

A Case Report of an Incidentally Diagnosed Blind-ending Bifid Ureter in a Patient with Ovarian Cancer

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A 58-year-old Japanese female was admitted to our hospital for treatment of ovarian cancer. She had no urinary tract symptoms at the time of presentation. Preoperative CT (Computed Tomography) was performed for surgical planning, and it revealed two left-sided ureters including a short ureter with a blind, cystic ending and a short ureter joined to the main ureter before entering into the bladder. On CT urography, these radiological findings were compatible with a blind-ending bifid ureter. Preoperatively, a double J stent was inserted into the normal left ureter, and then the blind-ending bifid ureter was resected before an ovarian cancer operation.

Key words: blind-ending bifid ureter, CT urography

INTRODUCTION

Urinary tract malformations are very common; however, a blind-ending bifid ureter is a rare ureteric duplication anomaly [1-5]. Most of the reported cases are asymptomatic and are detected incidentally [2, 4]. This was the first resected case of a blind-ending bifid ureter, diagnosed on CT urography before an ovarian cancer operation. Herein, we review the clinical significance, embryologic etiology, and radiologic findings of this anomaly.

CASE REPORT

A 58-year-old Japanese female, gravida 0, para 0, who was diagnosed with bilateral ovarian masses and ascites at an outside hospital, presented to our department of gynecology. Physical examination showed marked abdominal distension and upper abdominal tenderness. On laboratory investigations, CA (Cancer Antigen) 125 (2135.2 U/ml) and CA 72-4 (19.4 U/ml) were elevated. She was diagnosed with bilateral ovarian cancer with malignant peritonitis on contrast-enhanced CT and PET (Positron Emission Tomography) -CT, and preoperative adjuvant chemotherapy was performed. A decrease in tumor burden and ascites volume was observed on postoperative CT; however, an abnormal cystic component filled with contrast medium connecting to a caudal ductal structure was identified adjacent to the left normal ureter on follow-up contrast enhanced CT (Fig. 1a and b). The ductal structure and the normal ureter joined before entering into the bladder on maximum intensity projection (MIP; Fig. 1c) and volume rendering (VR) images on CT uro-

graphy. A left blind-ending bifid ureter was suspected from these findings. To prevent injury to the normal ureter as well as incorrect insertion of a double J stent into a blind-ending ureter, we suggested consultation with a urologist. Preoperatively, cystourethroscopy revealed a single ureteric orifice on the left side of the bladder wall, and retrograde pyelography showed a short ascending branch corresponding to the structure depicted on MIP and VR images (Fig. 2). A double J stent was inserted into the normal left ureter without difficulty. Intraoperatively, left double ureter joined 5 mm from the bladder wall; one entered the left kidney and the other terminated as a cystic blind end (Fig. 3). The abnormal ureter was resected to prevent future complications.

Pathological findings of the resected ureter revealed the layers of the wall were consistent with a normal ureter (Fig. 4), and the final diagnosis was blind-ending bifid ureter.

Total abdominal hysterectomy and bilateral salpingo-oophorectomy and omentectomy were subsequently performed, and the bilateral ovarian masses were suspected to be serous adenocarcinoma.

DISCUSSION

In 1904, Herbert [1] described the entity of the double blind-ending ureter. The incidence of this anomaly is unknown although there are only approximately 200 reported cases in the literature [1-9]. Some cases of the double blind-ending ureter were ureteral duplications [5, 7]. During embryologic development, the ureter is formed at about the fourth week of intrauterine life as a bud emerging from the mesonephric duct [6].

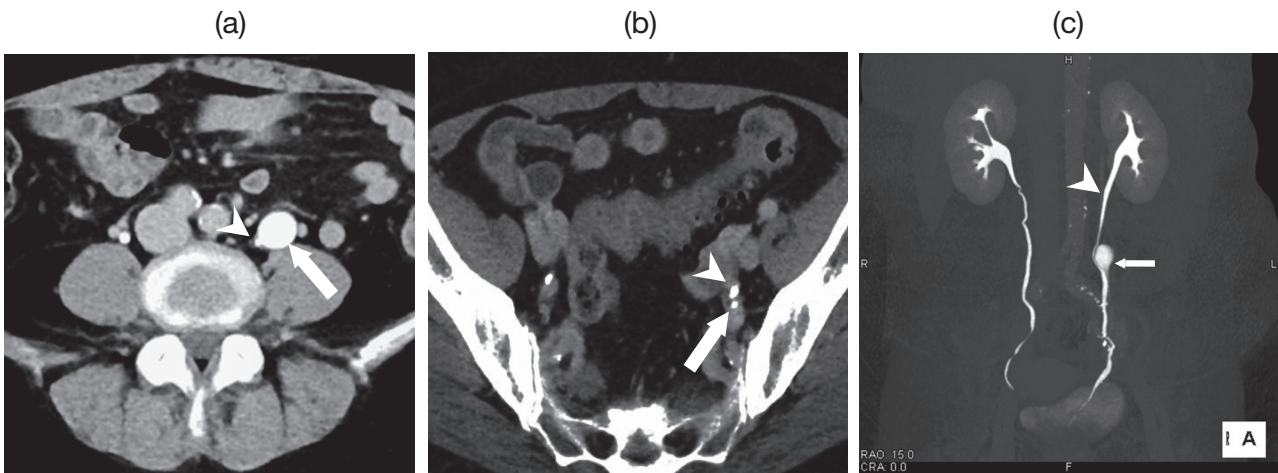


Fig. 1 Contrast-enhanced CT images.

(a) The axial CT image in delayed phase shows a cystic component of 2 cm in diameter with contrast material (white arrow) in the left side of the normal ureter (white arrowhead).
 (b) The axial CT image at the level of the minor pelvic cavity shows left double ureter (white arrow and arrowhead) without dilatation.
 (c) Maximum intensity projection of CT urography shows a short ureter with a cystic blind end (white arrow) and a normal left sided ureter (white arrowhead). At the lower level, they appear to make a common trunk and enter the bladder.



Fig. 2 Preoperative retrograde pyelography, when a catheter is inserted to orifice of a short ureter, shows a ductal structure with a cystic blind end. There is a single ureteric orifice on the left side of the bladder wall (no image).

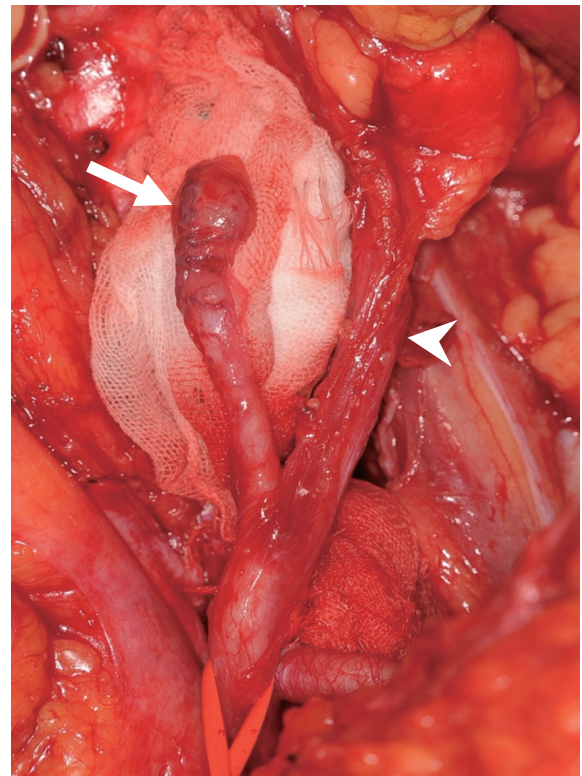


Fig. 3 Intraoperative, anterior-view photograph shows the short ureteral structure with a blind cystic end (white arrow) ramified from left ureter (white arrowhead).

Ureteric duplications may be complete, as a result of two separate ureteric buds arising from the Wolffian duct or incomplete due to premature branching of the ureteric bud. If the ureter fails to establish contact with the metanephros, a blind-ending ureter results [6]. In most cases of blind-ending bifid ureter, the blind-ending branch arises from the distal or middle third of the ureter [2]. The characteristic radiographic description of a blind-ending ureter is a hollow structure that joins the ureter at an acute angle and has a length that

is at least twice its greatest diameter; a blind end has all the histologic layers of a normal ureter [5, 8]. The reported range of length of blind-ending bifid ureters is from 2 to 23 cm [5]. Various blind-ending ureters were reported on size, shape, and number [2, 8, 11]. A blind-ending bifid ureter is three times more prevalent in females compared with males and is observed twice as often the right side as on the left. [7]. In Japanese reported cases, the range of age was 21–68 years old [4, 5, 9]. This anomaly has a familial occurrence, especial-

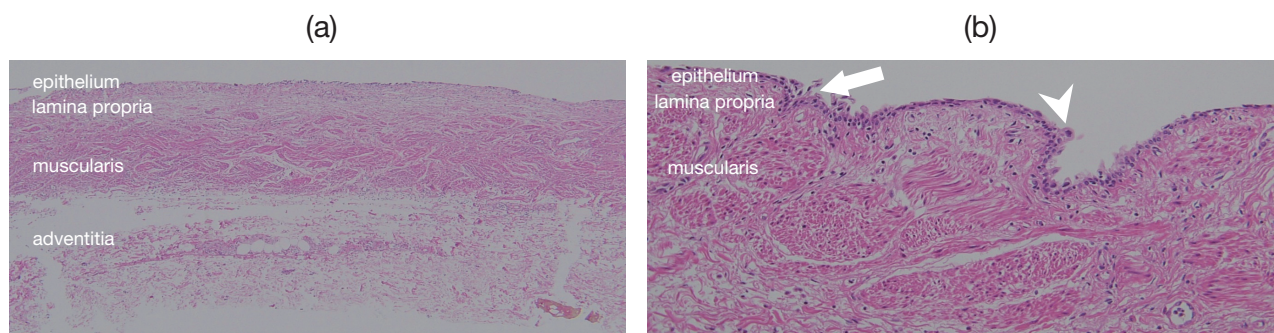


Fig. 4 Pathological specimen, hematoxylin and eosin stain.

(a) Low power field: The wall of the surgical specimen has layers of epithelium, lamina propria, and muscularis propria. The epithelium was exfoliated due to chronic inflammatory change.

(b) High power field: multiple layers of epithelial cells (white arrow) and umbrella cells (white arrowhead) can be partially found, consistent with urothelial epithelium.

ly in twins and sisters [12].

Most blind-ending bifid ureters are not clinically significant [2, 4, 6]. The two most common symptoms are recurrent urinary tract infection and poorly defined abdominal pain [2]. Other symptoms include renal colic pains and hematuria [2, 4, 5]. The cause of pain is an inflammatory process in the blind-ending ureteral branch, usually secondary to a concretion formed at the site of urinary retention or peristaltic disturbances caused by vesicoureteral reflux [2, 5]. There has also been at least one case of transitional cell carcinoma arising from within this anomaly [9]. Patients without these associated complications such as recurrent urinary tract infections, calculi, hydronephrosis, and other problems related to urinary stasis, obstruction, or reflux require only observation. Open surgical resection has traditionally been performed in the treatment of symptomatic patients with blind-ending bifid ureters [10]. In our case, surgical resection of the blind-ending bifid ureter was performed prior to resection of ovarian cancer to prevent infection due to urinary stasis and ureter injury by lymphadenectomy during subsequent operations.

The study most frequently used to diagnose this anomaly is IV urography [2, 4, 5]. Diagnosis with excretory urography depends on the reflux of contrast material into the blind end. Retrograde pyelography is independent of reflux and is more sensitive. CT urography and MR urography can be useful for diagnosis as alternative advanced imaging methods [2, 10]. In our case, because an abnormal cystic component was observed in the left side of the normal ureter on delayed imaging, it was important to rule out the presence of deep venous thrombosis. On the first CT scan before chemotherapy, the cystic component was not detected likely due to the presence of a large amount of ascites causing compression. We believe that a cystic dilatation of the blind end of a bifid ureter is caused by vesicoureteral reflux and urinary stasis. Urinary stasis is a risk for renal infection, stone, and malignancy. A case of transitional cell carcinoma associated with this anomaly has also been reported [9].

Differential diagnosis of this anomaly includes localized ureteral rupture, post hemi-nephrectomy stump, acquired diverticula of the ureter; these can be differentiated by history, clinical findings, and excretory urography of specific imaging findings [13]. CT uro-

graphic images including MIP and three-dimensional volume rendered images are very useful for providing an exact diagnosis. To our knowledge, this is the first reported case of a blind-ending bifid ureter diagnosed by CT urography where the diagnosis was confirmed histopathologically. Preoperative diagnosis helps prevent ureteral injury during subsequent lymph-node resection.

CONCLUSION

We reported a rare resected case of a blind-ending bifid ureter. CT urography was useful in obtaining a precise preoperative diagnosis.

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