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Real Time Intraoperative Gliomas Profiling – Preliminary Results on a Series of Patients Treated Using Intraoperative 3D US and iKnife

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Statement of the problem: Resection and biopsy of brain gliomas is challenging. Extent of resection has been proven to be an independent prognostic factor to predict both progression free survival and overall survival, but tumour margins are often hard to identify, and intraoperative targeting areas of suspected high grade components might be difficult only basing on pre-operative imaging. We previously explored role of intra-operative 3D US on intrinsic brain tumours resection, and the possibility of combining pre-operative spectroscopy MRI scan and PET with neuronavigation in order to target high grade areas. We have now investigated role of a new diagnostic tool, the iKnife, in combination with 3D US technology.

Methodology and theoretical orientation: Twenty-five patients diagnosed with suspected gliomas were treated with intraoperative use of 3D US and iKnife. Data were collected regarding extent of resection based on 3D US finding and targeting of the high grade components as defined by neuronavigation data, iknife results, and histological analysis according to WHO classification.

Findings: Use of 3D US was confirmed to be helpful in terms of tumour resection and verifying real-time changes. Both ultrasound and iknife data both showed areas within a transforming tumour that corresponded with a higher cell count and mitotic index on histology. iKnife use is technique and operator dependant, needing a strictly standardized protocol to obtain reproducible results.

Conclusions and significance: Intraoperative 3D US confirmed to be an extremely useful tool to both identify margins of resection and account for real time intraoperative changes. iKnife data were closely related to histological analysis, thus encouraging further data collection and studies to prove their efficacy and reliability.

Biography

Giulio Anichini is a qualified neurosurgeon with a background of 5 years of training and 4 years of practice as a neurosurgery specialty doctor, now working as a Neuro-oncology Neurosurgery Fellow at the Imperial College of London – Imperial College NHS Trust. His group's research is focused on: 1) implementation of new technologies in neurosurgery to improve both diagnosis and treatment of brain tumours; 2) molecular pathways in brain tumours; 3) improving neurological and neuro-cognitive assessment in patients with brain tumours.

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