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A Case of Unilateral double collecting system with duplicated ureters and a large intravesical ureterocoele.

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Abstract

Duplex collecting system is presence of two pelvicalyceal system which is associated with single or double ureter. Bifid ureter is one of the variations related to congenital anomalies of urinary system which are many times an incidental finding. A bifid ureter may be found in association with other congenital anomalies and defects. In the present case report of a duplicated ureters with duplex collecting system and with no other associated congenital anomaly. The embryological and clinical correlations of duplex collecting system are discussed in present paper.

Keywords: bifid ureter, duplex kidney, pelvicalyceal system and ureterocoele.

Introduction

Ureter is a long tubular structure extending from renal pelvis to urinary bladder, measuring 25-30 cm in length and 3-4mm in diameter. It has thick muscular wall and a narrow lumen. Superiorly it is continuous with funnel shaped structure called renal pelvis through which it communicates with secreting part of kidney. Inferiorly it opens into the lateral angle of the base of the urinary bladder[1]

Duplications of the ureter represent one of the most common anomalies of the urinary tract. Duplex collecting system is explained as the kidney with two pelvicalyceal systems, which may have either single or bifid ureter (partial duplication) or double ureter draining separately into the urinary bladder (complete duplication). A duplicated ureter is commonly found in association with other congenital anomalies and defects. Also, double ureter and duplex system have potential for future complications, such as the collecting system obstruction, urolithiasis, urethrocele, and vesicoureteral reflux[2-5]

Hence, their early detection may be helpful in better management and increased survival rates. Single normal ureter measuring 23.5 cm from hilum to bladder wall was noted on right side. Coronal section of kidney revealed duplication of pelvicalyceal system on left side. There were two separates renal pelvi on left side, ureters emanating from upper and lower moieties of kidneys one above the other, each giving rise to a ureter. Of which upper moiety shows moderate dilatation, where the renal pelvis is 25mm dilated and the draining ureter is dilated, lower ureter is tortuous in character and it measures 24mm in the distal ureteric segment. The duplicated ureters, lower pole ureter is not dilated.

Case Report

A sixty-year-old female presented with recurrent urinary tract infections, not investigated prior to this. she was not a diabetic, her blood investigations where within normal range only, Renal Function Test was normal, occasional pus cells found in urine microscopic examination.

USG was done shows double collecting system in left kidney with hydronephrosis of upper moiety, with two separate duplicated ureters, of which upper pole ureter is dilated, its renal pelvis is 25mm dilated, distal ureteric segment is dilated and tortious in character, it is 24mm dilated. Inside the bladder it shows a large intravesical ureterocoele. No calculus or any other obstructing element detected.

CT Urogram

Technique employed, infusing 250ml of saline immediately after contrast followed with iv Lasix 10mg Right kidney is of normal in size position contour and axis. Normal enhancement and attenuation pattern noted in nephrographic and cortico medullary phases(1-3mnts). Normal opacification of pelvicalyceal system and ureter is well accomplished in excretory phases(3-15mnts). No filling defect noted in ureter and no calyceal dilatation noted.

Left kidney is of normal in size, position and contour. Double collecting system with duplicated ureters noted. Normal contrast enhancement and attenuation pattern detected in nephrographic and cortico medullary phases (1-3mnts), in synchronous with right kidney. In the excretory phases(3-15mnts), pelvicalyceal system of lower moiety is fully opacified, where the upper moiety shows sustainable delay. Hydronephrotic upper moiety pushes the lower moiety, produces a “drooping lilly sign”. Upper moiety renal pelvis is 25mm dilated and the dilated distal segment is tortuous in character, where it is 23mm dilated. The ectopic ureter enters the bladder acquiring the trajectory, medial and inferior to the orthotopic ureter, here it inserts into the bladder itself sparing the vagina or urethra. Intramurally the ectopic ureter shows submucosal dilatation forming a large ureterocele,28mm dilated, where it abuts the bladder trigone. Ureteric opacification is full filled within a span of one hour only.

Intramural extension of orthotopic ureter is lateral and superior to the ectopic ureter.

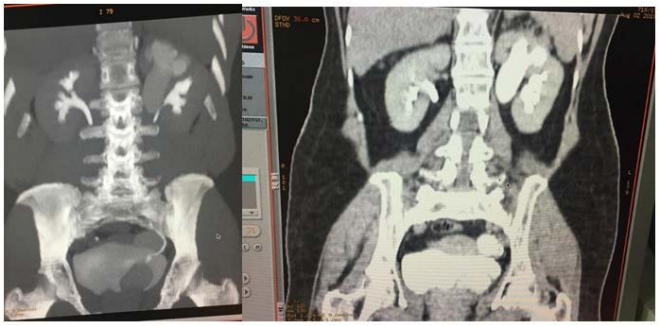

Figure 1 and 2: Contrast specified double calyceal system in left kidney, at Pelvicalyceal phase

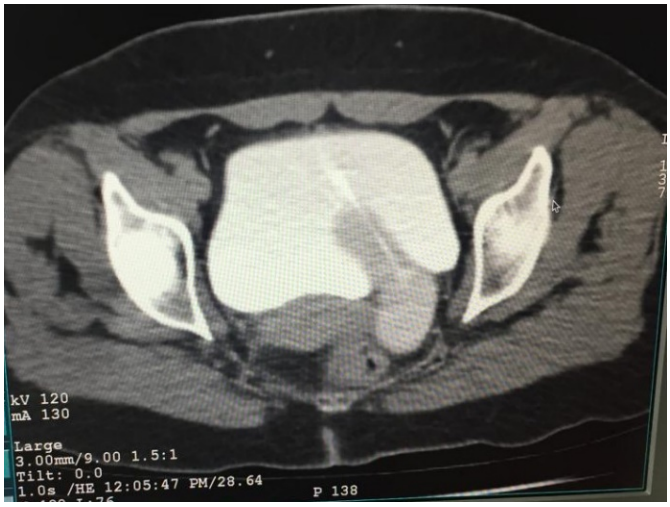

Figure 3: Medial and inferior insertion of ectopic ureter with large intravesical ureterocele.

Discussion

Genitourinary system develops from intermediate mesoderm which forms mesonephric tubules which then join to form mesonephric (wolffian) duct. The

ureteric bud arises from the mesonephric duct around the 5th week of intra uterine life. The caudal part of mesonephric duct and ureteric bud get incorporated into the posterior wall of urogenital sinus at around 7th week. The medial rotation results in placing the opening of the ureteric bud above and lateral to that of the wolffian duct. The ureteric bud grows and penetrates the metanephric tissue and subsequently forms renal pelvis which on division gives rise to major and minor calyces. Thus, the collecting system including ureter, pelvis, major and minor calyces originate from the ureteric bud and metanephric tissue forms kidney that is glomerulus, capsule and nephron tubules. However, sometimes the ureteric bud and metanephric tissue may divide before penetrating and then may give rise to a bifid ureter with having a single opening into the bladder and duplex kidney which may join with each other.

Review of literature reveals variable incidence of duplex collecting system, associated with complete or incomplete duplication of ureter. Dahnert conducted a study on urograms and found that the prevalence of partial duplication of the ureter was three times commoners than complete duplication of the ureters[6] prakash et al. Were also of similar opinion according to their study conducted on intravenous pyelograms of 50 cadavers. Partial duplication is to complete duplication was in the ratio of 3:1 respectively in their study[7]

Siomou et al conducted a study on 774 children of less than 6 years age of either sex. They found that a duplicated collecting system was two times more common in girls as compared to boys. Out of 63 children having duplicated systems, they observed that duplicated system was present unilaterally in 81% and bilaterally in 19% of children[8] whitaker and danks also found unilateral duplication more common than bilateral duplication (6:1).[9] rege vm et al. Believed bifid ureter was more common in females and was found to be present often on the right side[10] similar finding was obtained in the present study.

During entire lifetime, bifid ureter may remain asymptomatic, so it is of academic interest only. However, some complications like recurrent urinary tract infection, calculi, uretero ureteric reflux, ureteric stenosis, urinary lithiasis, pyelonephritis and non-functioning of kidney have been reported to be existing with bifid ureter[11-13]. The most common complication of a duplicated collecting system is reflux. The exact nature depends on the type of system involved as for example reflux associated with partially duplicated systems is ureter ureteric reflux and complete duplicated systems is usually associated with vesicoureteral reflux.

Knowledge of anatomical variations of this kind of duplicated collecting system is of immense importance to surgeons or urologists operating on any kind of pathology of ureter. Also, gynaecologists must be aware of such kind of variation so as to avoid accidental traumatic injury of ureter while performing hysterectomy. Radiologists must also be aware of all kinds of variations of ureter to correctly interpret the radiographs.

Conclusion

Review of literature suggests that duplication of ureter is seen very infrequently. It may be an accidental radiological finding in a patient or may be detected during autopsy. If at all the symptoms of duplicated ureter present then it may have variable clinical manifestations. Therefore, it is suggested that clinicians should be aware of existence of partial or complete duplication of ureter when a patient is presenting with complains of recurrent urinary tract infections or

urinary reflux disorders or hydronephrosis or urolithiasis, to treat the patient appropriately for a long-term healthy survival of patient.

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