A CASE OF DOUBLE RENAL PELVES AND URETERS ASSOCIATED WITH DOUBLE SUPERIOR VENAE CAVAE

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Received July 30, 2008

Abstract : A case of incomplete double renal pelves and ureters was found in a 78-year-old Japanese woman during an ordinary dissection by medical students at Nara Medical University in 2007. The double renal pelves and ureters were present in the left kidney. After two ureters were combined at the distal site, the combined ureter entered the urinary bladder. The number of renal calices was five and three in the upper and lower renal pelves of the left kidney, respectively. Furthermore, the right kidney and ureter were normal. The double superior venae cavae were also present in the woman.

Key words : double ureters, double renal pelves, double superior venae cavae, gross anatomy

INTRODUCTION

Duplicate renal pelves and ureters are a congenital anomaly. There are two types of complete and incomplete double renal pelves and ureters[1]. The first type has two ureters entering separately the urinary bladder. The second type has one ureter entering the urinary bladder after two ureters are combined. The authors encountered the second type of incomplete double renal pelves and ureters in a 78-year-old Japanese woman in 2007. As this anomaly is rare, the authors report the finding of this anomaly.

FINDINGS

A case of double renal pelves and ureters was found in a 78-year-old Japanese woman who died of myocardial infarction.

Ureter and Kidney

In the left kidney, double ureters were seen in a 78-year-old Japanese woman during an ordinary dissection practice in 2007 (Fig. 1). The upper ureter passed behind the left renal artery and vein, whereas the lower ureter passed behind the renal vein. The two ureters passed downward and were combined at 2.8 cm in length above the site entering the urinary bladder. The upper ureter of the upper renal pelvis passed medially to the lower ureter of the lower renal pelvis (Fig. 2). The upper ureter was 15.9 cm in length and maximum 4.8 mm in width and the lower ureter was 15.0 cm in length and maximum 6.0 mm in width. The present case belonged to the type of incomplete double renal pelves and ureters.

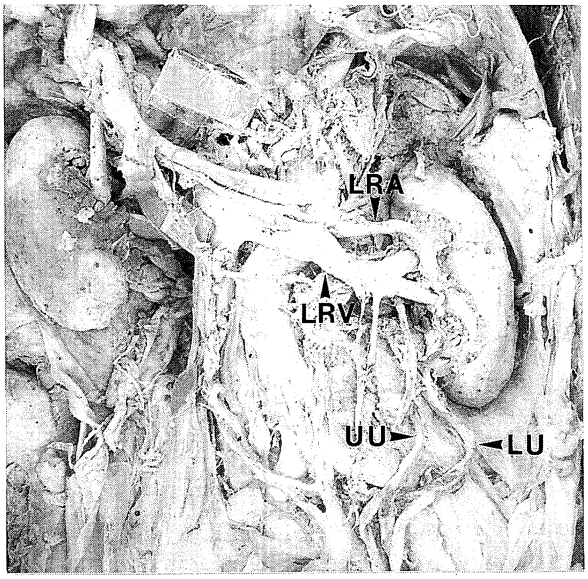

Fig. 1. Double ureters present in the left kidney.
LU, lower ureter; LRA, left renal artery; LRV, left renal vein; and UU, upper ureter.

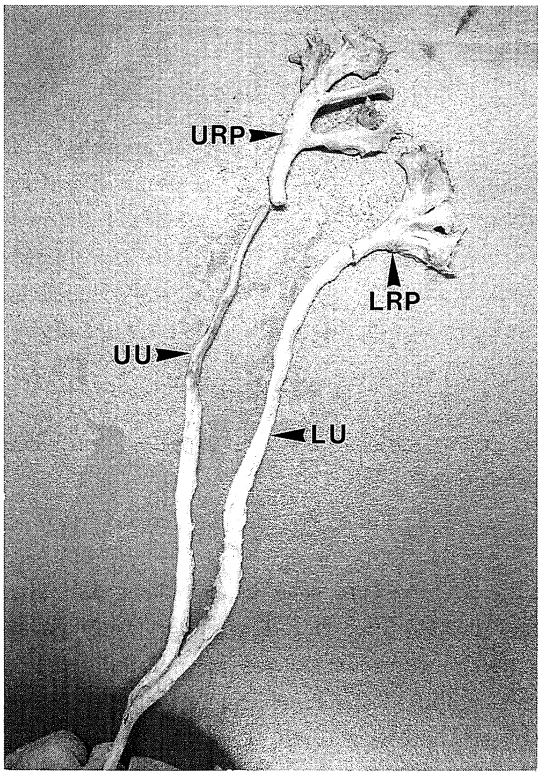

Fig. 2. Double renal pelves and ureters present in the left kidney.
LRP, lower renal pelvis; LU, lower ureter; URP, upper renal pelvis; and UU, upper ureter

Fig. 3. Anterior view of the heart.
LSVC, left superior vena cava; RSVC, right superior vena cava.

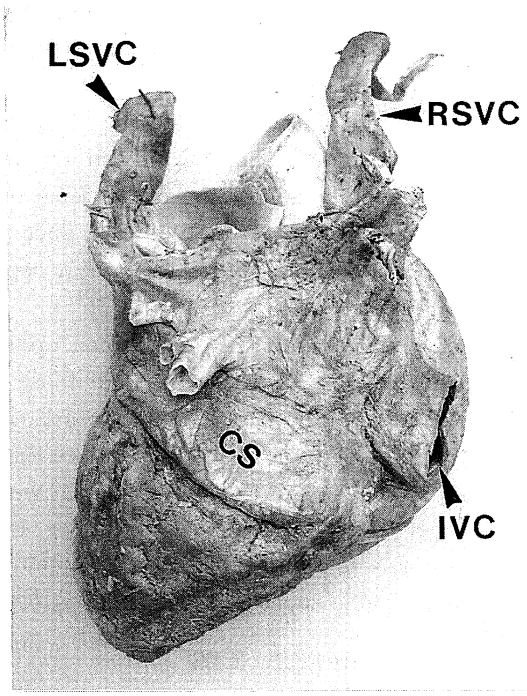

Fig. 4. Posterior view of the heart.
CS, coronary sinus; IVC, inferior vena cava; LSVC, left superior vena cava; and RSVC, right superior vena cava.

The number of minor calices was five and three in the upper and lower renal pelves, respectively, in the left kidney. The left kidney was 10.2 cm in length, maximum 3.5 cm in width, and 92 g in weight.

In the right kidney, a single ureter was present. The right ureter passed in normal course. The right kidney was 8.7 cm in length, maximum 4.0 cm in width, and 105 g in weight.

Superior Vena Cava

The left and right superior vanae cavae were also present in the Japanese woman (Fig.3). The left superior vena cava continued the coronary sinus and the coronary sinus opened below an orifice of the inferior vena cava (Fig. 4). The diameters of the left and right superior venae cavae were estimated to be 10.9 and 9.5 mm, respectively. The left superior vena cava was similar in size to the right one. No communication between the left and right superior venae cavae was absent.

DISCUSSION

The incidence of double renal pelves and ureters ranged from 0.5% to 3.0% in the human[2-6]. The authors found a case of the double renal pelves and ureters in one out of 427 cadavers at our Department. The incidence of this anomaly is 0.23% at our Department.

It is well known that the average number of minor calices is eight and a half in one kidney[4]. In our case, the number of minor calices was five in the upper pelvis and three in the lower pelvis. Therefore, the number of minor calices in the left kidney was equivalent to the average value of those in one normal kidney.

Pohlman[7] reported that incomplete double ureter was caused by the division of the renal bud beginning too early and the division extending beyond the pelvis into the segment belonging to the ureter; where more complete splitting of the renal bud occurred so as to be affected by the absorption of that segment of the Wolffian duct which lay between the opening of the ureter and cloaca, each ureter came to have a separate opening into the cloaca; that is, a complete double ureter was formed.

Huntington[8], on the other hand, reported that the additional ureter was derived from an additional renal bud which arose from the Wolffian duct. Of these two theories Pohlman's appears to be the more satisfactory hypothesis. In other words, it may be stated that a more complete dichotomy or division of the renal bud takes place than normally occurs.

It was reported that congenital anomalies of urogenital system were frequently associated with cases of duplicate renal pelves and ureters[3,9,10]. However, in the present case, the anomaly of the superior venae cavae was present, but other congenital anomaly of urogenital system was not. The incidence of double superior venae cavae is 0.36% at our Department[11].

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