

Bladder Safety during Natural Orifice Transluminal Endoscopic Surgery Hysterectomy in the Patients with Extensive Vesicouterine Adhesion

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Abstract

Adhesion at the vesicouterine fold presents a great challenge when performing hysterectomy through transvaginal natural orifice transluminal endoscopy surgery (NOTES) in women with a history of cesarean section. An attempt to lyse adhesions often prolongs the procedure and may inadvertently result in cystostomy. The purpose of this report is to demonstrate a safe technique for the lysis of vesicouterine adhesions during NOTES hysterectomy. We present the cases of two patients with a history of cesarean section. Severe adhesions at the vesicouterine peritoneum were encountered in both cases, and one patient had an extensive adhesion involving lower half of the uterus. Although the lateral approach is sufficient in most cases, it does not allow a surgeon to approach the peritoneal cavity if there is extensive adhesion. In cases such as these, direct dissection of the adhesion on the uterus is required.

Keywords: Bladder injury, cesarean section, hysterectomy, natural orifice transluminal endoscopy surgery

INTRODUCTION

Natural orifice transluminal endoscopic surgery (NOTES) has become a widely used technique in gynecological practice, and its clinical application has broadened significantly.^[1-4] This technique is effective in preventing visible scarring and trocar wound complications and can lead to better cosmetic outcomes.^[5] To our knowledge, there have been no studies conducted on complications specifically related to NOTES. The largest study of 137 patients reported that intraoperative complications occurred in only two patients, one of whom had an unintended cystostomy at the trigone during anterior colpotomy. In that study, there were 50 cases (36.5%) in which

the patient had had previously undergone abdominal surgery, and more than three-fourths of those patients had undergone at least one cesarean section.^[6] Cesarean section is the most common cause of adhesions, which lead to difficulties in vesicovaginal dissection. We aim to share our experience using a safe technique for lysis of bladder adhesion during NOTES hysterectomy.

CASE REPORT

Case 1

A 58-year-old female had been diagnosed with uterine myoma 5 years previously. A follow-up examination revealed that her

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Article History:

Received 13 September 2018
Received in revised form 29 April 2019
Accepted 21 May 2019
Available online 29 August 2019

Video available on: www.e-gmit.com

Access this article online

Quick Response Code:



Website:
www.e-gmit.com

DOI:
10.4103/GMIT.GMIT_87_18

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How to cite this article: Tantitamit T, Temtanakitpaisan T, Lee CL. Bladder safety during natural orifice transluminal endoscopic surgery hysterectomy in the patients with extensive vesicouterine adhesion. *Gynecol Minim Invasive Ther* 2019;8:129-31.

uterine size had increased, and a pelvic examination revealed the size of pelvic mass at 20 weeks' gestation. Ultrasonography showed a uterus measuring 18.8 cm × 8.3 cm with a 15-cm myoma. The patient decided to treat the uterine fibroid by undergoing NOTES hysterectomy.

A dilute Pitressin solution was injected around the cervix to minimize bleeding. The hysterectomy was initiated with circumcision of the vaginal mucosa around the cervix followed by a posterior colpotomy. The bilateral uterosacral ligaments were then transected. The anterior vaginal wall was pushed up along with the uterocervical fascia, but the peritoneum between the bladder and uterus could not be identified. We used a lateral approach, starting with the development of the paravesical spaces. Once we entered into spaces, we used a retractor and a glove port and established a pneumoperitoneum. Usually, the pneumoperitoneum allows for identification of the peritoneal fold and aids in access to the peritoneal cavity. In this case, however, we were still unable to identify the peritoneal fold due to dense adhesion. We continued cutting the remaining portion of the broad ligament attached to the lower segment containing the uterine artery and round ligaments. Following this step, we were able to access the peritoneal cavity from the left lateral side [Figure 1] and divide the bilateral infundibulopelvic ligaments. The specimen was removed, and the vaginal cuff was closed. Complete hysterectomy with bilateral salpingo-oophorectomy was successfully accomplished without complication.

Case 2

A 39-year-old female presented with menorrhagia. Her operative history included one cesarean section and one hysterotomy abortion. Her uterus was enlarged, and an ultrasound revealed a globular uterus measuring 14 cm × 10 cm. We diagnosed her with adenomyosis and arranged for her to undergo transvaginal NOTES hysterectomy.

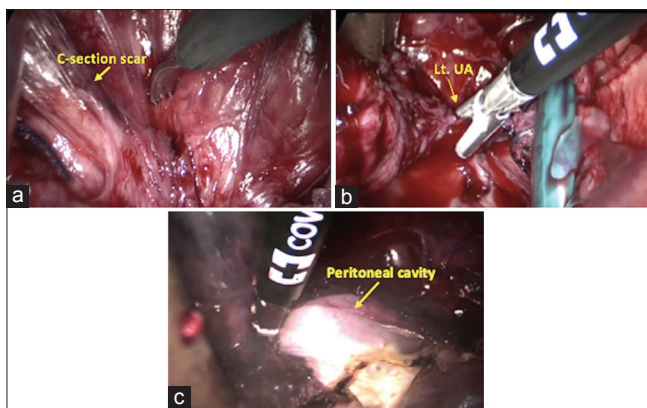


Figure 1: A view of lysis vesicouterine adhesion (adhesion secondary to a previous cesarean section). We tried to identify the junction between peritoneum and uterus (a). After cutting the uterine artery and dissecting the peritoneum at the lateral part (b). The peritoneal cavity was entered (c). C-section: Cesarean section, Lt. UA: Left uterine artery

After the pouch of Douglas was opened, an anterior colpotomy could not be easily performed. We thus used a lateral approach as we had in the first case. The paravesical spaces were developed followed by transection of the uterosacral ligaments. We then used a retractor and a glove port with CO₂ insufflation to create the pneumoperitoneum. During the endoscopic phase, bilateral broad ligaments, uterine vessels, and round ligaments were identified, coagulated, and cut bilaterally. In this case, the uterus was enlarged to the size of 14 weeks' gestation. The adhesion formation was much more severe than in the first case as it involved the lower half of the uterus. We were, therefore, unable to enter the peritoneum using the lateral approach. We carefully performed adhesiolysis by direct dissection of the vesicouterine adhesion on the uterus [Figure 2]. After entering the peritoneal cavity, a complete hysterectomy was achieved without complication. Cystoscopic evaluation in both cases revealed bilateral ureteric jets, normal bladder mucosa, and a normal trigone area. The surgical technique of two cases were shown in the supplementary material [Supplementary Video 1]

DISCUSSION

Severe vesicouterine adhesion remains a great challenge when performing hysterectomy. It causes difficulty in developing the spaces between the vaginal walls and bladder, resulting in significant morbidities such as bleeding, prolonged operative time, and bladder injury. One retrospective study of 3076 vaginal hysterectomies reported that 11 of 33 patients with bladder injuries had a history of abdominal surgery (nine cesarean sections and two myomectomies) and that most incidents of the bladder laceration (72%) occurred during the opening of the vesicovaginal space.^[7] Ko *et al.* reported that laparoscopically assisted vaginal hysterectomy (LAVH) in women with a history of cesarean section may take 45 min longer if anterior wall adhesions are present.^[8]

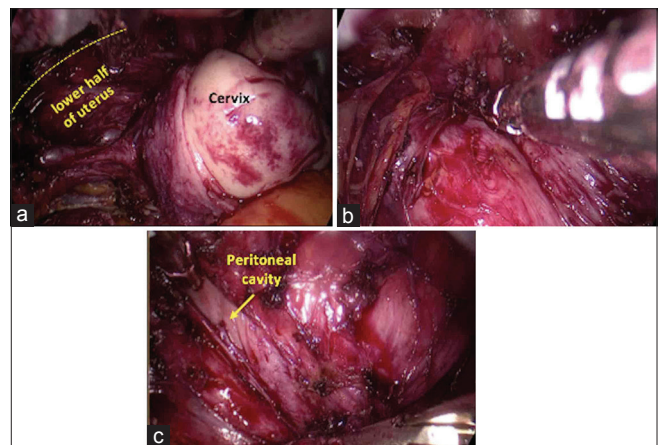


Figure 2: Lysis of the vesicouterine adhesion. The adhesion involved more than the lower one-half of the uterus. We were unable to enter the peritoneal cavity using a lateral approach (a). Direct dissection of the vesicouterine adhesion (b). The peritoneal cavity was entered (c)

In addition to anatomical knowledge, the proper surgical technique is essential to prevent complications. Li and Ding reported on the use of NOTES hysterectomy in a patient with extensive adhesions from the previous adnominal surgery. Although the patient had adhesions between the uterine fundus and small intestine, both anterior and posterior colpotomy were performed without difficulty.^[9] This is the first study to demonstrate a safe adhesiolysis technique for vesicouterine adhesion during NOTES hysterectomy. Chang *et al.* reported using transvaginal lateral intervention to reduce the occurrence of bladder injury during LAVH in women who had previously undergone a cesarean section. An operator began by creating the lateral windows of the vesicouterine space during the vaginal manipulation. In most of the cases, they were able to easily develop the potential spaces lateral to the adhesions using blunt finger dissection. They then swept an index finger medially to define the margin of the midline adhesions and were able to safely dissect the adhesion under direct vision and finger guidance.^[10] We attempted a similar technique but were not able to access the peritoneal cavity. Because NOTES can be conducted using endoscopic guidance, we were able to divide the remaining portion of the broad ligament and dissect the adhesion beyond the reach of the operator's fingers with the assistance of a laparoscopic instrument. Using this technique, we were able to more confidently and safely perform adhesiolysis of bladder adhesion than with LAVH or vaginal hysterectomy. Using conventional laparoscopy to determine the correct plane during adhesiolysis can be helpful if the surgeon is inexperienced. After completion of NOTES hysterectomy, it is important to perform a cystoscopy, especially in high-risk cases with scarring of the anterior peritoneum. The bilateral ureteric jet, bladder mucosa, and trigone area should be accessed as they carry a risk of potential ureteric injury.

CONCLUSION

The presence of adhesions from cesarean section scars or other abdominal surgeries should not be considered as a contraindication for NOTES. Although the operation may take longer in these cases, it is safe if carefully performed using proper dissection technique.

Ethical approval

This research was approved by Chang Gung Medical Foundation Institutional Review Board (IRB No. 201901221B0) on 14th August in 2019.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for 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.

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