The caudal opening of the ureteral orifice beyond the standard location of the bladder trigone is called ectopic ureter. More than 80% of patients with ectopic ureter also have a complete duplex system. The fact that affected individuals are asymptomatic often prevents them from being diagnosed with ectopic ureter. In females, the ectopic ureter may present with urinary incontinence. In both sexes, it may be diagnosed in the antenatal period while it may present with urinary tract infection or urinary obstruction in the postnatal period.

In male patients, the most common ectopic ureter orifice site is posterior urethra (50%). Other opening sites contain seminal vesicle in about one-third of the patients, vas deferens, prostate, bladder neck, and epididymis. Bladder and upper urethra (33%), vaginal vestibule between the urethra and vaginal opening (33%), vagina (25%), cervix and uterus (<5%) are the most common terminal sites of female ureteral ectopy.

In this study, we aimed to discuss the diagnosis and treatment of a case treated with ureteropyelostomy. The female patient with antenatally diagnosed left hydronephrosis had periurethral dripping when she was evaluated in the neonatal period. Continuous urine drainage from the periurethral area was observed in the examination under general anesthesia, but ectopic ureter opening was not seen. At two years of age, ultrasonography and renal scintigraphy showed similar findings and dripping was also present. Ureteropyelostomy and upper pole ureterectomy were performed with left anterior subcostal incision. Surgical treatment in patients who have duplex collecting system with ectopic ureteric opening varies according to the function of the renal unit drained by the ectopic ureter. Ureteropyelostomy and distal ureteral excision are appropriate treatment options in patients with functional upper pole.

**Keywords:** Ureter; duplication; urinary incontinence; ureteropyelostomy

The newborn female patient with antenatally diagnosed left hydronephrosis was admitted for postnatal follow-up. On inspection, continuous urine dribbling...
from the periurethral area was determined. The gen-
tinal examination was normal and an ectopic opening
ureteric orifice could not be seen. Urinary system ul-
trasonography revealed normal right kidney, a com-
plete double ureteral system in the left kidney, and
hydroureronephrosis in the ureter draining the
upper pole. With ultrasound in the left kidney, the
lower pole parenchymal thickness was 15 mm, the
anterior-posterior diameter of the pelvis was 3 mm
and the degree of hydronephrosis was Society of
Fetal Urology (SFU) Grade-1. Upper pole parenchy-
mal thickness was 10 mm, pelvic anterior-posterior
diameter was 6 mm and hydronephrosis degree was
SFU Grade-2. Voiding cystourethrogram (VCUG)
was normal. Mercaptoacetyltriglycine (MAG3) dy-
namic renal scintigraphy showed functional upper
and lower poles of the left kidney (Figure 1), and sta-
sis with totally wash out after diuretic administration
in the left upper pole and ureter. Differential renal
function was 52% on the left and 48% on the right
side. In the examination performed under general
anesthesia, continuous urine dribbling was observed
from the periurethral area, but no ectopic ureter open-
ing was observed. On cystoscopy, the bladder was
normal and ureteral orifices were in normal location
bilaterally. Cystoscopy and vaginoscopy revealed no
ectopic ureteral openings in the urethra, bladder or
vagina. Left retrograde pyelography revealed only the
left lower pole collecting system, and this collecting
system and ureter were normal (Figure 2).

At the age of two years, repeated urinary system
ultrasonography and MAG3 dynamic renal scintigra-
phy revealed similar findings, and the patient still had
complaint of urine dribbling from periurethral area.
Considering that the patient’s condition is thought to
be resolved before toilet training, ureteropyelostomy
and ureterectomy of the dilated and tortuous upper
pole ureter as far down as could be reached were
performed with the left anterior subcostal incision
(Figure 3). Three Fr ureter stent was inserted cysto-
scopically to the lower pole ureter and it was placed
to the upper pole pelvis during ureteropyelostomy.
Early postoperative period was uneventful and she
was discharged on the second postoperative day.
Ureteral stent (proximal part was left out of the ure-
thra) was removed in outpatient clinic on the postop-
erative 7th day. The patient had toilet training, while
she was full continent and asymptomatic at the end of
postoperative first and third year.

**DISCUSSION**

Embryologically, ureters thrive from mesonephric
ducts at the fourth gestational week. The ureteral tran-
scription fully occurs when the methanephric blastema is stimulated by two different ureteric
buds that emerge from the mesonephric ducts. With
respect to the Weigert-Meyer law, the lower pole
ureter opens more laterally and cranially, and the
upper pole ureter opens more caudally and medially
as in our patient.4,5

In the case series published in the United States
and Great Britain, the majority of ectopic ureters are
associated with a duplex kidney, ranging from 75 to
90 percent. In these reports, ectopic ureters in duplex kidneys are seen 8-9 times more common in females than in males. In contrast, ectopic ureters with single renal system are more common in India and Japan. In India, 75 percent of ectopic ureters were associated with a single kidney system. In this series, there was a strong female predominance. However, in reports from the United States and Great Britain, single-system ectopia is either equally or more likely to occur in males than in females. This may be related to genetic differences between populations.

The ectopic ureteral orifice is every time above the external sphincter in male patients. Therefore, male patients with ectopic ureter have no urinary incontinence. But typically, they present with hydronephrosis or urinary tract infection. In contrast, due to the ectopic ureters may get over the external sphincter, females sometimes present with a history of urinary incontinence. The incontinence is typically characterized by continuous dripping or moisture requiring the use of a pad. Since the upper pole drained by the ectopic ureter is generally dysplastic or low-functional, the volume of urine ectopically drained is also in low volume. In our patient, the upper pole drained by the ectopic ureter was functional, and there was constant wetting in the diaper and moisture in the vaginal area.

Ultrasonography is the first diagnostic method to detect possible hydroureteronephrosis associated with ectopic orifice. Because of associated anomalies such as ureterocele or vesicoureteral reflux, VCUG should be seen in patients with double collecting system. Although rarely done, intravenous pyelography could be seen in patients with suspected double collecting system. However, the ureter draining the dysplastic or dysfunctional kidney may not be seen in intravenous pyelography. In the case of diagnostic challenge with suspicion of ureteral ectopia, magnetic resonance urography is the ideal diagnostic method currently used. Magnetic resonance urography is able to indicate the dilated system, ectopic ureter and its extravésical opening and give detailed information about the malformation.

Evaluation under anesthesia, cystourethroscopy and vaginoscopy should be used in the diagnosis, however endoscopic assessment is not always able to reveal ectopic orifice. Plaire et al. showed that 58 percent of the ureters ectopically open to the vagina, vestibulum or bladder neck may be assigned. In our patient, urine dribbling was seen but the ectopic opening of the ureter was not determined and ureteral catheterization could not be done.

Most of the ectopic ureters in a double collecting system are related with a dysplastic upper pole. Extraction of this part throughout with the proximal ureter is commonly curative. When the upper pole is well functional, the ectopic ureter is reimplanted into the bladder or anastomosed to the normal pole ureter as ureteroureterostomy or lower pole pelvis as ureteropyelostomy. In our patient, ureteropyelostomy was selected as a surgical preference to avoid ureteroureteral reflux (Yo-yo reflux).

In conclusion, the ectopic ureter should be kept in mind in case of continuous urine dribbling. Surgical treatment in patients who have duplex collecting system with ectopic ureteric opening varies according to the function of the renal unit drained by the ectopic ureter. Ureteropyelostomy and distal ureteral excision are ideal treatment options in patients with functional upper pole.
Informed Consent
Due to the fact that our study was a case report, ethics committee approval was not required. The permission to use the patient data in later studies was obtained at hospital admission.

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Conflict of Interest
No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions
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