

DEVELOPMENT OF A PLANNING TOOL FOR ROBOT-ASSISTED PARTIAL NEPHRECTOMY SURGERY BASED ON 3D RECONSTRUCTIONS OF KIDNEYS

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Planning of partial nephrectomy

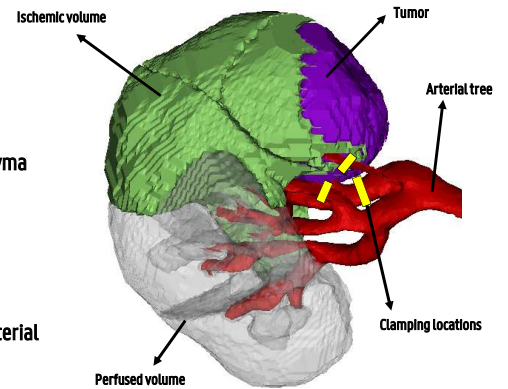
Partial nephrectomy is the treatment of choice for early-stage (T1) renal cell carcinoma (EAU guidelines, 2018).

Selective clamping of the perfusing arteries prior to tumor resection:

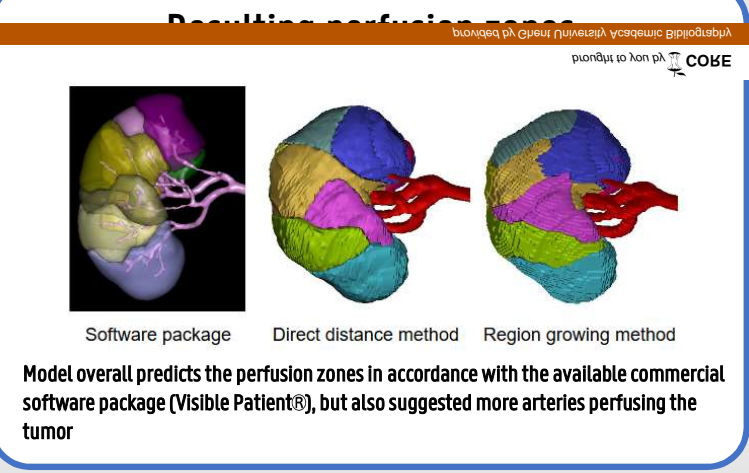
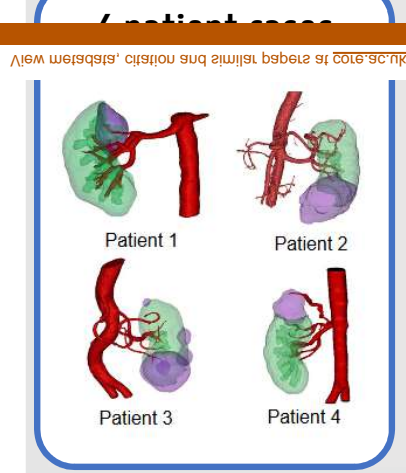
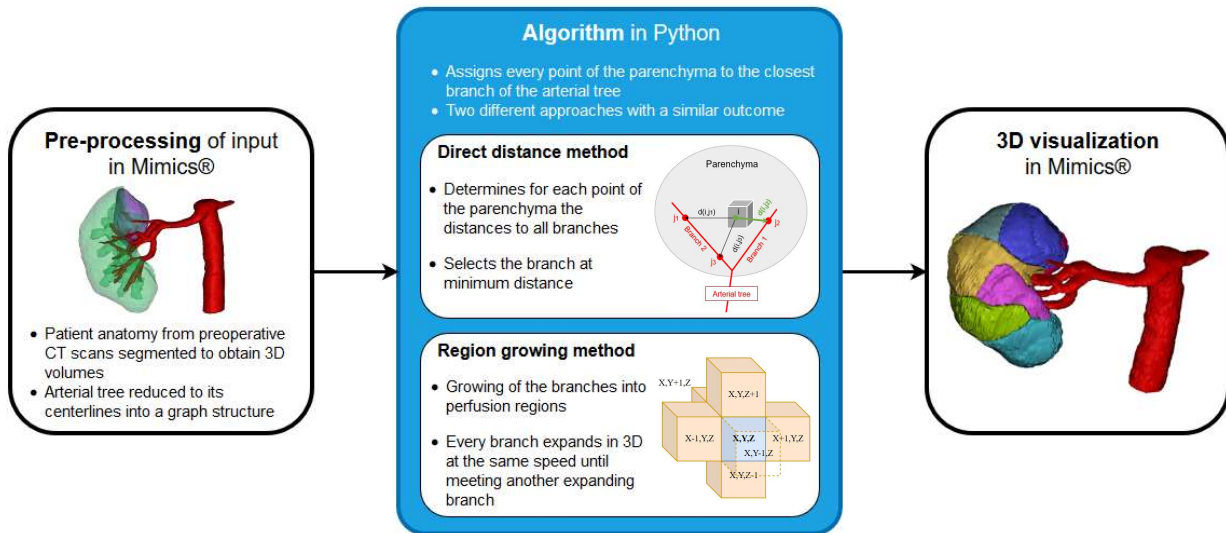
- avoids excessive bleeding
- minimizes the resulting ischemia volume
- ⇒ requires a good understanding of the patient-specific vasculature and the perfusion of the surrounding parenchyma

How can we assist the surgeon?

Development of a perfusion model that provides the optimal clamping locations through 3D visualization of the arterial perfusion zones based on the anatomy of the arterial tree



Workflow: from patient-specific anatomy to 3D perfusion map



Future work

Increase the accuracy of the model outcomes by

- Optimization of the model (automatization, include the influence of tissue type and arterial diameter)
- Especially optimization input data (CT scan and segmentation quality)

In vivo validation