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Case Report

Use of an Ellik evacuator to remove tenacious bladder clots resulting from transvaginal oocyte retrieval: 2 cases and a literature review

Yu-Ting Su, Kuan-Hui Huang, Fei-Chi Chuang, Kuo-Chung Lan*

Department of Obstetrics and Gynecology, Kaohsiung Chang Gung Memorial Hospital, Chang Gung University College of Medicine, Kaohsiung, Taiwan

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ABSTRACT

Objective: Transvaginal oocyte retrieval has become the common method for infertility couples undergoing artificial reproductive technology. Although it was considered to be safe, rare complications including urinary bladder injury were reported.

Case report: We described two cases of bladder injury with refractory blood clots after oocyte retrieval, for whom conservative treatment failed. Diagnostic cystoscopy was performed and an Ellik evacuator was used for clot dissolution successfully.

Conclusion: Urinary bladder injury with clots retention is a rare complication following ovary puncture. When tenacious clots become organized, the removal with traditional bladder irrigation may be difficult. We introduce Ellik evacuator as an effective and reliable procedure for evacuating tenacious clots in the urinary bladder.

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Introduction

There is increasing use of assisted reproductive technologies (ARTs), and transvaginal oocyte retrieval (TVOR) has become standard for infertile couples since its introduction by Wickland et al., in 1985 [1]. Several observational studies evaluated the rate of complications from TVOR, and considered it to be safe [2,3]. The rare complications from this procedure include intra-abdominal bleeding, pelvic abscess, injury to the pelvic organ, adnexal torsion, and ovarian hyperstimulation syndrome (OHSS) [4–7]. Bladder injury with hematuria is even more rare, but conservative treatment using a Foley catheter for irrigation and drainage is mostly effective. We report two cases with bladder injuries causing hematuria with blood clots after TVOR, in which initial treatment by irrigation was unsuccessful, and review the literature on this complication. Institutional review board approval was obtained for the study (No. 201601637B0).

Case reports

Patient 1

A 35-year-old woman presented to the emergency room (ER) reporting voiding difficulty and hematuria 3 days after TVOR. She had a 5-year-history of primary infertility, with 2 failed attempts from intracytoplasmic sperm injection (ICSI). No specific past history, in particular pelvic inflammatory disease or surgery, was reported. There was no obvious female infertility after evaluation, but semen analysis of her husband revealed azoospermia.

Controlled ovarian stimulation began using the GnRH agonist long protocol, followed by stimulation with daily 150 IU of recombinant FSH and 75 IU of urinary hMG for 10 days. After 10 days of stimulation, ovulation was triggered with 6500 IU of hCG when ≥ 2 follicles reached a diameter of 18 mm. The serum E2 level was 4500 pg/mL on the day of trigger. The patient underwent TVOR 36 h after the hCG trigger, followed by ICSI due to male factor. The TVOR was performed with a 5.0-MHz multi-frequency convex vaginal probe (Aloka UST-984-5) fitted with the original manufacturer's needle guide and 16-gauge double-lumen needle from Cook-REchotipR (Australia). Ten matured oocytes were aspirated which took about 15 min. There were no technical difficulties during oocyte retrieval. All embryos were cultured to the blastocyst stage, and subjected to cryopreservation because of the risk of OHSS.

* Corresponding author. Department of Obstetrics and Gynecology, Kaohsiung Chang Gung Memorial Hospital, Chang Gung University College of Medicine, No. 123, Dapi Rd., Niasong Dist., Kaohsiung City, 83301, Taiwan.

E-mail address: lankuochung@gmail.com (K.-C. Lan).

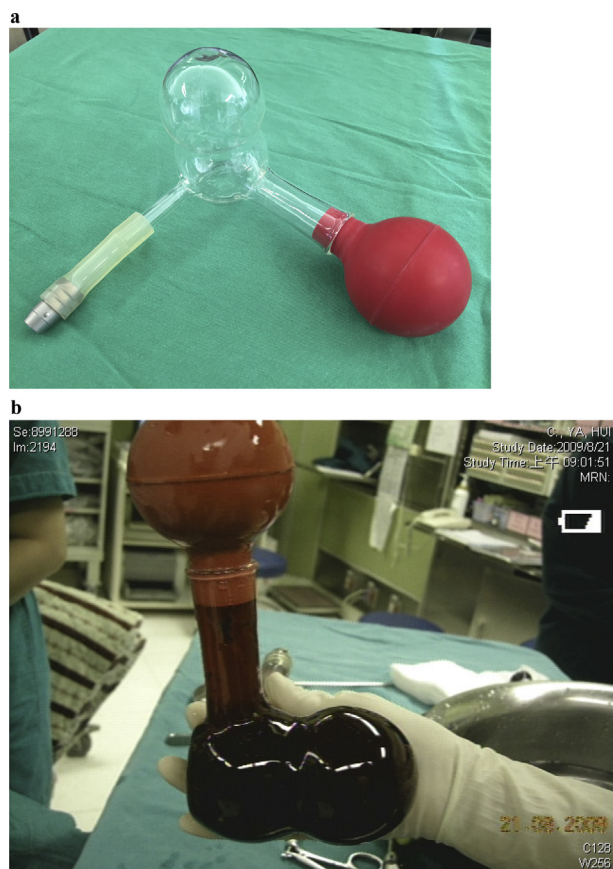


Fig. 3. The Ellik evacuator used for clot dissolution and evacuation (patient 1). a: before use; b: after use.

present compared with the examination previously performed (60×26 mm) (Fig. 4).

Due to the failure of continuous irrigation and further anemia, the cystoscopy was performed by the urogynecologist with the team to remove the clots and search for the potential bleeding site. The cystoscopy revealed dense blood clots and focal erythematous area on the mucosa of right lateral floor (Fig. 5). No active bleeding or disrupted mucosa was found. Clot evacuation was performed

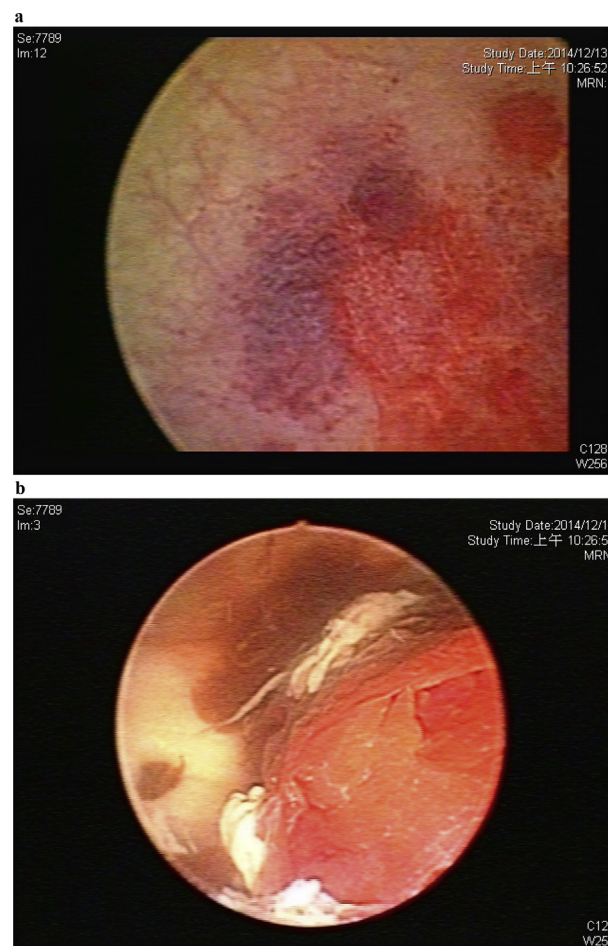


Fig. 5. a Cystoscopy showing focal erythematous area on the mucosa of right lateral floor (patient 2). b Cystoscopy showing the organized clots (patient 2).

using a cystoscope sheath with an Ellik evacuator, followed by single-blastocyst transfer on the same day. She reported being comfortable, and had no further hematuria after this procedure. She was discharged 3 days after the cystoscopy, and transferred to a continuous progesterone and estradiol supplement.

Discussion

Peritoneal bladder injury following oocyte retrieval is rare. Previous studies documented the efficacy and safety of transvaginal ultrasound-guided oocyte retrieval [4,5,7]. The most common complications of this procedure are vaginal bleeding, pelvic infection, pelvic trauma, ovarian torsion, and anesthesia-related complications. Aragona et al. recently reviewed more than 7000 cases undergoing TVOR and reported that 0.06% patients had peritoneal bleeding that required surgical intervention [4]. However, none of the cases included in that review involved bladder injury following TVOR, indicating the rarity of this complication.

The most common causes of urinary tract injury following TVOR are pelvic adhesion, endometriosis, and pelvic surgery. These may alter the anatomy of the pelvis, and increase the risk of complications from oocyte aspiration. However, the two cases presented here had no such history. The bladder injury is classified as contusion, extraperitoneal rupture, and intraperitoneal rupture [8,9]. For the patients, there may be at least three reasons why bladder injury by contusion or needle penetrating occurred during ovaries puncture: 1. mechanical pressure of the vaginal probe

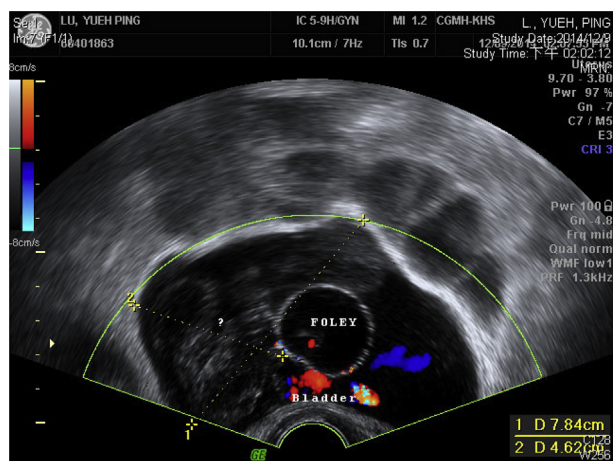


Fig. 4. Transvaginal ultrasound showing a large and persistent blood clot in the bladder cavity, measuring 60.6×26.1 cm in diameter, after irrigation and drainage with a three-way Foley catheter (patient 2).

Table 1
Previous publications of bladder injury following transvaginal oocyte retrieval.

Study	Study type	Number of cases	Symptoms	Treatment
Sauer (2001) [11]	Review	1 ^a	Bladder atony with hematuria	Bladder catheter irrigation and drainage for 24 h
Modder et al. (2006) [12]	Case report	1	Suprapubic discomfort and postvoid fullness, hematuria, hemodynamic instability	Intravenous fluid bolus, continuous bladder irrigation.
Jayakrishnan et al. (2011) [13]	Case report	1 ^b	Hematuria, hemodynamic instability	Resectoscope and wire loop with cutting and coagulating current

^a Based on review of 1000 aspirations of oocyte donors.

^b Bleeding pseudoaneurysm.

possibly changing pelvic anatomy [10]; 2. prolonged aspiration procedure with intravenous hyperhydration enhancing bladder distension; 3. increased bleeding tendency in these patients treated with low-dose aspirin as adjuvant during ART.

In most cases, urinary bladder clot can be managed conservatively, according to our experience and a review of previous reports [11–13]. However, removing tenacious clots by continuous urinary irrigation may not always be successful when delayed diagnosis or management. We describe our experience in managing big blood clots in the bladder after conservative treatment with catheter irrigation and drainage. The incidence of this complication is 0.05% in more than 4000 cases of ART at our hospital during the period from Jan 2001 to December 2015.

Our review of the literature indicated only 3 cases of bladder injury as a complication of TVOR (Table 1). Sauer et al. reported 1000 aspirations of oocyte donors, and found 1 case presenting with urine retention and bladder atony with gross hematuria [11]. This patient was successfully treated using urinary catheter irrigation and drainage. Another case report described bladder injury with hematuria and urinary retention after transvaginal oocyte aspiration [12]. This patient also received conservative treatment with catheter irrigation and drainage only. Although conservative treatment is generally sufficient, another interesting case report described a patient with persistent hematuria and hemodynamic instability following pseudoaneurysms in the bladder [13]. This patient received cystoscopy for diagnosis, followed by resection and cauterization of the pseudoaneurysms.

The two patients described in the present report had bladder injuries with blood clots following follicles puncture. Clot retention can lead to severe suprapubic pain, tachycardia, and hypertension due to an acutely over-distended bladder [14]. Initially, we placed an indwelling catheter and performed bladder irrigation to wash out the blood clots. However, tenacious and large blood clots clogged the catheter, leading to failure of this method. In such cases, an experienced urogynecologist should perform a cystoscopy. Goel et al. [15] described several treatments for blood clots during urological surgery, including evacuation with an Ellik evacuator or a Toomey syringe, disruption using a resectoscope loop or various chemicals, and mechanical suction. The Ellik evacuator has been used worldwide by urologist to remove tissue sections during transurethral prostatectomy, bladder biopsy, and for removing calculi from urinary bladder [16]. The instrument is a piece of blown glass with a tube connecting to the cystoscope sheath and a rubber bulb. The bulb is squeezed to push saline into the bladder, and the clots are sucked out when the bulb is slowly released. The design of the evacuator provides for the collection of the clots in the lower chamber as the irrigating action is carried out. This process is repeated rhythmically until all the clots have been removed. Here, we demonstrated a safe and effective method with using of Ellik evacuator through a cystoscope sheath to evacuate large refractory blood clots in the bladder that developed as a complication of oocyte retrieval, after conservative Foley irrigation failed. To date,

the two cases after the procedure have showed good results and no associated complications.

To prevent bladder injury during TVOR, completely emptying bladder before commencing procedure is essential. Clinicians should be aware to keep the tip of puncture needle in the lateral position to avoid the trauma to the bladder. Finally, urine collection with bladder catheter after TVOR can possibly detect early hematuria.

Conclusion

Bladder injury with blood clots is a rare but serious complication of ARTs. Infertility doctors should consider this as a possible complication when a patient presents with hematuria and urine retention after TVOR. Bladder irrigation should be attempted first. However, if organized clots persist, cystoscopic evacuation of clots sometimes is an alternative option for dissolving clots. Our report suggests that refractory bladder clots can be effectively removed using a cystoscopic sheath with the Ellik evacuator when conservative treatment fails.

Conflict of interest

The authors declare that they have no conflict of interest.

References

- [1] Wikland M, Enk L, Hamberger L. Transvesical and transvaginal approaches for the aspiration of follicles by use of ultrasound. *Ann N Y Acad Sci* 1985;442:182–94.
- [2] Dicker D, Ashkenazi J, Feldberg D, Levy T, Dekel A, Ben-Rafael Z. Severe abdominal complications after transvaginal ultrasonographically guided retrieval of oocytes for in vitro fertilization and embryo transfer. *Fertil Steril* 1993;59:1313–5.
- [3] Bergh T, Lundkvist O. Clinical complications during in-vitro fertilization treatment. *Hum Reprod* 1992;7:625–6.
- [4] Aragona C, Mohamed MA, Espinola MS, Linari A, Pecorini F, Micara G, et al. Clinical complications after transvaginal oocyte retrieval in 7,098 IVF cycles. *Fertil Steril* 2011;95:293–4.
- [5] Bodri D, Guillen JJ, Polo A, Trullenque M, Esteve C, Coll O. Complications related to ovarian stimulation and oocyte retrieval in 4052 oocyte donor cycles. *Reprod Biomed Online* 2008;17:237–43.
- [6] Bennett SJ, Waterstone JJ, Cheng WC, Parsons J. Complications of transvaginal ultrasound-directed follicle aspiration: a review of 2670 consecutive procedures. *J Assist Reprod Genet* 1993;10:72–7.
- [7] Ludwig AK, Glawatz M, Griesinger G, Diedrich K, Ludwig M. Perioperative and post-operative complications of transvaginal ultrasound-guided oocyte retrieval: prospective study of >1000 oocyte retrievals. *Hum Reprod* 2006;21:3235–40.
- [8] Corriere Jr JN, Sandler CM. Diagnosis and management of bladder injuries. *Urol Clin N Am* 2006;33:67–71. vi.
- [9] Gomez RG, Ceballos L, Coburn M, Corriere Jr JN, Dixon CM, Lobel B, et al. Consensus statement on bladder injuries. *BJU Int* 2004;94:27–32.
- [10] Grynberg M, Berwanger AL, Toledano M, Frydman R, Deffieux X, Fanchin R. Ureteral injury after transvaginal ultrasound-guided oocyte retrieval: a complication of in vitro fertilization-embryo transfer that may lurk undetected in women presenting with severe ovarian hyperstimulation syndrome. *Fertil Steril* 2011;96:869–71.

- [11] Sauer MV. Defining the incidence of serious complications experienced by oocyte donors: a review of 1000 cases. *Am J Obstet Gynecol* 2001;184l: 277–8.
- [12] Modder J, Kettel LM, Sakamoto K. Hematuria and clot retention after trans-vaginal oocyte aspiration: a case report. *Fertil Steril* 2006;86l:720 e721–722.
- [13] Jayakrishnan K, Raman VK, Vijayalakshmi VK, Baheti S, Nambiar D. Massive hematuria with hemodynamic instability—complication of oocyte retrieval. *Fertil Steril* 2011;96l:e22–4.
- [14] Ritch CR, Ordonez MA, Okhunov Z, Araujo J, Walsh R, Baudin V, et al. Pilot study of Alteplase (tissue plasminogen activator) for treatment of urinary clot retention in an in vitro model. *J Endourol* 2009;23l:1353–7.
- [15] Goel A, Sengottayan VK, Dwivedi AK. Mechanical suction: an effective and safe method to remove large and tenacious clots from the urinary bladder. *Urology* 2011;77l:494–6.
- [16] Holm J, Holm M, Holm NC, Holm HH. A new disposable bladder evacuator. *Br J Urol* 1997;80l:950–2.