

Intraoperative 3D ultrasound for brain tumor surgery: a case report

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ABSTRACT

Dr Louis Collins' group has developed a prototype neuronavigation system that combines the detailed preoperative anatomical information of MRI with the low cost and real-time advantages of ultrasound. The system includes a tracked 2D ultrasound probe, which enables acquiring a series of images that can then be reconstructed in 3D. The 3D ultrasound can then be viewed in parallel or superimposed on the preoperative MRI. One unique feature of the system is its ability, when necessary, to automatically correct the ultrasound/MRI misalignment.

The system is currently being tested in the context of brain tumor surgery in collaboration with Dr Del Maestro and Dr Petrecca. This presentation will focus on one recent tumor case and use it to demonstrate the many advantages of intraoperative tracked ultrasound and also its few associated limitations. In this reoperation for a GBM, ultrasound was used at two time points: on the dura for tumor visualization and at the end of surgery, for residual tumor evaluation. Videos of the two acquisitions will be shown. The ultrasound images for this case were particularly clear and helped the surgeon visualize the extent of resection at the end of surgery. Postoperative MRI confirmed what was previously seen on ultrasound.