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Utilization of Three-dimensional Virtual Reconstruction and Intraoperative Retrograde Pyelogram for Partial Nephrectomy of Renal Tumour in Horseshoe Kidney: A Case Report and Literature Review

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Aim:

- To explore the use of **three-dimensional (3D) reconstruction and intraoperative retrograde pyelogram (RP)** for precise surgical resection of renal cell carcinoma (RCC) in horseshoe kidneys (HSK).

Methods:

- We present a case of partial nephrectomy (PN) for RCC in a patient with a HSK, accompanied by a literature review.

Results:

- 74-year-old male patient with incidental right abdominal mass.
- Computed tomography revealed a 7.5cm heterogeneous mass on right side of the HSK.
- Preoperative 3D-reconstruction CT revealed complex hilar anatomy: 2 renal arteries, 2 renal veins to right side, plus 1 artery to isthmus.
- Open PN performed: Vessels to right side identified/slung; tumour resected under selective arterial clamping.
- Intraoperative RP showed tumour involvement of right lateral calyx in pelvicalyceal system, which was closed.
- Pathology: Grade 2, pT2a clear-cell RCC with **negative margins**.
- Reviewed 47 PNs performed for renal tumour in HSK reported in the literature.
- ~50% of these cases utilized **3D-reconstruction, benefiting preoperative planning for complex surgeries**.
- First reported case of PN in HSK utilizing intraoperative-RP to aid resection of the pelvicalyceal system.**

Conclusion:

- The integration of preoperative 3D-reconstruction and intraoperative-RP in PN for RCC in HSK may aid in navigating complex anatomical variations and enhance surgical precision.

Figure 1: axial cut of arterial phase enhanced CT abdomen at tumour level

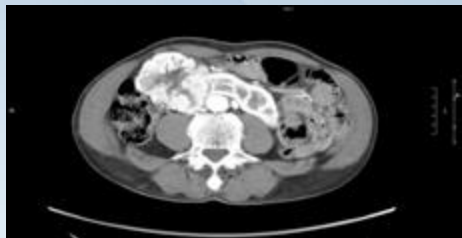


Figure 2: 3D reconstruction of horseshoe kidney and the tumour



Figure 3: Retrograde pyelogram of right renal pelvis of horseshoe kidney



Figure 4: Carefully slung vasculatures intraoperatively

