Endometriosis is defined as the presence of active endometrial tissue outside the uterine cavity. It is the second most common pelvic pathology in females and occurs with an incidence of about 15% [1–3]. Involvement of the genitourinary tract has been reported to have an incidence of 1.2%, with the peak age of incidence being between 40 and 44 years of age [4]. Ureteral involvement accounts for only a small minority of cases (0.1–0.4%) and can be regarded as a rare occurrence. Although ureteral obstruction is a rare complication of endometriosis, early diagnosis and treatment of urinary tract endometriosis are necessary to avoid loss of renal function. We report a case of ureteral endometriosis that caused an obstruction of the ureter and a clinically significant dilation of the renal pelvis, together with a deterioration of renal function.

Case Presentation
A 49-year-old woman (gravida 3, para 2, abortion 1) with a history of endometrioma, excised 10 years earlier, was admitted to the Kaohsiung Medical University Hospital with right hydronephrosis and left kidney atrophy. Routine urinalysis revealed microscopic hematuria with occult blood 2+. In addition, her urine cytology results prompted us to suspect urothelial cell carcinoma. Blood analyses, including CA125, were normal. Biochemical analyses revealed a creatinine level of 2.0 mg/dL.

Key Words: endometriosis, hydronephrosis, ureter, ureteroscopy
Retrograde pyelography demonstrated hydronephrosis and partial obstruction of the right ureter in the distal third, together with a filling defect in the distal third and proximal third of the left ureter (Figure 1). The filling defect in the distal third of the left ureter was suspected to be related to an air bubble. The proximal third of the left ureter was redundant and kinked. Based on the suspicion of a right ureteral tumor, a right ureteroscopy with biopsy was performed.

The patient was placed in the lithotomy position. The bladder mucosa looked normal on cystoscopy. A right ureteroscope was introduced through the right ureteral orifice. A cold-cup biopsy of a polypoid lesion (Figure 2) in the distal third of the ureter was performed, and the lesion was removed as completely as possible. A retrograde ureteral double-J stent was then placed via cystoscopy using a guidewire. Grossly, the specimen was grayish and soft. Microscopically, sectioning showed the presence of endometrial tissue, namely endometrial gland tissue and stroma. Therefore, histological examination suggested ureteric endometriosis (Figure 3).

After discharge from the urology ward, the patient’s creatinine level was checked because of her poor renal function. Based on the results, the patient was referred to the obstetrics and gynecology outpatient department for further treatment. Pelvic ultrasonography revealed a right endometrioma (size, $7.5 \times 4.8 \times 5.5 \text{ cm}$) attached to the ovary. One month later, a total hysterectomy and bilateral salpingo-oophorectomy was performed, and pathological examination revealed endometriosis of the patient’s bilateral ovaries and fallopian tubes with no evidence of malignancy or anomaly. The ureteral stent was removed 6 weeks later. To date, although the patient has residual right hydronephrosis, her serum creatinine level returned to 1.2 mg/dL during the follow-up.

**DISCUSSION**

Endometriosis, which involves extra-uterine non-neoplastic endometrial tissue, is a fairly common gynecologic disease. Endometriosis is the second most common pelvic pathology in females with an incidence of about 15% [5]. It is most commonly diagnosed in women of childbearing age, with the peak age being between 40 and 44 years. Nevertheless, ureteral endometriosis is a rare disease and the symptoms may vary. Patients usually present with menstrual dysfunction, flank, lumbar or lower abdominal pain, or gross hematuria. In patients without symptoms, 83.3% are referred to a clinic because of the existence of hydronephrosis [6]. In the present case, hydronephrosis of the right side was referred
to the urology clinic and led to a final diagnosis of ureteral endometriosis with obstructive uropathy.

The area of the ureter that is most commonly affected by endometriosis is the distal third [4]. The clinical presentation and radiological aspects of endometriosis of the ureter can be nonspecific, which makes preoperative diagnosis difficult. Plous et al reported that computed tomography scans show soft-tissue density around the distal ureter, which was suggestive of extrinsic compression at the point of obstruction [2]. Deep biopsy or transurethral resection is often necessary for definitive diagnosis.

The goal of therapy in the management of ureteral endometriosis is to relieve obstruction, eliminate the symptoms, and preserve renal function. The treatment for ureteral endometriosis includes hormonal therapy alone or hormonal therapy in combination with insertion of a double-J stent, and a variety of surgical approaches including ureterolysis, segmental ureterectomy and nephroureterectomy, or combinations of these. Medical hormone therapy involves the use of any of the following agents: danazol, gonadotropin-releasing hormone agonist (leuprolide, goserelin), medroxyprogesterone, estrogen/progestin in combination and progestin alone [7–10]. Hormonal therapy is best suited for patients of childbearing age who desire to have children in the future. However, when the ovaries are preserved, the recurrence rate can be as high as 27% [11]. Although the clinical response of endometriosis to hormonal therapy is excellent, drugs are unlikely to relieve endometriotic ureteral obstruction once dense fibrosis has occurred. Surgical therapy can be categorized into treatment options that are either minimally invasive or involve conventional open surgery. The goal of surgery is to relieve and/or remove the urinary obstruction.

In the present case, we did not have a choice of surgical treatment options for the ureteral endometriosis because of the presence of impaired renal function. Therefore, an endoscopic deep biopsy was carried out in an attempt to remove the entire mass. After conservative treatment, the patient’s creatinine level improved to 1.2 mg/dL during follow-up. However, the obstetrics and gynecology outpatient department arranged a further survey and, in this case, ultrasonography revealed a right endometrioma of the ovary. Thus the present case was eventually treated by total hysterectomy and bilateral salpingo-oophorectomy, which allows the removal of both the hormone stimulus and the origin of the endometriotic cells.

In summary, the present patient had a silent obstruction of the kidney. Therefore, based on this finding, we believe assessment of the urinary tract involving ultrasonography and urographic examination is essential for all patients suffering from pelvic endometriosis. In addition, the endoscopic deep biopsy that was performed to remove the mass had a good result in this case in terms of halting the deterioration of the patient’s renal function.

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高雄醫學大學 醫學院醫學系 泌尿學科

因子宮內膜異位症造成輸尿管阻塞是不常見的。本篇文章，我們報告一位 49 歲女性
經由健康檢查中的腹部超音波檢查意外發現右側腎积水。以輸尿管鏡做檢查及切片，
病理組織診斷為輸尿管子宮內膜異位。一個月後，至婦產科做子宮全切除及雙側卵
巢、輸卵管切除手術。目前門診追蹤病患，雖然有殘存腎水腫，但肌酸酐由已原先
2.0 mg/dL 降至 1.2 mg/dL。

關鍵詞：子宮內膜異位、腎水腫、輸尿管、輸尿管鏡
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