Application of preoperative three-dimensional image reconstruction in the treatment of ureteropelvic junction obstruction

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• **Objective**
  
  To investigate the value of preoperative three-dimensional (3D) image reconstruction in the treatment of ureteropelvic junction obstruction.

• **Methods**
  
  We reviewed data on 40 patients (22 male cases, 18 female cases) diagnosed with ureteropelvic junction obstruction in Peking University first hospital from May 2017 to April 2019. All patients underwent preoperative enhanced CT scan, and 3D reconstruction models were reconstructed based on the CT data to assist planning surgery.
• Results

1. UPJO with **ectopic vessels**

Fig 1. Three dimensional (3D) image model of UPJO with ectopic vessels  
A: patient no.1, UPJO caused by renal crossing artery; B: patient no. 3, the large gap between UPJ and two ectopic arteries; C: patient no. 5, multiple arteries and veins clinging to the renal pelvis, located in the operation area; D: patient no.8. heterotopic vein in front of UPJ, which located in the surgical area

2. UPJO with **kidney stones**

Fig 2. 3D model of UPJO with kidney stones  
A: The location and shape of urinary stone located in the lower calyces could be clearly identified when renal tissue and blood vessels were eliminated; B: The maximum length axis and the maximum diameter of the stone could be found and measured by adjusting the spatial orientation and angle in the 3D mode.

3. UPJO with **horseshoe kidney and UPJO after pyeloplasty**

Fig 3. 3D image model of UPJO with horseshoe kidney and UPJO after pyeloplasty  
A: Horseshoe kidney with UPJO, with many vessels around the isthmus of horseshoe kidney, which includes small arteries and a vein across the renal pelvis; B: UPJO after pyeloplasty, with rough upper ureteral segment.

• Conclusion

- The preoperative 3D image reconstruction has a high clinical value in the treatment of ureteropelvic junction obstruction, and it is of great help to assist surgery planning and reduce the intraoperative vascular, tissue and organ damage.