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Lithiasis Inside a Blind-Ending Branch of a Bifid Ureter Causing Ureterohydronephrosis: A Case Report

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ABSTRACT

A bifid blind-ending ureter is an extremely rare congenital anomaly of the upper urinary tract. Lithiasis inside the blind-ending branch has only been reported in a few cases. This unusual ureteric condition appears to be most common in female patients. A 53-year-old woman was admitted with right lumbar colic pain. A kidney-ureter-bladder X-ray revealed a spherical radiopaque shadow, projected on the right side of the sacrum in the region of the lower third of the right ureter. An intravenous pyelography showed a distal stone in the right ureter, with mild hydronephrosis and a hydroureter. Ureteroscopy and retrograde pyelography revealed a right blind-ending bifid ureter. The blind-ending branch, originating in the distal third of the ureter, contained a stone that caused obstruction of the normal branch. The stone was treated with endoscopic lithotripsy. At the 3-month follow-up evaluation, the patient was stone-free and asymptomtic. The clinical significance of this malformation is discussed in light of the current literature.

INTRODUCTION

The blind-ending bifid ureter is a rare congenital urologic anomaly in adults. Only a few cases have been reported in the literature [1-3]. Although a blind-ending branch of a bifid ureter may be associated with no apparent disease, significant complications such as infections, stones, or hydroureteronephrosis may occur [4].

The present report is a very unusual case in which the blind-ending branch of a bifid ureter contained a stone that caused ureterohydronephrosis.

CASE REPORT

A 24-year-old female was admitted for intermittent right lumbar pain. The pain radiated to the thigh and was present for the past 6 months. She did not have a history of fever or urinary symptoms. Physical examination revealed an afebrile, normotensive patient whose abdomen was soft but somewhat tender in the right lower quadrant.

A plain kidney-ureter-bladder (KUB) X-ray showed a spherical, radiopaque shadow that was projected on the right side of the sacrum in the region of the lower third of the right ureter. Laboratory investigations showed normal renal function.

Urine microscopy and culture showed red blood cells in the urine, but there was no bacterial growth. The intravenous urography (IVU) delineated a right distal ureteral stone with mild hydronephrosis and a hydroureter (Figure 1).

Endoscopy showed a normal bladder with no calculus. The right ureter had a Y shape. Retrograde pyelography (RP) revealed a blind-ending branch (ie, a tube-shaped cavity),

KEYWORDS: Blind-ending ureter; Bifid ureter; Abnormalities; Intravenous urography; Ureter; Calculus.

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Abbreviations and Acronyms
IVU = intravenous urography
RP = retrograde pyelography.

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case report

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Figure 1. Intravenous Urography Showing False Impression of an Obstructive Distal Ureteral Stone (arrow). doi: 10.3834/uij.1944-5784.2010.06.11f1

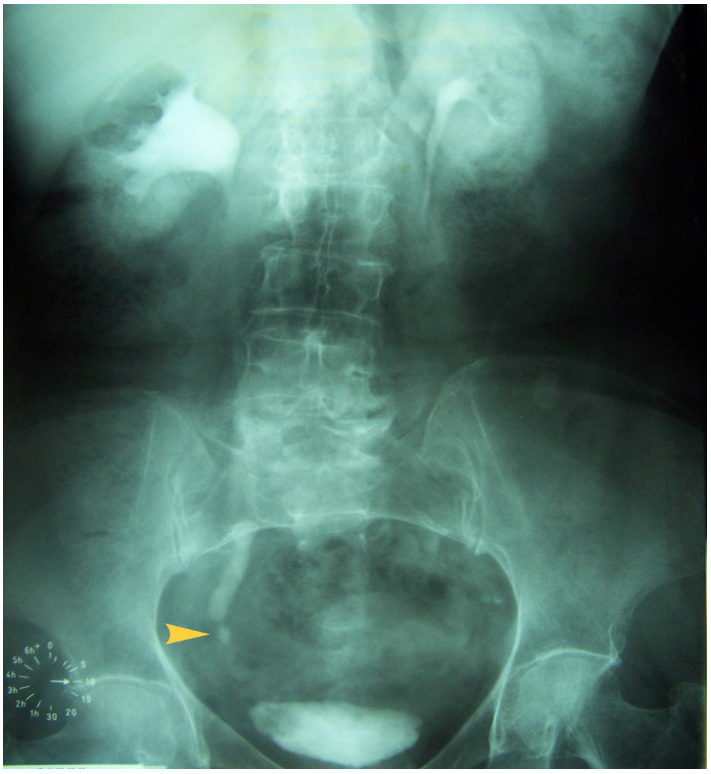
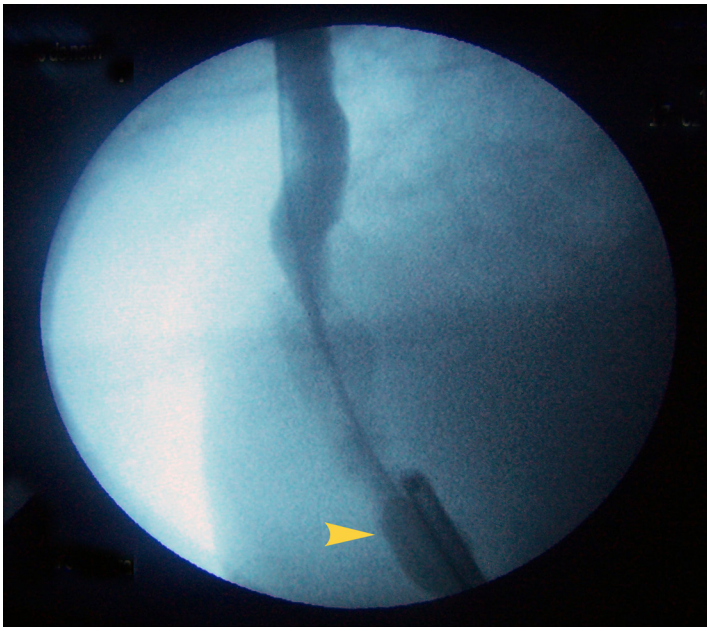


Figure 2. Right Retrograde Pyelography Showing Right Duplex Ureter With a Long, Blind-Ending Duplicated Ureter (arrow). doi: 10.3834/uij.1944-5784.2010.06.11f2



originating in the distal third of the right ureter (Figure 2). It measured 8 cm in length (as seen in Figure 1) and 0.8 cm at its greatest diameter. It contained a stone that caused obstruction of the normal branch. A guidewire was introduced into the right ureter under endoscopic control; ureteroscopy of the blind-ending branch confirmed the presence of a calculus (Figure 3; Figure 4).

Endoscopic pneumatic lithotripsy was recommended because of the stone location, size, and lack of response to medical treatment of alpha-blockers and NSAIDs for 3 weeks. The authors used a Swiss Lithoclast® (Electro Medical System, Le Sentier, Switzerland). At the 3-month follow-up evaluation, the patient was pain-free and stone-free.

DISCUSSION

The blind-ending bifid ureter is a rare congenital anomaly of the urinary system [1-3]. Culp [5] defined it as any blind-ending hollow structure with its lumen joining the ureter at an acute angle, its wall presenting the same components as the ureter, and its length greater than 2 times its largest diameter. This anomaly is found 3 times more frequently in women than in men [4,11], and 2 times more frequently on the right side than the left. It has also been reported in twins and sisters [12]. The majority of cases are diagnosed in the third or fourth decade of life.

The exact mechanism of the blind-ending bifid ureter is still unclear [6,7]. The mechanisms described in the literature have been associated with abnormal development of the ureteric bud and failed development of metanephrogenic blastema [8].

One possible mechanism is associated with an unknown branching defect of the ureteric bud. If the ureteric bud divides and develops, duplication of the urinary system occurs. This leads to a blind-ending bifid ureter with a single ureteral orifice. Another possible mechanism is associated with incompletely developed double ureteric buds [8]. If 2 ureteric buds form and 1 fails to make contact with the metanephrogenic blastema, the blind-ending bifid ureter develops with double ureteral orifices [6].

Although the Y-shaped junction site of the blind-ending branch is variable, the most common origin is the lower third of the ureter; it rarely develops from the upper third [9]. The length of the blind-ending branch varies from 1.5 cm to > 20 cm [10]. In the present case, the blind-ending branch originated from

Figure 3. Endoscopic Aspect of Blind-Ending Ureteral Duplication Showing Normal Ureter Containing Guidewire and the Blind-Ending Ureter (asterisk).
doi: 10.3834/uij.1944-5784.2010.06.11f3

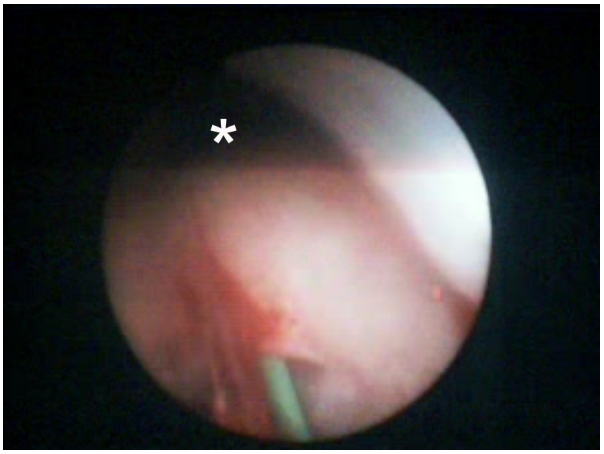
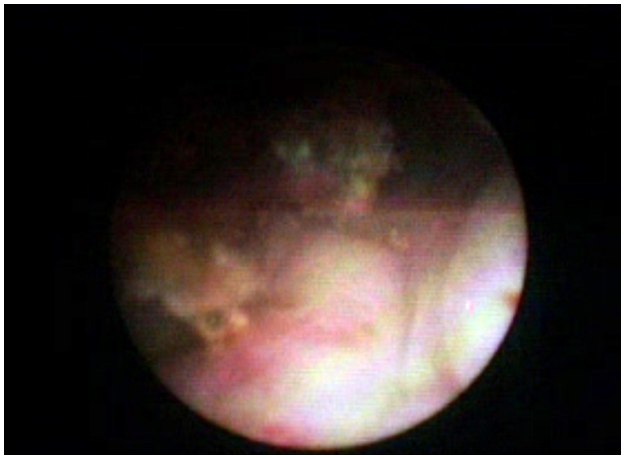


Figure 4. Endoscopic Aspect of the Blind Branch End Containing the Stone.
doi: 10.3834/uij.1944-5784.2010.06.11f4



the distal third of the ureter and was relatively short.

Most cases of blind-ending bifid ureter are asymptomatic throughout the patient's life, which leads to the low reported incidence [8,11]. The presenting symptoms and signs are variable for the cases in the literature. Symptomatic patients most often complain of vague abdominal or chronic flank pain [6]. Additional symptoms and signs are hematuria, pyuria, fever, frequency, dysuria, and enuresis [4,6,10]. These relate to the hydroureteronephrosis, urinary stasis, ureteroureteral reflux, calculi, and infections often associated with blind-ending segments [4,6].

The majority of cases have been diagnosed by IVU or RP [6,10,13]. Unlike the present case, the anteroposterior view plus the oblique view of IVU should demonstrate the whole course of the blind-ending branch and its length [8].

Because the blind-ending ureter does not fill during IVU, the diagnosis of blind-ending ureteral duplication is best made with the help of RP [10]. The blind-ending bifid ureter has been incidentally diagnosed on computerized tomography; the cross-sectional imaging of the blind-ending branch may be confusing [8,13]. In the present case, the stone in the blind-ending ureter caused compression of the normal ureter branch, because both branches were involved in the same inextensible fascia.

Treatment may or may not be necessary, depending on the status of the blind-ending branch and the ipsilateral ureter. An asymptomatic, nondiseased blind-ending branch requires no treatment [4]. When symptoms or infection are present, the treatment is surgical excision of the blind-ending branch with antireflux reimplantation of the normal ureter. If hydronephrosis, pyonephrosis, or renal damage is present, nephroureterectomy may be required [2]. Sun et al [8] reported treatment with extracorporeal shock-wave lithotripsy (ESWL), and the present authors used endoscopic treatment. When such conservative treatment is used, long-term follow-up is recommended.

CONCLUSION

A blind-ending bifid ureter is a rare congenital anomaly of the urinary system. Complicated cases should be diagnosed as early as possible. Treatment options are chosen on a case-by-case basis.

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