade for 24 hours post operatively for better hemostasis. The patient was recommended using tampons for six weeks post operatively.

FOLLOW UP VISIT

Six weeks postoperative follow up showed great improvement in her condition. She reported subjective improvement since the surgery. She did not need any self catheterization however she still suffered from UTI. She had no more episodes of stress a semi-colon incontinence needed no safety pads and reported a normal urinary flow.

Physical and gynecological examinations were unremarkable. On vaginal examination the vagina and perineum were unremarkable. Good fixation, smooth and featureless cervix, and the uterus was anteflected. Stress test was negative. Perineal sonography demonstrated a slightly vertically mobile urethra. Vaginal sonography reviled a normal appearing uterus, and unremarkable adnexas. Abdominal sonography showed no renal congestion. Her post void residual urine was normal (<50ml).

FOLLOWING VISIT

A month later the patient presented once again with severe abdominal pain. She had no fever upon presentation and her blood work was normal. The working diagnosis was of ascending UTI and antibiotics were administered accordingly, however, an MRI was performed to rule out possible abdominal or pelvic pathology that was normal. Due to persistent pain a diagnostic laparoscopy was indicated.

DIAGNOSTIC LAPAROSCOPY

The procedure was conducted under general anaesthesia with the patient supine in semi-lithotomy and in the

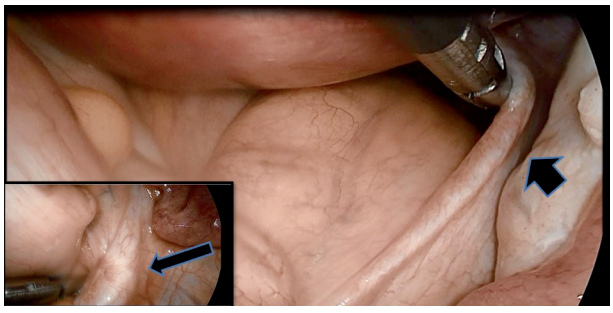

Figure 2. – The covered inserted MESH along the anatomical path of the sacro-uterine ligament (short thick arrow), in the box the covered MESH fixation point the promontorium (long thin arrow).

Trandelenburg position. A pneumoperitoneum was created, and three laparoscopic ports were placed: one 10-mm umbilical port and two 5-mm lateral ports. Abdominal and pelvic organ scan reviled no apparent pathology apart from some fine adhesions between the sigmoid colon and the left pelvic wall that were lysed easily. The uterus was fixed in the anatomical position. The sutures used for the round ligament fixation were completely resolved.

The abdomen was deflated and sutures were applied to the skin incisions. We left a catheter and for 24 hours post operatively.

In the word following the surgery the patient had elevated fever up to 38.7C. We continued the antibiotic treatment and eventually the diagnosis of pyelonephritis was confirmed. Urine cultures came back positive for coagulase negative E. Coli in addition PCR for STD was positive for Chlamydia. Five days later she was well, afibrile, without any pain and was discharged with a prescription for completion of two weeks of antibiotic treatment and antibiotic prophylaxis thereafter.

DISCUSSION

This unique case focuses on three major issues: 1) this unusual clinical presentation; 2) the novel laparoscopic hysterosacropexy procedure; and 3) the rare opportunity for an MRI and second look laparoscopy that enabled us to inspectus the results of our novel procedure.

This was a very unusual case of a young women with sever VD in the presence of mild level 1 defect. After ruling out other possibilities the probable etiology was either infectious or weakened pelvic organ support giving rise to this clinical presentation. After failure of conservative treatment, surgical reconstruction of her pelvic organ support was undertaken.

The remarkable post operative improvement that was noted fortified the diagnosis of pelvic organ support weakness as the cause of her condition. Even in hindsight conservative measures had to be exhausted before turning to surgery.

Uterine sacropexy for treatment of POP is gaining popularity worldwide.[6] Nevertheless, complications such as new onset bowel, voiding, and sexual dysfunction, de-novo stress incontinence, obstructed defecation syndrome and mesh erosion after sacropexy have been reported and may have a negative effect on patient's satisfaction.[7-8]

One of the biggest technical challenges in performing this procedure is creating a tunnel for the mesh under the peritoneum. We performed a novel procedure using a reusable helical tunneling device to create a sub-peritoneal tunnel along the path of the sacro-uterine ligament. This enabled us to restore the normal anatomy.

This novel procedure has many advantages besides those universally attributed to laparoscopic procedures (minimal blood loss, reduced pain, shorter hospital stay and fast recovery time). It is easy to perform, easy to teach, has a short operating time. Using the mesh sling offers the advantages of a minimal mesh area reducing the risk of erosion and it is MRI visible.

Although this was not the indication for MRI and diagnostic laparoscopy this evaluation of abdominal pain that was presented here gave us the rare opportunity for a second look at the anatomic results of our novel procedure. Both the patients' post operative follow up visit and the MRI and direct vision in laparoscopy indicate that unilateral hystrosacropexy in this case gave excellent anatomic and functional results.

We believe this novel procedure provides better anatomic reconstruction while minimizing mesh-related complications.

CONCLUSION

In severe and puzzling cases of VD, after exhausting conservative measures, surgical reconstruction of the pelvic organ support should be considered.

DISCLOSURE STATEMENTS

The Authors declare no conflict of interest and informed patients consent was obtained.

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