

CASE REPORT

Acute ureteral obstruction following transvaginal oocyte retrieval for IVF

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Transvaginal, ultrasound-guided oocyte retrieval has become the gold standard for IVF therapy. Despite a low reported complication rate, here a case is reported of acute ureteral obstruction following seemingly uncomplicated oocyte retrieval. Prompt diagnosis and ureteral stenting led to rapid patient recovery with no long-term urinary tract sequelae. Ureteral injury needs to be included in the differential diagnosis of a patient presenting with pelvic/abdominal pain following oocyte retrieval.

Key words: IVF/oocyte retrieval/ureteral injury

Introduction

Since it was first described (Wickland *et al.*, 1985) transvaginal sonographic oocyte retrieval has become the standard of care for couples undergoing IVF treatment. Although the technique is associated with few serious side effects, early recognition of potential pitfalls may help to prevent long-term sequelae. Endovaginal sonography readily allows for identification of enlarged, multicystic ovaries, uterus, and bowel, but provides limited recognition of smaller structures such as small pelvic blood vessels, nerves, and ureters. Given the latter's anatomical position immediately anterolateral to the upper fornices of the vagina, it is surprising that clinically recognizable ureteral injuries do not occur more often than reported. This seems especially true given the relatively high percentage of women presenting for oocyte retrieval who have distortion of pelvic anatomy secondary to adhesions or endometriosis. In a report of 2670 transvaginal oocyte retrievals (Bennett *et al.*, 1993), not a single case of ureteral injury was encountered, in contrast to a background rate of 0.5–1% for all pelvic operations (Daly and Higgins, 1988).

The only case reports known to the authors of ureteral injury incurred at the time of oocyte retrieval involved presentation beyond the immediate post-operative period. One patient developed symptoms seven days after oocyte retrieval (Coroleu *et al.*, 1997), while the other presented for evaluation four months following her procedure (Jones *et al.*, 1985). To the best of our knowledge, this is the only report of acute ureteral injury presenting within 24 h of the inciting event.

Case Report

A 60 kg, 34 year old married woman presented to our tertiary care fertility centre with an 18-month history of primary

infertility. Her evaluation up to that time included basal body temperature charting, hysterosalpingography, urine LH testing and hormonal studies, all of which failed to detect any abnormalities. Further testing included diagnostic laparoscopy and hysteroscopy with normal pelvic anatomy, confirming her diagnosis of unexplained infertility. After failing six cycles of ovulation induction using clomiphene citrate, both with and without intrauterine insemination, she and her husband elected to undergo IVF therapy.

After failing to conceive with her first IVF attempt, she began our usual long stimulation protocol for a second cycle using a midluteal start of gonadotrophin-releasing hormone (GnRH) agonist leuprolide acetate (Lupron; TAP Pharmaceuticals, Lake Forest, IL, USA) followed by daily injections of HMG (Repronex; Ferring Pharmaceuticals, New York, NY, USA) 150 IU in the morning and recombinant FSH (rFSH) (Gonal-F; Serono Laboratories, Norwell, MA, USA) 150 IU in the evening. After nine days of stimulation with a peak serum estradiol level of 2708 pg/ml, she underwent transvaginal sonographic oocyte retrieval using a 6.5 MHz transducer (Logiq 200 Pro Series; General Electric, Fairfield, CT, USA). Patient comfort was maintained using i.v. fentanyl and propofol with continuously monitored anaesthesia care. A total of 19 oocytes were retrieved with no technical difficulty encountered. Intra-operative blood loss was judged to be minimal, and the patient was transferred to the recovery area from which she was discharged to home 45 min later after an uneventful post-operative course.

Within 7 h she presented to the emergency department complaining of several hours of worsening right lower quadrant and right flank pain with nausea and emesis. Her temperature

and blood pressure were normal with mild tachycardia. Abdominal examination was notable for normal bowel sounds with moderate right lower quadrant tenderness and voluntary guarding, but no evidence of peritonitis. Her right costovertebral area was also mildly tender. Laboratory analysis revealed normal haematocrit, leukocyte count, platelets and electrolytes with a large amount of blood on urinalysis. An endovaginal pelvic sonogram demonstrated a small amount of echogenic fluid in the pelvis with moderately enlarged, multicystic ovaries with normal Doppler blood flow. A renal sonogram revealed mild right hydronephrosis with debris in the right collecting system consistent with blood or pus.

The patient was admitted for observation and pain management with i.v. ampicillin/sulbactam (Unasyn; Pfizer, New York, NY, USA) begun prophylactically. All IVF medications were continued, including i.m. progesterone in oil 50 mg daily, and oral methylprednisolone 8 mg twice daily. The following day, an abdominal/pelvic computerized tomography (CT) scan confirmed right hydronephrosis and mild hydroureter down to the level of the right adnexa, with density in the right collecting system consistent with blood. Pelvic findings were non-contributory given the earlier ultrasound findings.

Subsequently, the patient underwent cystoscopy and right ureteroscopy with ureteral stent placement. On cystoscopy, the bladder mucosa appeared normal with normal urine efflux from the left orifice and none on the right. During right ureteroscopy, the scope could not be passed beyond a point 1 cm above the ureterovesical junction at which a thrombus with underlying mucosal disruption was detected. Stent placement was accomplished without complication. Post-operatively, the patient noted significant relief of her right lower quadrant pain.

Of the 19 oocytes retrieved, 16 were inseminated conventionally, 11 of which fertilized normally as judged by the presence of two pronuclei 16 h after insemination. Six zygotes were cryopreserved for later pregnancy attempts, while five remained in culture for more immediate transfer. Assisted hatching using acid Tyrode's solution was performed on day 3 of embryo development, followed later that day by transcervical embryo transfer of three embryos (one grade 1, two grade 2) using a Wallace catheter (Cooper Surgical, Shelton, CT, USA). The patient was discharged from the recovery area after transfer with continuation of daily progesterone injections as well as oral cephalosporin therapy. Her pregnancy test 12 days after transfer was negative.

Three weeks after her initial cystoscopy, she underwent uncomplicated office cystoscopy and stent removal, followed by five days of fluoroquinolone prophylaxis. An i.v. pyelogram performed six weeks after stent removal was normal.

Discussion

The ureteral trauma discovered in this case undoubtedly occurred at the time of vaginal puncture as the needle traversed the tissues interposed between the vaginal wall and the ovary. Clinical experience suggests that this distance varies considerably depending on the patient's size and the position of the ovaries. In this case, the patient was of normal size and had had earlier laparoscopic confirmation of normal anatomy. Despite this, identification of structures in this region (e.g.

ureters, uterine vessels) can be extremely difficult, especially when inward pressure is applied to the vaginal ultrasound probe to improve image quality and 'stabilize' the targeted ovary. The use of colour Doppler techniques to preview the proposed needle path before puncture may improve visualization, however not all IVF centres (including ours) have access to such technology. Additionally, extrinsic vaginal probe pressure is likely to occlude vessels, either wholly or partially, thus preventing Doppler imaging. A more practical approach for prevention, although unproven, is to maintain the needle guide in a lateral position prior to puncture, away from dangerous anterior structures.

This is the first case report of ureteral trauma in the medical literature in which the patient presented acutely within hours of her oocyte retrieval. In the report by Jones and co-workers their patient had known endometriosis with pelvic adhesions, which, along with repeated ovarian punctures, predisposed her to ureteral injury (Jones *et al.*, 1985). The position of the obstruction at the level of the lower border of the left sacroiliac joint suggests that their injury occurred from passage of the needle through the ovary, as opposed to the case presented here of pre-ovarian needle trauma. Coroleu and co-workers described a case of ureteral injury after oocyte retrieval in which painful vaginal tumescence, after being surgically drained of sanguineous fluid, subsequently revealed a ureterovaginal fistula (Coroleu *et al.*, 1997). Like the current case, their patient suffered from trauma to retroperitoneal structures before needle entry into the ovary despite normal pelvic anatomy. What differs about these cases is the delayed presentation and diagnosis of ureteral trauma in the other two case reports. Injury, either by direct puncture or extrinsic compression, compromised ureteral function, but did not completely halt urination—a testimony to the resilient nature of this structure and an intimation of more frequent, unrecognized injury.

For others who may face a similar post-operative patient presentation, the differential diagnosis should include ovarian pathology, such as intra-ovarian haemorrhage or torsion, but should also include an assessment of extra-ovarian structures, such as the urinary tract and pelvic blood vessels, looking for obstruction or haematoma formation, respectively. Infectious causes are not as likely to develop over such a short time course, but should not prevent the judicious use of empirical antibiotic therapy. Likewise, early consultation from a urologist may expedite resolution of symptoms and diminish the chance of more serious sequelae (e.g. fistula formation).

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