



Robotic Pelvic Reconstruction for a Case of Multiple Uterine Myomas with Acute Urinary Retention Combined with Pelvic Organ Prolapse and Occult Stress Urinary Incontinence

Feng-Sheng Jin¹, Chen-Yu Wang², Yu-Kuen Wang², Hsiang-Chun Dong², Cheng-Chang Chang²

¹Department of Obstetrics and Gynecology, Tri-Service General Hospital, Songshan Branch, ²Department of Obstetrics and Gynecology, Tri-Service General Hospital and National Defense Medical Center, Taipei, Taiwan

Pelvic organ prolapse (POP) is the descent of the female organs that result in a protrusion of the vagina and/or uterus. Women often present with multiple complaints including bladder, bowel, and pelvic symptoms. Urinary retention was the symptom that woman presents uncommonly. Treatments of urinary retention were including removing the etiology of compression of the urethra and rescuing the normal position of pelvic organs. Surgery may be by abdominal, vaginal, or laparoscopic or robotic approach according to doctor's skillfulness, patient's need, and involving pelvic organs. Robotic technology has advantages of minimally invasive surgery such as reduced postoperative pain, shorter hospital stay, and quicker recovery times. It also has advantages of faster performance times, increased accuracy, enhanced dexterity, more accessible and more comfortable suturing, and a lower number of errors when compared to conventional laparoscopic instrumentation. Hence, it could be performed complex surgery such as this case. We present a case of multiple uterine myomas with compression symptoms and occult stress urinary incontinence. At the case of paravaginal wall defect with stress incontinence, she underwent robotic Burch colposuspension and paravaginal repair. Robotic pelvic reconstruction can be accomplished safely and efficiently and should be considered as an option for patients who had POP with urinary incontinence and who are prepared undergoing robotic surgery.

Key words: Uterine myomas, pelvic organ prolapse, stress incontinence, robotic pelvic reconstruction, burch colposuspension, paravaginal repair

INTRODUCTION

POP is specified as the descent of one or more of the vaginal wall (anterior or posterior), the uterus, or the apex of the vagina. It may involve multiple systems (genitourinary, gastrointestinal, and musculoskeletal).¹ Symptoms of POP were bulge or vaginal pressure or with associated symptoms including urinary, defecatory, or sexual dysfunction. Signs include descent of one or more of the anterior vaginal wall, posterior vaginal wall, uterus and cervix, and the apex of the vagina after hysterectomy. POP is diagnosed using pelvic examination. The pelvic organ prolapse quantitation (POP-Q) system is objectively define the degree of prolapse and to determine the integrity of the connective tissue and muscular

support of the pelvic organs. The urodynamic study is to assess the function of lower urinary tract and the presence of "occult" dysfunction. Pelvic magnetic resonance imaging (MRI) and ultrasound could offer more detailed visualization of the soft tissues and the knowledge about the dynamic interaction between the pelvic supporting structures and the pelvic support defect. Most of the women with POP are asymptomatic that they did not treat. Surgical candidates for POP repair are women with symptomatic prolapse who decline or fail conservative therapy (e.g., vaginal pessaries). Treatment planning involves a full assessment of all symptoms, doctor's experience, and patient need. Surgical management of POP is

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

Received: July 10, 2017; Revised: August 16, 2018;
Accepted: September 05, 2018

Corresponding Author: Dr. Cheng-Chang Chang, Department of Obstetrics and Gynecology, Tri-Service General Hospital and National Defense Medical Center, No. 325, Section 2, Cheng-Kung Road, Neihu District 114, Taipei, Taiwan. Tel: 0912-170-048; Fax: +886-2-87927207. E-mail: sundoor66@gmail.com

How to cite this article: Jin FS, Wang CY, Wang YK, Dong HC, Chang CC. Robotic pelvic reconstruction for a case of multiple uterine myomas with acute urinary retention combined with pelvic organ prolapse and occult stress urinary incontinence. J Med Sci 0;0:0.

reconstructive and obliterative, and it may be performed by the vaginal, abdominal, laparoscopic, or robotic route.² The abdominal approach will be preferable in the presence of other abdominal pathology requiring treatment such as an ovarian mass or uterine myomas, or vaginal cavity is already reduced from previous surgery. No best approach to the surgery for the involved women, and therefore, the decision must be individualized.³ We posed that the case of the woman with POP with complicated surgery with robotic systems.

CASE REPORT

A 47-year-old female, gravida 2, para 1, presented to our hospital with a complained of voiding difficulty for 1 day. After reviewed history, she also suffered from the massive amount of menstruation and involuntary urinary leakage when she had a cough for 2 years. Moreover, she also had difficulty voiding for a few months. She had uterine myomas and followed up regularly at another hospital. When she had voiding difficulty and had to be indwelled Foley's catheter many times. She visited a gynecologist at local hospital and indwelling Foley's catheter this time due to difficult urination. Then, she referred to our emergency room (ER) for further evaluation. Physical examination showed that there was the increased uterine size in the pelvic cavity and obvious cystocele. The MRI documented multiple uterine myomas with the most significant size of 12 cm over a lower segment of the uterus, and it compressed the urethra [Figure 1]. The urodynamic study showed urodynamic stress incontinence (urethral pressure profiles study showed the maximal urethral pressure was 72 cm H₂O and the max, and urethral leak point pressure was 78 cmH₂O.). Pressure-flow study showed no uroflow (infused volume was 195 ml), and

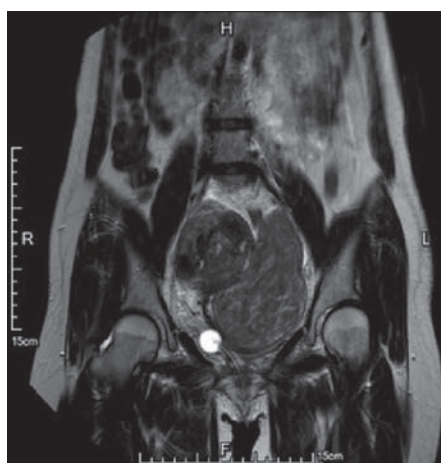


Figure 1: Magnetic resonance imaging T2-W1, coronary view showed an enlarged uterus with multiple myomas, and the largest one with the size of 12 cm in the lower segment of the uterus. The myoma compressed the urethra and tract the urethra at bladder region to the right side

the residual urine was 193 ml. The preliminary diagnosis was uterine myomas with compression symptoms, uterine prolapse with cystocele, and occult stress urinary incontinence. The hemoglobin was 10.0 g/dl, and hematocrit was 30.0%. The patient had a successful robotic subtotal hysterectomy, presacral uterosacral ligament – cervicovaginal suspension, paravaginal repair, and Burch colposuspension [Figure 2a-c]. Foley catheter was removed from the patient after the 1st postoperative day, and the patient was encouraged for appropriate activity. The patient was discharged on day 3. No analgesic drugs were administered. She was reexamined at the outpatient department 1 week after surgery and between 1 and 3 months after surgery. The patient had urinated smoothly and not had massive amount when menstruation came.

DISCUSSION

Urinary retention is one of the results of voiding phase dysfunction. Voiding phase dysfunction may be caused by a problem with the bladder (impaired contractility) or a problem with the outlet (obstruction).³ In this case, it may results in multiple uterine myomas with POP. The essential evaluation should include history, physical examination, and laboratory tests (urinalysis, urine culture, and even cytology if necessary). Pelvic ultrasound could also be utilized if there is suspicion of a pelvic mass or external compression. MRI can provide detailed soft-tissue evaluation without radiation. It may be useful if the symptoms do not appear consistent with her anatomy on physical examination. Urodynamic studies can be used to assess the function of the bladder during filling

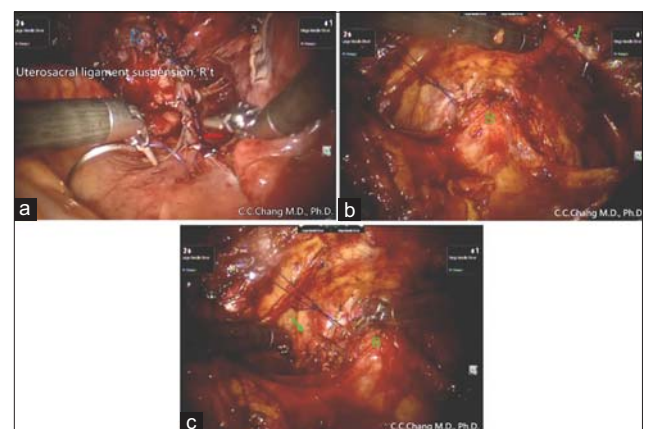


Figure 2: (a) Cervicovagina presacral uterosacral ligament suspension (high uterosacral ligament suspension). After a subtotal hysterectomy, we used 1-0 PDS to suture from the cervicovaginal region, along the uterosacral ligament (arrow), and end tied at the place of the presacral region (C: Cervical stump). (b) Burch suspension. After open Retzius space, sutures are placed in the periurethral tissues and then fixed to the ipsilateral Cooper ligament (arrow) (B: Bladder). (c) Paravaginal repair. Sutures were tied from vaginal fascia to the arcus tendineus fascia pelvis (arrow) (B: Bladder)

and voiding. At the urethral pressure study, it could evaluate the possibility of the occult urinary incontinence and add the surgery of anti-incontinence.⁴

Women with mild-to-moderate prolapse, conservative management including the change of lifestyle (weight loss or reduction of activities that increase intra-abdominal pressure) or physical intervention with pelvic floor muscle training may be considered. Pelvic floor muscle training is an effective treatment for urinary incontinence; however, it may limit progression in the related symptom of POP.⁴

Surgical treatment was left to the patient that failed at conservative treatment or severe symptoms of POP. Those may be reconstructive or obliterative procedures. The surgical management depending on the extent and location of prolapse, surgery may involve a combination of repairs directed to the anterior vagina, vaginal apex, posterior vagina, and perineum. The surgical route is chosen based on the type and severity of prolapse, the surgeon's training and experience, the patient's preference, and the expected or desired surgical outcome.¹ Treatments of POP may be sacrospinous ligament suspension, uterosacral ligament suspension, or iliococcygeus fascia suspension. Routes to surgery include vaginal, abdominal, laparoscopic, or robotic routes.¹ The patient had uterine myomas and coexisted with stress urinary incontinence. Reconstructive surgery may combined with hysterectomy/subtotal hysterectomy and anti-continent surgery. The abdominal approach may be considered to complete the complex surgery. Robotic surgery could replace abdominal surgery and also had benefit of laparoscopy. The robotic surgery aims to offer the benefits of minimally invasive surgery such as reduced postoperative pain, shorter hospital stay, and quicker recovery time alongside the specific benefits associated with robotic surgery including less technically demanding, shorter learning curve, and ergonomic benefits. It could be replaced abdominal procedure if the patient needs to receive multiple procedures of POP.⁵

Uterosacral ligament suspension could be performed vaginally, abdominally, laparoscopically, or robotically, and it suspends the apex of the vagina into the tissue of the presacral region and thus does not create any signification distortion of the vaginal axis. Moreover, it could prevent enterocele formation. Suspension of the vagina to the presacral region is an effective treatment for uterovaginal prolapse.¹ The abdominal approach was considered if the patient had uterine or ovarian pathology that needs to manage with hysterectomy or adnexectomy and also have anterior vaginal defect or urinary incontinence that needs to perform paravaginal defect repair or Burch colposuspension.⁴ Total recurrence rate was 13.7% with transvaginal approach.⁶ Moreover, the recurrence rate was 5% by abdominal approach.⁷ About 92% of success

rate by the robotic surgery that there was no significant difference with vaginal approach.⁸ Robotic surgery could be done with uterosacral suspension concomitant total or subtotal hysterectomy.

The robotic surgery like laparoscopic approach allows the surgeon to have a clear and global view to inspect the pelvic cavity. Moreover, the surgeon could use pneumoperitoneum to access better surgical planes and the accuracy of suture placement to complete optimal results.⁹ Robotic surgery had slightly longer operation times and expensive cost. However, it had the advantage of minimal surgery such as reduced blood loss, hospitalization time, and wound pain.¹⁰

The patient received cervicovagina presacral uterosacral ligament suspension after supracervical hysterectomy. The procedure did not use mesh for sexual active young woman. We suspended to the vaginal vault using PDS 1-0 and intracorporeal knot tying. It could be avoid to use mesh and has the risk of mesh erosion.¹¹

Three techniques have considered superior efficacy for the treatment of stress urinary incontinence. These procedures include retropubic colposuspensions (Burch colposuspension and the Marshall-Marchetti-Krantz procedure), the traditional bladder-neck sling, and the tension-free vaginal tape procedure.¹² Retropubic colposuspension could be performed by abdominal, laparoscopic, or robotic routes. Open retropubic colcosuspension is an effective treatment for SUI. The overall continence rate of the 1st year of treatment is approximately 85%–90%.¹³ The clinical outcomes were similar for two procedures.¹⁴ Laparoscopic surgery should be considered the same as open surgery but carried out through smaller incisions with longer instruments. The advantages of the laparoscopic approach are better visualization of the anatomy, less postoperative pain, and an earlier return to normal activities. Bora GS's case report showed no complications during robotic surgery. The patient that was followed up to 6 months could be continent and voiding without residual urine.¹⁵

Open abdominal approach for POP has high cure rate, however, she must have a larger wound, more wound pain, and longer hospital stay. Laparoscopic approach for POP has advantages of minimal wound, less pain, and short hospital stay; however, the lower success rate was noted. Robotic surgery has the advantages of high resolution of image, absence of tremor, and faster and easier suturing that makes the pelvic reconstructive surgery high success rate and diminishes of complication of ureter injury. High resolution of images makes the pelvic organs clear to view. In laparoscopy, the amplitude of the movement of the tip of the instrument is the same as the amplitude of the movement of the surgeon's hands, whereas in robotics it can be downsized, resulting in increased precision. The movement of the robotic instruments

is intuitive, following the movement of the surgeon hands that make the suturing easy to perform and intracorporeal knot tying. The lack of tactile feedback can be a disadvantage when the instruments are not in the visual field.²

The common complication of surgery is obstruction or kinking of ureter when the surgeon performs uterosacral ligament suspension. The rate up to 11%, and in most cases, will alleviate any obstruction without consequence when remove the offending sutures. The bladder dome was also a common injury when the surgeon performed Burch suspension. The complication rate was up to 10.3%. The view of patency of ureter with intraoperative cystoscopy is an important step. The case has intact mucosa of bladder and patency of ureter when cystoscopy examination. Gupta *et al.* reported 196 women with robotic prolapse repair. Intraoperative complications were 0.5% (cystotomy [4], vaginotomy [4], conversion to open [2], bowel injury/aborted [1], adhesions/aborted [1], and ureteral injury [1]). Immediate postoperative complications were rare (port-site hernia [2], discitis [1], ileus [1], and ulnar neuropraxia [3]).¹⁶ The limitations of robotic surgery as the laparoscopic surgery were severe intra-abdominal adhesions or enlarged abdominal lesions.

CONCLUSION

Robotic surgery is relatively easy to use, associated with a short learning curve, and comfortable for the surgeon. The robotic approach to cervicovagina presacral uterosacral ligament suspension may be better than conventional laparoscopy because of the ease of suturing and of intracorporeal knot tying. It could be perform multiple complex procedures at minimal wound. However, the cost is a problem in Taiwan. However, it could be managed for complex surgery of POP.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Gleason JL, Richter HE, Varner RE. Pelvic organ prolapse. In: Berek JS, editor. Berek & Novak's Gynecology. 15th ed. Philadelphia: Lippincott Williams & Wilkins; 2012. p. 906-39.
2. Magrina JF. Robotic operations. In: Berek JS, editor. Berek & Novak's Gynecology. 15th ed. Philadelphia: Lippincott Williams & Wilkins; 2012. p. 843-60.
3. Brucker BM, Nitti VW. Voiding phase dysfunction. In: Rogers RG, editor. Female Pelvic Medicine and Reconstructive Surgery. 1st ed. New York: McGraw Hill Educations; 2013. p. 135-52.
4. Muffly TM, Jelovsek JE, Walters MD. Apical pelvic organ prolapse. In: Rogers RG, editor. Female Pelvic Medicine and Reconstructive Surgery. 1st ed. New York: McGraw Hill Educations; 2013. p. 245-63.
5. O'Sullivan OE, O'Reilly BA. Robot-assisted surgery: – Impact on gynaecological and pelvic floor reconstructive surgery. *Int Urogynecol J* 2012;23:1163-73.
6. Milani R, Frigerio M, Cola A, Beretta C, Spelzini F, Manodoro S. Outcomes of transvaginal high uterosacral ligaments suspension: Over 500-patient single-center study. *Female Pelvic Med Reconstr Surg* 2018;24:203-6.
7. Lowenstein L, Fitz A, Kenton K, FitzGerald MP, Mueller ER, Brubaker L, *et al.* Transabdominal uterosacral suspension: Outcomes and complications. *Am J Obstet Gynecol* 2009;200:656.e1-5.
8. Vallabh-Patel V, Saiz C, Salamon C. Subjective and objective outcomes of robotic and vaginal high uterosacral ligament suspension. *Female Pelvic Med Reconstr Surg* 2016;22:420-4.
9. Crigler B, Zakaria M, Hart S. Total laparoscopic hysterectomy with laparoscopic uterosacral ligament suspension for the treatment of apical pelvic organ prolapse. *Surg Technol Int* 2012;22:195-202.
10. Seman EI, Cook JR, O'Shea RT. Two-year experience with laparoscopic pelvic floor repair. *J Am Assoc Gynecol Laparosc* 2003;10:38-45.
11. Jan H, Ghai V, Doumouchsis SK. Mesh-free laparoscopic high uterosacral ligament suspension during total laparoscopic hysterectomy for uterine prolapse. *J Minim Invasive Gynecol* 2017. pii: S1553-4650(17)31337-7.
12. Barber MD. Surgical treatment of stress urinary incontinence. In: Bent AE, Cundiff GW, Swift SE, editor. Ostergard's Urogynecology and Pelvic Floor Dysfunction. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007. p. 225-62.
13. Lapitan MC, Cody DJ, Grant AM. Open retropubic colposuspension for urinary incontinence in women. *Cochrane Database Syst Rev* 2005;(3):CD002912.

14. Reid F, Smith AR. Laparoscopic versus open colposuspension: Which one should we choose? *Curr Opin Obstet Gynecol* 2007;19:345-9.
15. Bora GS, Gupta VG, Mavuduru RS, Devana SK, Singh SK, Mandal AK, *et al.* Robotic Burch colposuspension-modified technique. *J Robot Surg* 2017;11:381-2.
16. Gupta P, Ehlert M, Bartley J, Gilleran J, Killinger KA, Boura JA, *et al.* Perioperative outcomes, complications, and efficacy of robotic-assisted prolapse repair: A Single institution study of 196 patients. *Female Pelvic Med Reconstr Surg* 2017. DOI: 10.1097/SPV.0000000000000472.