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Complete ureteral duplication associated with megaureter and ureteropelvic junction dilatation: Report on an adult cadaver case with a brief review of the literature

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Summary

Although ureteral duplication, megaureter (MU) or ureteropelvic junction obstruction is a common anomaly of the urinary tract, complete ureteral duplication accompanied by MU and ureteropelvic junction dilatation (UPD) appears to be rare. In this paper, a case of a Japanese female cadaver with complete ureter duplication associated with MU in the upper pole ureter (UpU) and UPD in the lower pole ureter (LoU) is described. Besides describing and illustrating this case, we discuss the anatomy and etiology of these anomalous structures with a brief review of the literature.

Introduction

Ureteral duplication is the most common congenital anomaly of the urinary system (Fernbach et al., 1995, 1997; Berrocal et al., 2002). Although numerous clinical cases of ureteral duplication associated with megaureter (MU), which appeared mainly in imaging findings or diagnosis, were reported, there have been only a limited number of anatomical reports (Weinstein et al., 1988; Kawauchi et al., 2004). Moreover, neither clinical nor anatomical reports of ureteral duplication associated with MU and ureteropelvic junction dilatation (UPD) have yet been available in the literature.

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Duplicated ureters are classified into a complete type with the doubling of both the renal pelvis and the ureters in the entire course to the bladder and an incomplete type with the doubling of the renal pelvis followed by a combined ureter. The unilateral and incomplete types are more frequent than the bilateral and complete types, respectively. We encountered a case of ureteral duplication associated with UPD of the lower pole ureter (LoU) and MU of the upper pole ureter (UpU) in a cadaver dissection course for student education in Tokyo Medical University.

In this present study, besides describing and illustrating this case, we discuss the causal relations among the ureteral duplication, MU, UPD and changes in renal parenchyma.

Objects and methods

Morphological observation

This case concerns the dissection of an 81-year-old Japanese female cadaver (NO. 200052) from the anatomy laboratory of Tokyo Medical University, Japan, during routine educational dissection which was carried out in 2002. The cause of death was cerebral hemorrhage. Gross dissection was performed according to customary procedures. The sizes of the kidneys and ureters were determined, the ureters with dilated parts were incised, and the lumens and orifices of the ureters were carefully observed.

Histological analysis

Samples of renal parenchyma from the right kidney (as a normal side) and the left kidney (as a side with duplex ureters) were obtained, refixed in 10% formalin over night and then embedded in paraffin. Paraffin sections of 5 μm were stained with hematoxylin and eosin (HE) and observed under a light microscope (E800, Nikon, Tokyo, Japan).

Results

The duplicated ureters were found on the left side of the urinary organs. The left kidney was smaller than the right kidney, measuring 102 and 108 mm in length, 40 and 45 mm in width, and 35 and 35 mm in thickness, respectively (Fig. 1). The left two ureters emerged from the renal hilus behind the renal artery and vein in an upward and downward alignment, named the UpU and the LoU in this paper, respectively (Fig. 1).

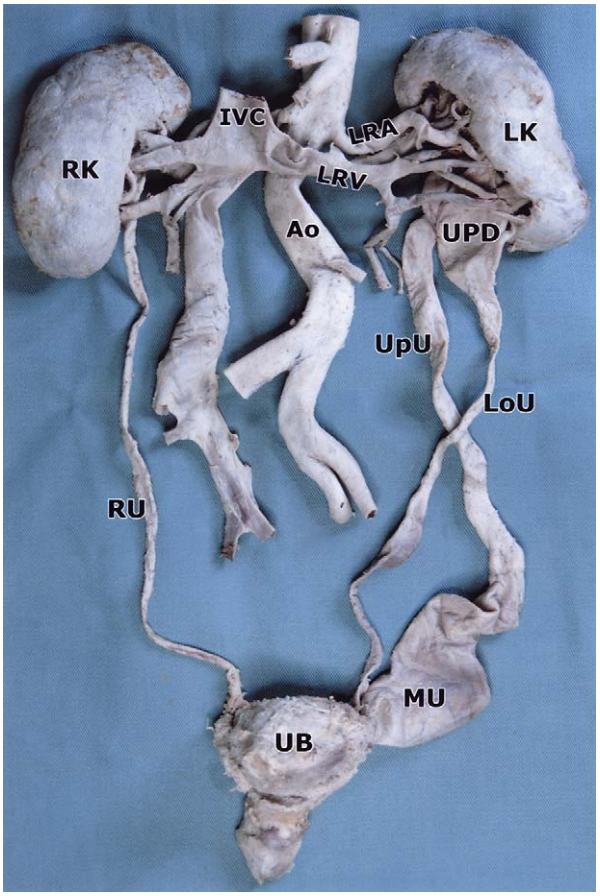

Figure 1. Bilateral kidney and ureters, ventral view, indicating a complete ureteral duplication in the left ureter associated with megaureter (MU) and UPD. The upper pole ureter (UpU) opens into the bladder distally and medially and is associated with an obvious dilatation near the vesicoureteral junction, and the lower pole ureter (LoU) showed an obvious dilatation near the ureteropelvic junction, entering the bladder proximally and laterally. Ao, aorta; IVC, inferior vena cava; LK, left kidney; LRA, left renal artery; LRV, left renal vein; RK, right kidney; RU, right ureter; UB, urinary bladder.

The arising region of the LoU, the inferior ureteropelvic junction, was markedly dilated (= UPD), with the dilated part measuring 35 mm in maximum width, and 50 mm in length longitudinally. The terminal part of this UPD exhibited no obvious narrowing (obstruction). The diameter of the other non-dilated ureteral part was 4–6 mm (Fig. 1).

On incising the left kidney through the renal pelvis longitudinally, two ureters (UpU and LoU) were shown to arise from different pelvises, the superior moiety and inferior moiety pelvises, respectively. Compared to the right kidney, the parenchyma of both the superior and inferior