



Unilateral incomplete duplicated ureter – A clinical and embryological insight

Parveen Ojha and Seema Prakash

Department of Anatomy, R. N. T. Medical College, Udaipur
Corresponding Email: drparveena@yahoo.com

ABSTRACT

Unilateral incomplete duplication of ureter of right kidney was observed during routine dissection of an adult male cadaver at R.N.T. Medical College, Udaipur. Two ureters of right kidney joined just before entrance into urinary bladder and opened in urinary bladder by a single ureteric orifice. Duplication is one of the commonest anomaly of genitourinary system and may be accompanied by other congenital anomaly or it may be a cause of urinary tract infections, calculi or it may get injured during pelvic surgeries. In this case study we have discussed embryological development and clinical implications of such type of anomaly.

Key words: Duplication, ureter, bifid

INTRODUCTION

Ureter is a muscular tube of 25-30cm length, continuous superiorly with funnel shaped structure called renal pelvis and inferiorly it opens into the lateral angle of the base of the urinary bladder. Ureters develop from ureteric bud which penetrates the metanephric tissue [1]. Duplication of ureter results from early splitting of ureteric bud [2]. One such case of duplication was observed by us during routine dissection of an adult male cadaver. Duplication of ureter may remain asymptomatic or it may cause repeated urinary tract infections or calculi. It may get injured during pelvic surgeries.

Case study - (Fig-1)

During routine dissection of abdomen of an adult male cadaver two ureters were noticed emerging from the right kidney. Right kidney was normal in size and shape and its hilus was just above the transpyloric plane. At the hilus anterior to posterior relations of vein, artery and pelvis were not maintained. Two renal veins were seen as the anterior most structure. Both renal veins joined to form a single vein just before entering into inferior vena cava. Renal artery was not seen at the hilus. A single renal artery from abdominal aorta was seen at the lower pole of the kidney. Two ureters were present behind the renal veins. Ureter I and Ureter II were at the upper and lower margin of hilus respectively. Both the ureters were of equal diameter. Both traversed superficial to renal artery and then parallel to each other. Just near the entrance to urinary bladder the two ureters joined just close and before opening in the bladder through a single ureteric orifice.

Left kidney was normal in size and shape and had a single ureter.

No other associated congenital anomaly was seen in the abdominal or thoracic viscera.

DISCUSSION

Collecting system of the permanent kidney develop from the ureteric bud, an outgrowth of the mesonephric duct. This bud penetrates the metanephric tissue. Later the bud dilates and forms renal pelvis. This bud forms the ureter, renal pelvis, the major and minor calyces and collecting tubules. Duplication of ureter results from early splitting of the ureteric bud. Sometimes two ureteric buds may form, and then one of the buds has a normal position and the other moves down and has an abnormal entrance into bladder, urethra, and vagina or epididymal region. [2]

Duplication of ureter can be either complete or incomplete. Complete double ureter opens by two separate openings in the urinary bladder. The two openings may be closely situated or further apart. In incomplete duplication two ureters join before entering in bladder through a single orifice [3]. Such an incomplete duplication of ureter also known as bifid ureter was observed by us during routine dissection where two ureters have joined just before opening into urinary bladder. Two ureters in duplication may join at any point from renal pelvis to urinary bladder. Unilateral duplication has an incidence of 1 in 125 while bilateral duplication has an incidence of 1 in 800 cases [1]. Duplication is two to five times more common in females than in males [4]. Moreover incomplete duplication is three times more common than complete duplication. Incomplete type may remain asymptomatic or may cause complications like ureteric stenosis, urinary lithiasis and pyelonephritis. Gupta et al [5] reported yoyo reflux in partial duplication which can be demonstrated by ^{99m}Tc mercaptoacetyl triglycine renal scintigraphy. Ureteroureteral reflux (yoyo reflux) prevents the urinary tract from complete drainage. Such patients of duplication with yoyo reflux should be treated surgically without delay. Atwell et al [6] after investigations of families of patients with duplex urinary tract found anomaly to be autosomal dominantly inherited and recommended routine screening by limited intravenous pyelography in these patients to detect before onset of complications. Duplication may be accompanied by other congenital anomalies such as anomaly of external ear or hearing loss [2].

Duplex ureters if undiagnosed pre or peroperatively can get injured during gynaecological surgeries. Alexander et al [7] has reported a case of duplex ureter which got damaged during laparoscopic hysterectomy and was diagnosed postoperatively. Surgeons performing surgeries in pelvic region should be well aware of such anomalies as congenital anomalies in genitourinary region has an incidence of about 10% [8] and duplication is one of the commonest anomalies of upper urinary tract.

Figure 1- Unilateral Incomplete Duplicated Ureter

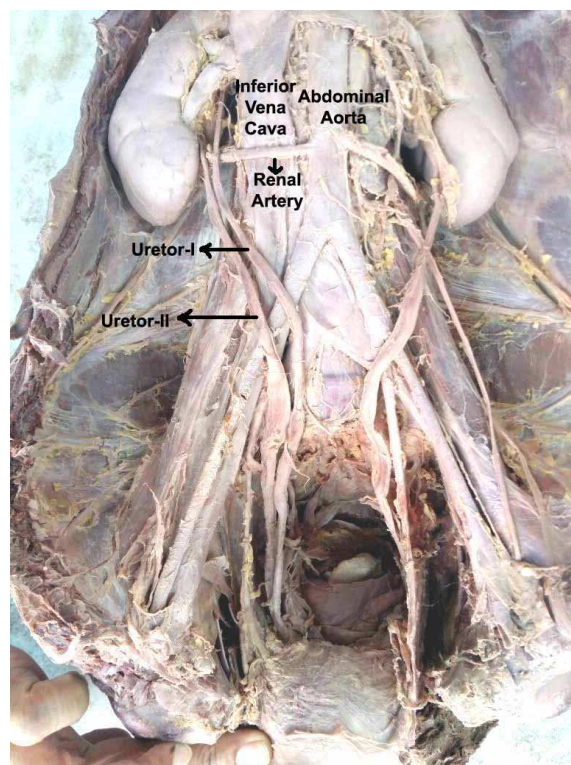


Fig-1: Showing Duplication of Ureter on Right Side

CONCLUSION

Though duplication of ureter may remain asymptomatic but it has a wide clinical significance especially in presence of yoyo reflex, urogenital or gynaecological surgeries or laparoscopic procedures where it may get injured if not diagnosed earlier.

Acknowledgement

The authors are grateful to authors of all the articles, journals and books from where literature for the article is reviewed and discussed.

REFERENCES

- [1] Standring S; In Gray's Anatomy. 38th ed. Edinburgh, London: Churchill Livingstone; 2005:1285-1288
- [2] Sadler TW. Langman's Medical Embryology. 9th Ed., Baltimore, Maryland, USA, Lippincott Williams & Wilkins, 2004: 329.
- [3] Hawthorne, AB. The embryological and clinical aspect of double ureter. Canadian Medical Association Journal, 1936, vol. 34, n. 1, p. 21-26. PMID:20320125.
- [4] George S Bisset III, Janet L Strife .The Duplex collecting system in girls with urinary tract infection ; Prevalence and Significance. AJR. March 1987; 148: 497-500
- [5] Gupta, K., Galhotra, R. and Saggar, K. Yo-yo reflux in partial duplication of ureter: a diagnosis on the color and pulse Doppler study. Muller J Med Sci Res, 2013, vol. 4, n. 1, p. 116-118. [http:// dx.doi.org/10.4103/0975-9727.118243](http://dx.doi.org/10.4103/0975-9727.118243)
- [6] Atwell, JD., Cook, PL., Howell, CJ. Hyde, I. and Parker, BC. Familial incidence of bifid and double ureters. Archives of Disease in Childhood, 1974, vol. 49, n. 5, p. 390-393. <http://dx.doi.org/10.1136/adc.49.5.390>. PMID: 4834020
- [7] Alexander P. B. Dalzell, Richard G. Robinson, Kirsten M. Crooke(2) Pelvipiperineology 2010; 29: 88 Duplex ureter damaged during laparoscopic hysterectomy
- [8] Burkland, C. E. (1958). The significance of genetic and environmental factors in urogenital disease. Journal of Urology, 79,532.