

Anatomical study of the pre-segmental and segmental arteries of the kidney and their impact in the nephron-sparing surgery

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Clamping of the main renal artery (RA) is still regarded as a commonly used technique to decrease haemorrhage in partial nephrectomy, but it causes warm ischaemic injury. The aim of this study was to describe the pattern of pre-segmental and segmental branches of the RA. To obtain vascular corrosion casts, twenty kidneys were injected with acrylic resins and underwent to computed tomography examination. Analysis of images and of casts showed that the pattern of vascularisation of posterior renal segment was constant (except that in one case), presenting one segmental artery. The vascularisation of the anterior parenchyma (apical, superior, middle and inferior segments) originated directly from an anterior branch of the RA (70%) or thorough pre-segmental arteries (PSA) (30%). In 20% two middle segmental artery originated from two different PSAs. A series of vascular renal patterns have been identified, that the surgeon must know before to conduct the selective clamping, i.e. the selective clamping of segmental artery originating from a PSA could more difficult, because the surgeon can wrongly close the PSA with subsequent ischemia of the more parenchymal segments. Moreover, in case of multiple segmental arteries, originating from two PSA, the surgeon can wrongly clamp only one of them with subsequent intraoperative hemorrhage.

Keywords

Kidney, radiological anatomy, casts, segments.