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3D AUGMENTED REALITY ROBOT-ASSISTED PARTIAL NEPHRECTOMY (3D AR RAPN): A BETTER GUIDANCE FOR BETTER SURGICAL RESULTS

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Background and Study Design

- Management of complex masses and identification of anatomical details during Robot-Assisted Partial Nephrectomy can be challenging using standard 2D imaging techniques.
- To overcome this limit, Hyper Accuracy 3D Models (HA3DTM) were created and overlapped to intraoperative images, using a static and elastic Augmented Reality system.





91 patients were recruited from 07/2017 to 05/2019:

- 48 patients -> 3D-guided RAPN
- 43 patients -> 2D-US-guided RAPN



Results and conclusions

| SURGICAL FEATURES | 3D-guided | 2D-US-guided | p-value |
|----------------------------------|---------------|---------------|---------|
| Global ischemia rate | 45.8% | 69.7% | 0.03 |
| Enucleation rate | 62.5% | 37.5% | 0.02 |
| Collecting system violation rate | 10.4% | 45.5% | 0.03 |
| FUNCTIONAL FEATURES | 3D-guided | 2D-US-guided | p-value |
| Estimated Renal Plasma Flow | -12.38 ml/min | -18.14 ml/min | 0.01 |

HA3DTM models during RAPN can be useful for identifying the lesion and intraparenchymal structures, leading to a better quality of the resection phase and functional recovery.