

# Bladder stone formation on permanent suture material ten years after laparoscopic high uterosacral ligament suspension

H. Jang<sup>1</sup>, E.K. Park<sup>2</sup>, D.S. Han<sup>1</sup>, C.J. Kim<sup>3</sup>, Y.S. Lee<sup>2</sup>

<sup>1</sup> Department of Urology, <sup>2</sup> Department of Obstetrics and Gynecology, The Catholic University of Korea, Daejeon St. Mary's Hospital, Daehung-dong, Jung-gu, Daejeon

<sup>3</sup> Department of Obstetrics and Gynecology, The Catholic University of Korea, St. Paul's Hospital, Dongdaemun-gu, Seoul (Korea)

## Summary

The present authors describe an uncommon case of iatrogenic bladder stone formation in a patient who underwent surgery for pelvic organ prolapse. A female patient who underwent high uterosacral ligament suspension ten years ago presented with pyuria and irritable bladder symptoms that did not respond to treatment. She had not experienced any specific urinary symptoms during the previous ten years. Patient evaluation revealed bladder stone formation on the non-absorbable suture material used during the previous operation. Cystoscopy during the previous operation did not find the suture material, and the suture knot that was tied extravesically during the operation was found inside the bladder. These strongly suggest delayed migration and rotation of the suture knot after surgery rather than direct penetration of the bladder during operation. Delayed suture migration is a long-term complication that clinicians should consider in a patient who suffers from recurrent urinary symptoms after pelvic surgery around the bladder.

**Key words:** Bladder stone; Delayed migration; Non-absorbable suture; High uterosacral ligament suspension (HUSLS).

## Introduction

Most bladder stones develop in male patients who are bedridden and have a urethral catheter, bladder outlet obstruction, infection, or other similar characteristics [1]. Bladder stone formation after gynecologic surgery is rare and usually associated with foreign bodies, such as suture materials and synthetic mesh [2]. Most patients with iatrogenic bladder stones are assumed to have direct bladder injury during the operation and usually present with irritable bladder symptoms or recurrent urinary infection shortly after surgery. The authors describe a female patient who underwent laparoscopic high uterosacral ligament suspension (HUSLS) surgery and showed recurrent cystitis and bladder stone formation after a ten-year asymptomatic period. Appearance of symptoms ten years after surgery is the longest time interval among similar reported cases. In addition, direct bladder penetration was not noted by cystoscopic examination during the previous surgery.

## Case Report

A 72-year-old woman with a month-long history of voiding difficulty, frequency, dysuria, and hesitancy visited the outpatient clinic of the Urology Department of Daejeon St. Mary's hospital in June 2014. She had a history of pelvic organ prolapse and underwent total laparoscopic hysterectomy with bilateral adnexectomy, colpoperineorrhaphy, and laparoscopic HUSLS ten years ago in another large gynecologic clinic. Operative records show that longitudinally-placed nonabsorbable sutures were passed through the ridge or

uterosacral ligaments, down the cul-de-sac to the edge of the rectovaginal fascia, into the vaginal vault, and finally through the edge of the pubocervical fascia during the HUSLS procedure. Her prolapse symptoms resolved after the surgery.

At her first visit, urinalysis revealed many white blood cells and *Escherichia coli*. The post-void residual urine volume (PVR) was 250 ml. According to the patient's symptoms and test results, the authors diagnosed cystitis and neurogenic bladder presenting as detrusor underactivity and treated with oral antibiotics, an alpha adrenergic blocker, and bethanechol chloride. After seven days of treatment, although white blood cells in the urine and PVR were decreased compared to the first visit, pyuria was sustained and the patient's symptoms had no apparent improvement. The authors determined that the antibiotic treatment was insufficient and tried an additional antibiotic treatment for a week, but there was no improvement. In order to find pyuria and identify the source of abnormal urinary symptoms that did not respond to treatment, the authors performed cystoscopic examination and radiologic studies, including plain radiography of the kidney, ureter, and urinary bladder (KUB) and abdominal computed tomography (CT). A 28.49×16.15 mm, radio-opaque, round lesion was noted in the right side of the pelvic cavity on the KUB (Figure 1A). Abdominal CT showed that this mass was a bladder stone (Figure 1B). Cystoscopic examination showed a bright yellow stone in the right posterior bladder wall, suspended, and surrounded by suture material passing through the bladder wall (Figure 1C).

Based on the radiographic studies and cystoscopic examination, open cystolithotomy was performed in the patient. During the operation, the bladder stone was found to be formed in the middle of the suture material through the right posterior bladder wall, as shown through cystoscopic examination (Figure 2A). The bladder stone, including suture material, was removed by resection of the suture material (Figure 2B), and suture sites were de-

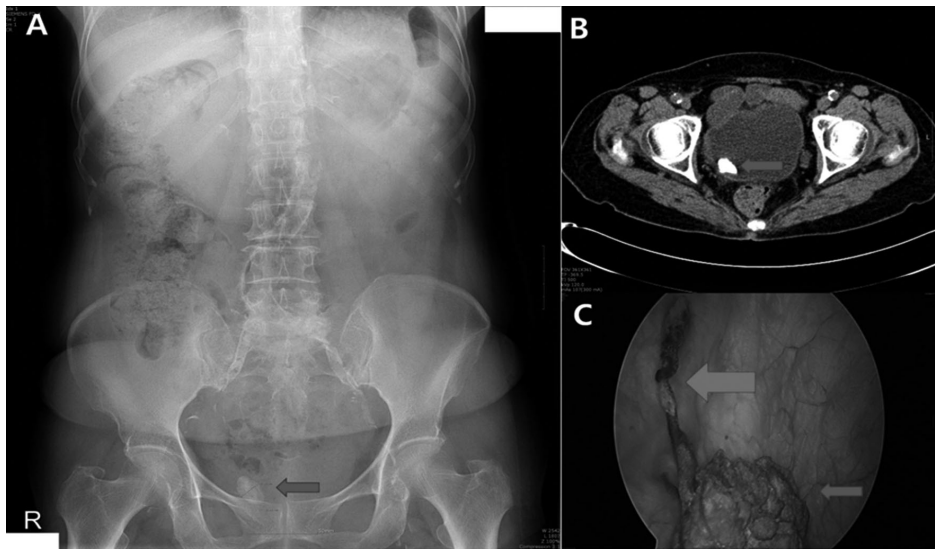


Figure 1. — Preoperative radiologic study showing a radio-opaque and round bladder stone in the right side of the pelvic cavity in (A) KUB and (B) abdominal CT. On cystoscopic examination, a bright yellow stone is identified in the right posterior wall of the bladder, and it is suspended and surrounded by suture material passing through the right posterior bladder wall (C).

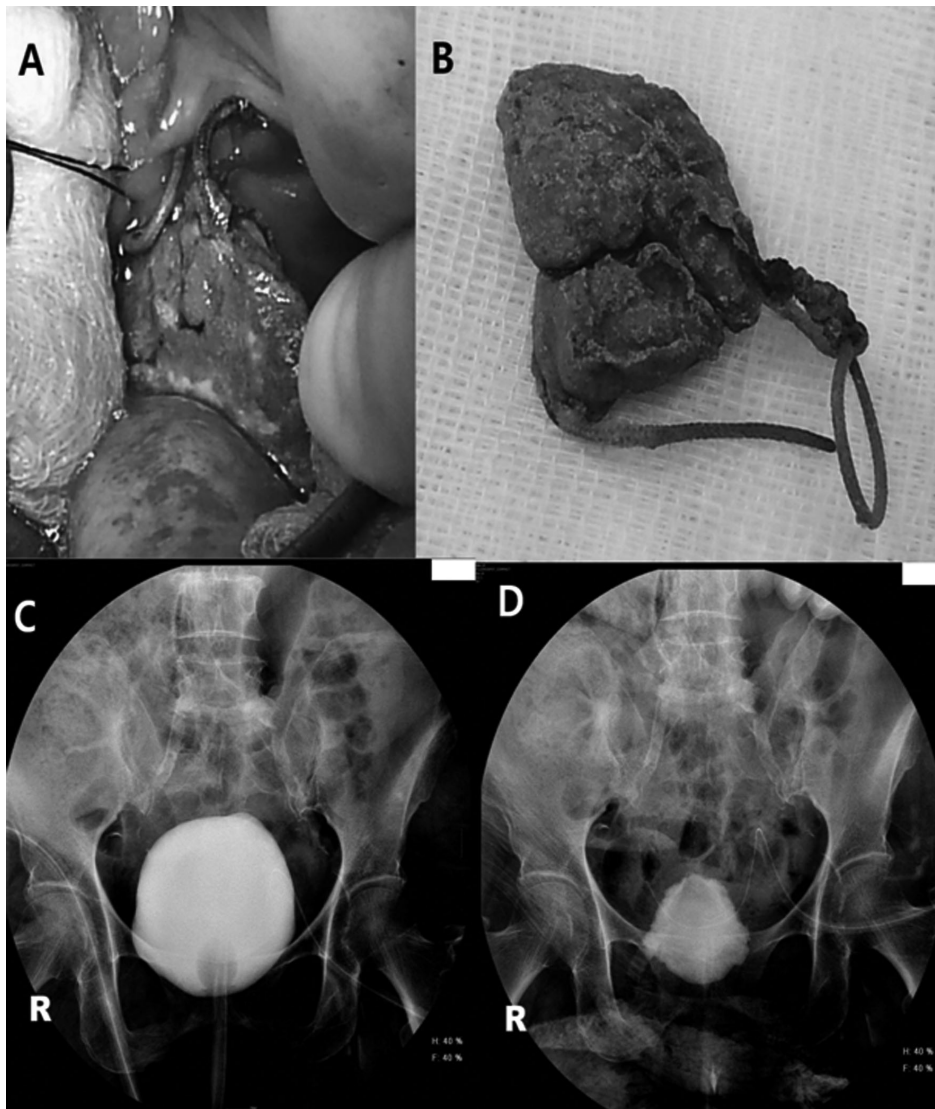


Figure 2. — The bladder stone was formed in the middle of the suture material through the right posterior wall of the bladder during the operation (A). The bladder stone, including suture material, was removed by resection of the suture material (B). Three-dimensional computerized tomography (3D-CT) of the pelvis without contrast enhancement after removal (C).

brided and closed with absorbable sutures. Then, a Foley catheter was placed in the bladder for two weeks. After two weeks, the catheter was removed and voiding cystourethrography (VCUG) was performed. In VCUG, there was no dye leakage around the operation site (Figure 2C) and a small amount of PVR (Figure 2D) was identified. The patient has been well without complications or abnormal urinary symptoms after surgery.

## Discussion

Pelvic organ prolapse is a challenging problem for the gynecologist, and various approaches have been tried including vaginal, laparoscopic, and abdominal approaches. Laparoscopic HUSLS is a surgical option for gynecologists treating pelvic organ prolapse, and seems to be a durable procedure for the repair of enterocele and vaginal vault prolapse [3]. For the operation, non-absorbable suture materials or a surgical stapler are usually used and should not directly contact the urinary system. A literature search revealed iatrogenic bladder stone formation by non-absorbable suture materials or a surgical stapler after uro-gynecological surgeries, including various colposuspension procedures and even hysterectomy [4-6]. In most cases, the investigators found that synthetic and non-absorbable suture materials were encrusted by bladder stone. The underlying mechanism involves direct suture penetration through the wall bladder wall during the operation, which then causes calcium salt deposition. Therefore, a patient with an iatrogenic bladder stone usually presents with lower urinary tract symptoms such as pain, urgency, and/or intermittency in voiding within relatively short time after surgery. However, some studies showed that these materials can migrate through the tissues to reach other organs, including the bladder, with a long term time interval after surgery, even though the suture does not directly penetrate the bladder mucosa [7, 8]. The delayed migration could be related to infection, an inflammation process, and/or tension and movement of the surrounding tissue [8]. Biyani *et al.* report delayed migration of sutures into the bladder occurring seven years after a colposuspension procedure [9]. Although extremely rare, there are a few reports of migration of non-absorbable operative devices to other organs, including delayed staple erosion into the bladder after removal of an ovarian mass and small bowel obstruction by a staple after laparoscopic vaginal hysterectomy [10, 11]. Alternatively, the present authors recognize the possibility that the original suture may have penetrated the bladder wall but not through its full thickness, eventually eroding into the lumen.

In the present case, cystoscopy during the previous operation did not find the suture material, and the suture knot, which was tied extravesically during the operation, was found inside the bladder. In addition, the patient did not show any urinary symptoms for ten years after operation; to the present authors' knowledge, this is longest time interval after surgery among reported similar cases. These suggest delayed migration and rotation of the non-absorbable suture materials after surgery rather than direct penetration of the bladder during operation.

Bladder stone formation induced by surgical procedures outside the bladder seems to be rare. The complication can be prevented in many cases by avoiding non-absorbable suture materials, Kasturi *et al.* reported that permanent sutures, in comparison with delayed absorbable sutures, do not offer significantly better apical support even at short-term follow-up after HUSLS [12]. In addition, careful sutures that do not penetrate the urinary bladder and the use of cystoscopy to check the urinary bladder after surgery are also necessary. However, delayed suture migration is another long-term complication to consider in patients with recurrent urinary symptoms after pelvic surgery around the bladder. Despite the limited number of cases, it is important to recognize the potential of this complication.

## References

- [1] Schwartz B.F., Stoller M.L.: "The vesical calculus". *Urol. Clin. North Am.*, 2000, 27, 333.
- [2] Stav K., Dwyer P.L.: "Urinary bladder stones in women". *Obstet. Gynecol. Surv.*, 2012, 67, 715.
- [3] Silva W.A., Pauls R.N., Segal J.L., Rooney C.M., Kleeman S.D., Karram M.M.: "Uterosacral ligament vault suspension: five-year outcomes". *Obstet. Gynecol.*, 2006, 108, 255.
- [4] Borgaonkar S.S., Hackman B.W.: "Neodymium: YAG laser removal of stone formed on nonabsorbable suture used previously in colposuspension". *J. Urol.*, 1996, 156, 472.
- [5] Lu CM.: "Intravesical stone formation several years after hysterectomy: a case report". *J. Med. Case Rep.*, 2013, 7, 230.
- [6] Yesilli C., Seckiner I., Mungan N.A., Akduman B.: "Stone formation on surgical staple in the bladder: a long-term complication of laparoscopic colposuspension". *Surg. Laparosc. Endosc. Percutan. Tech.*, 2007, 17, 568.
- [7] Trevino R., Goldstein A.M., Vartanian N.L.: "Vesical bladder stones forming around non-absorbable sutures and possible explanation for their delayed appearance". *J. Urol.*, 1979, 122, 849.
- [8] Kannan K., Balakrishnan S., Kasper A., Corstiaans A., Rane A.: "Recurrent non-absorbable suture erosion into the bladder after a Pereyra bladder neck suspension". *J. Obstet. Gynaecol.*, 2009, 29, 352.
- [9] Biyani C.S., Upsdell S.M.: "An unusual foreign body in the bladder 7 years after a Stamey endoscopic bladder neck suspension". *Int. Urogynecol. J. Pelvic Floor Dysfunct.*, 1998, 9, 303.
- [10] Rettenmaier C.R., Abaid L.N., Hu J.C., Brown J.V., Micha J.P., Goldstein B.H.: "Delayed staple erosion into the bladder after removal of a benign ovarian mass". *J. Minim. Invasive. Gynecol.*, 2009, 16, 491.
- [11] Abularach S.M., Ashai S.: "Bowel perforation caused by an endoscopic stapler used during laparoscopically assisted vaginal hysterectomy: a case report". *J. Reprod. Med.*, 2000, 45, 504.
- [12] Kasturi S., Bentley-Taylor M., Woodman P.J., Terry C.L., Hale D.S.: "High uterosacral ligament vaginal vault suspension: comparison of absorbable vs. permanent suture for apical fixation". *Int. Urogynecol. J.*, 2012, 23, 941.

Corresponding Author:

Y.S. LEE, M.D.

Department of Obstetrics and Gynecology  
The Catholic University of Korea  
Daejeon St. Mary's Hospital  
520-2, Daehung-dong, Jung-gu  
Daejeon, 301-723 (South Korea)  
e-mail: gom@catholic.ac.kr