Retrocaval Ureter:
An Unusual Cause of Hydronephrosis in an Adult

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Introduction

Retrocaval ureter is an uncommon anomaly in which the right ureter courses posterior to the inferior vena cava and partially encircles it[1].

Retrocaval ureter results from persistence of the posterior cardinal venous system that anomalously forms the inferior vena cava and subsequently courses anterior to the ureter for a variable distance[2].

This can cause a varying degrees of ureteral obstruction and hydronephrosis[2, 3].

Case Report

Clinical presentation

A 62-year old man was referred to urology clinic from a prostate awareness campaign. He complaint of incomplete voiding and dribbling for the past 5 years. On clinical examination, prostate was mildly enlarged. Blood investigations were unremarkable. He was diagnosed and treated as benign prostatic hypertrophy.

Imaging findings

1. Ultrasound of the abdomen showed

✓Mild enlargement of the prostate.

✓Dilated right pelvicalyceal system. The proximal right ureter was also dilated and and can be traced up to its midlevel. Lower part of the right ureter was not dilated.

✓Left lower pole renal calculus with no obstructive uropathy.

Impression: Right hydronephrosis and hydroureter which could be due to ureteric calculus (not identified on ultrasound).

2. CT urography (Figure 1 and 2) showed

✓right hydronephrosis and right hydroureter.

✓No calculus identified within both kidneys or the ureters.

Impression: Correlating with ultrasound findings, a possibility of right ureteric stricture post passage of calculus causing the right hydronephrosis and hydroureter was given.

3. Intravenous urography (IVU) showed right hydronephrosis and hydroureter with medial displacement of right ureter at its midlevel (Figure 3) . The appearance was highly suggestive of a retrocaval ureter.

Management

Based on ultrasound and CT findings, cystoscopy examination (CE) with right ureteric stenting was done. During the procedure, a kink of ureter at L3 level was noted. The right ureter proximal to the kink was dilated. Ureteral orifice was normal.

CE was repeated 2 months later. RPG showed no calculus found until upper ureter. However, there was leakage of contrast at upper ureter during RPG due to iatrogenic injury. A new stent was inserted.

Removal of stent was done 2 months after that and the patient recovered well. However, he refused further surgical intervention.

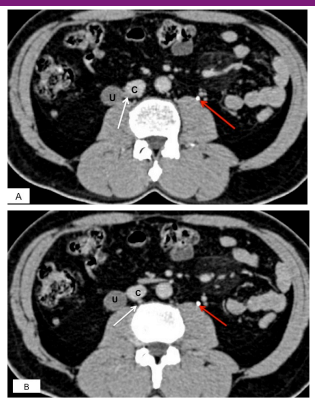

Figure 1: Axial contrast-enhanced CT scan showing (A) the dilated ureter (U) proximal to its obstruction. The right ureter coursing medially (white arrow) at this level posterior to the inferior vena cava (C). Normal contrast-filled left ureter (red arrow). At a lower scan (B), the retrocaval location of the right ureter is medially located as compared to normal location of left ureter (red arrow).

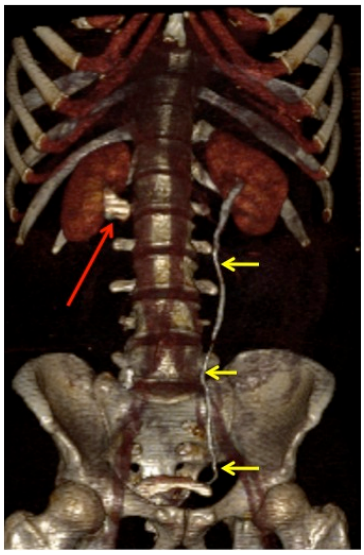

Figure 2: A 3-D reconstruction image from the excretory phase of CTU showing normal course and calibre of left ureter (yellow arrow). However, right ureter was not demonstrated (no contrast within) due to contrast pooling in the dilated right renal pelvis (red arrow).

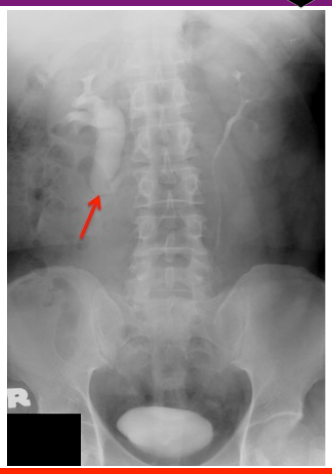

Figure 3: Intravenous urogram showing right-sided hydronephrosis and dilatation of proximal ureter up to the level of L3 transverse process. Medial deviation of the ureter at this level (arrow) giving rise to 'fish-hook' appearance, typical of Type 1 retrocaval ureter.

Discussion

Retrocaval ureter is an unusual cause of hydronephrosis[2, 5]. It showed 2 to 3 folds male predominance. Most of the cases are asymptomatic[1, 2].

There are two types based on radiographic criteria[4].

	Type 1 (low loop)	Type 2 (high loop)
Incidence	More common	Less common
Obstruction site	pyeloureteral segment	level of renal pelvis.
Appearance on IVU or RPG	fish-hook or reversed 'J' with medial deviation of middle/lower ureter	sickle shaped with less medial deviation of the ureter
Hydronephrosis	moderate to severe.	Mild

The intravenous urography is usually diagnostic. CT scan may miss the diagnosis without strong clinical suspicion and without correlation with other imaging. However, CT scan is good to exclude retroperitoneal fibrosis and a retroperitoneal mass as a cause of medial deviation of the ureter. Recent reported cases showed MRI to be as good and has the benefit of no radiation risk[3, 4].

Conservative management is indicated to those with mild hydronephrosis without obvious symptoms, infection, worsening renal function or stone formation. Uretreroureteral anastomosis anterior to vena cava with resection of the retrocaval segment is the favoured surgical option with reported good outcome[3,4].

Conclusion

Retrocaval ureter is a rare cause of hydronephrosis in an adult patient. Its rarity and non-specific presentation can be a challenge to radiologists and surgeons in making accurate diagnosis for a successful surgical intervention. Changing practice pattern had seen CTU replacing IVU in urological assessment of hydronephrosis, mostly were due to calculi. However, IVU remains an appropriate examination for the evaluation of certain congenital anomalies causing the hydronephrosis as demonstrated in our case.

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