World Research Journal of Nephrology
Volume 1, Issue 1, 2013, pp.-10-12.
Available online at http://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000121

UNILATERAL DUPLEX COLLECTING SYSTEM WITH INCOMPLETE DUPLICATION OF URETER - A CASE REPORT

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Received: March 29, 2013; Accepted: April 08, 2013

Abstract- Duplex collecting system is presence of two pylocaliceal 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 we present a case of isolated bifid ureter with duplex collecting system and with no other associated congenital anomaly. The embryological & clinical correlations of duplex collecting system is discussed.

Keywords- Bifid Ureter, Congenital anomalies, Clinical correlation

Citation: More R.M., et al (2013) Unilateral Duplex Collecting System with Incomplete Duplication of Ureter - a Case Report. World Research Journal of Nephrology, Volume 1, Issue 1, pp.-10-12.

Introduction

Duplication of ureter might be complete or incomplete. Incomplete duplication of ureter is known as bifid ureter. These may be associated with duplex collecting system where two pylocaliceal systems are present. The incidence of incomplete duplication of ureter and bifid renal pelvis is 4% in North American population [1]. Presence of bifid ureter is often associated with various congenital anomalies and clinical complications [2]. In the present case we have found bifid ureter with two pylocaliceal systems and double moiety of kidney. Any developmental insult may manifestate in the anomalies of urinary system. The clinical and embryological significance of present case is discussed.

Case Report

27 years old female patient came with complaints of fever with chills since three days, increased frequency of micturation. Pain in right lumbar region since one month. The pain was radiated from loin to groin. She also complained of haematuria and dysuria. Routine urine examination denoted urinary tract infection.

CT Abdomen (P+C) Reveled that [Fig-1]:

1. Right kidney measured 13.5 * 4.3 cm, enlarged in size shows normal contrast excretion. Duplex moiety noted with double ureter which are seen to fuse forming single ureter about 2 to 2.5 cm proximal to vescicoureteral junction which then opens into urinary bladder.
2. Multiple round to oval fairly well defined hypodense hypoenhancing lesions are noted in the cortex at the upper moiety of right kidney of average size of 1.6*1.5 cm. Similar morphology subcentimeter lesions are noted in the upper pole cortex of lower moiety. Hypodense hypoenhancing lesions were suggestive of focal pylonephritis / forming renal abscesses.
3. Left kidney 10.3 X 4.9 cm -normal in size, shape attenuation and contrast enhancement.
4. No evidence of HN/HU/Calculus in both kidneys
5. Ovaries, uterus -normal in structure
6. Few subcentimeter sized pre, para aortic and mesenteric lymph nodes were noted.
7. Mild hepatomegaly was seen

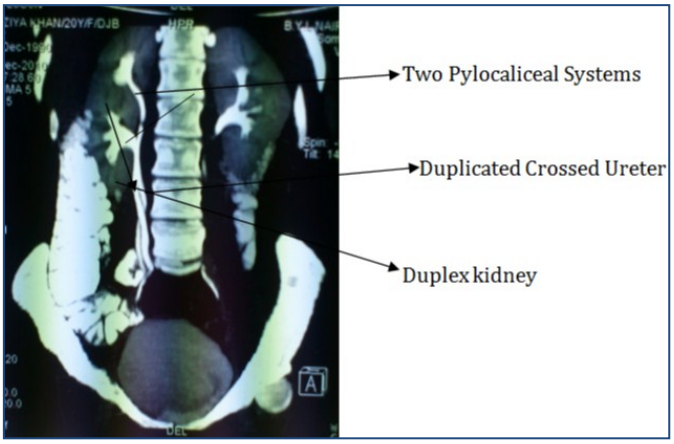

Fig. 1- CT abdomen and pelvis shows incomplete crossed duplication of ureter with duplex kidney on right side.

Discussion

Duplicated or duplex collecting system is one of the most common

congenital renal anomalies. It can be unilateral or bilateral and may be associated with other genitourinary tract anomalies. Though incidence of bilateral duplex collecting system is rare, its diagnosis and treatment and follow up are very important.

Wide literature tells variable incidence of duplex collecting system, association with complete or incomplete duplication of ureter. Incidence of bifid ureter is 0.5% [1], ranging from 0.5 to 3% [3]. Incidence of partial duplication is 0.6% [4] while duplication is seen in 1 in 160 patients [5]. The incidence of incomplete duplicate ureter to be 18 out of a series of 4215 autopsies studied. Amongst these 2 were bilaterally incomplete duplicate, 7 were unilaterally incomplete duplicate and 8 were unilaterally complete duplicate [6]. On an average 3% excretory urograms show ureteral duplication on routine examination [7]. Presence of bifid ureter is often seen to be associated with congenital hydronephrosis [8], contralateral orthotopic qudrafid ureter [9], complete duplication of contralateral ureter [10, 11], Goltz's Syndrome [12], high cephalad kidney and duplication of pelvis [13]. Duplex collecting system occurs in approximately 1.3% patients [14], 0.7% [15], associated urinary tract anomalies occurred in 17% of children [16] and 12% of male and female patients [17] with complete duplication, duplex anomalies with urinary tract infection occurred in 8% of girls [16]. Bifid ureter may remain asymptomatic in life and create academic interest only. Nevertheless complications including frequent urinary tract infection, calculi [18], uretero ureteric reflux, ureteric stenosis [19], urinary lithiasis, pyelonephritis, non-functioning of kidney units [20] have been reported. Bifid ureter is reported to be twice more common in females and on the right side [21] and same was seen in present case.

In the present case double moiety of kidney was seen along with double pylocaliceal systems. Thus the whole duplex kidney was well connected to the pylocaliceal system and so the functioning of the collection of urine was not disturbed. Also the duplicated ureter had joined 2-2.5 cm proximal to vescicoureteral junction which then opens into urinary bladder with single opening. Though two ureters on right side, they open in urinary bladder with one opening which is normal. It has been postulated that the longer the ureteral duplication the higher rate of urinary tract infection [22] and duplex urinary tract is prone to infection either from obstruction associated with ectopic ureter or vesicoureteric reflux [2]. Vesicopelvic junction obstruction can occur with partial or duplicated collecting system which can be associated with vesicoureteric reflux [23]. This could be the reason of urinary tract infection in the present study which was correlated with routine urine examination, CT scan report and clinical symptoms.

Both the ureters crossed twice during their course which increased the chances of obstruction and kinking.

In present case the functioning of formation and collection of urine was not disturbed at all so surgical treatment was not necessary. Urinary tract infection will be taken care by coverage of antibiotics, antispasmodics and good intake of water. Long term follow up of the patient is mandatory as recurrent infection can lead to chronic pylonephritis with later development of hypertension and renal failure.

Developmental Basis

Genitourinary system is developed 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.

References

[1] Adel K. Afifi, *Illustrated Encyclopedia of Human Anatomic Variation: Opus iv: Organ Systems: Urinary System Kidneys, Ureters, Bladder and Urethra*.

[2] Atwell J.D., Cook P.L., Howell C.J., Hyde I., Parker B.C. (1974) *Arch. Dis. Child*., 49(10), 825-826.

[3] Setsuko Tohno, Cho A., Yoshiyki T. (2008) *J. NARA Med. Assoc*., 59(1), 183-187.

[4] Richard Gong (2009) *Imaging Science Interesting Cases*, case 158, Univ. of Rocheser Medical Center.

[5] Kirks D.R. (1991) *Practical Pediatric Imaging*, 2nd ed., Boston Little Brown and CO, 960-963.

[6] Lowsley O.S. (1956) *Clinical Urology*, 3rd ed., Williams and Wilkins Company, USA.

[7] Russel R.C.G., Bulstrode C.J.K., Williams N.S. (2000) *Bailey and Love's Short practice of Surgery*, 23rd ed., Arnold Publishers, New York, 1163-1172.

[8] Angulo Cuesta J., Unda Urzaiz M., Florescorral N. (1991) *Archives Esp. Urology*, 44, 869-71.

[9] Bhandarkar, Raju A.M., Rao M.S. (1997) *Journal of Postgraduate Medicine,* 43, 104-5.

[10] Tundidor B.A.M. (1999) *Archives of Esp. Urology*, 52, 790-2.

[11] Borrego Hernando J., Galbis F., Tellez M., Galmes I., Rodriguez R., Rivas J.A., del Hoyo J., Perez Butamante, Escudero Barri (1994) *Archives Esp. Urology,* 47, 625-7.

[12] Gunduz K., Gunaip I., Erden I. (1997) *Ophth-Genetics*, 18, 143-149.

[13] Al Attia H.M. (1999) *Scandevenian Journal of Urology and Nephrology,* 33, 257-259.

[14] Stec A.A., Baradaran N., Gearhart J.P. (2012) *Urology*, 79(1), 207-209.

[15] Amis E.S., Cronan J.J., Pfister R.C. (1985) *Urology*, 26, 82-88.

[16] George S. Bisset (1987) *ARJ*, 148, 497-500.

[17] Natior E.F. (1994) *J. Urol*., 51, 456-465.

[18] Giannokopoulos X., Chambilomatis P., Thirothoulakis M., Seferiadis G. (1994) *Internal Urology and Nephrology,* 26, 161-165.

[19] Busslinger M.I., Kaiser G. (1992) *European Journal of Paediatric Surgery,* 2,150-151.

[20] Chalouhy E., Harram R., Ezzo G. (1992) *Journal of Medicine Libnan,* 40, 16-21.

[21]Rege V.M., Deshmukh S.S., Borwankar S.S. and Gandhi R.K. (1986) *Journal of Postgraduate Medicine*, 32, 233-235.

[22]Marshall F.F., Mc Loughlin M.G. (1978) *J. Urol*., 120, 626-628.

[23]Woo Jin Ko, Chang Hee Hong and Sang Won Han (2001) *Yonsei Medical Journal*, 42(5), 553-557.