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WHAT IS THE TRUE EXTENT OF GLIOBLASTOMAS?

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Resumen

Although individual glioblastoma cells are distributed throughout the brain, most patients will die from local progression. We achieve local control in less than 20% of cases, despite aggressive surgery and high dose, localised radiotherapy. Local progression occurs earlier than distant recurrence and leads to significant deterioration in quality of life that never recovers back to baseline with treatment. Our inability to detect this occult tumour is due to our reliance on non-specific imaging modalities that have no pathological basis. If we could identify the true extent of this invasive GBM we could adapt both surgery and radiotherapy targets to deal with this local invasion.

Modern advanced imaging can probe pathological features of tumours. Our recent data suggests identifying regions that are cellular (low ADC on diffusion MRI) and vascular (high rCBV on perfusion MRI) have a metabolic profile of aggressive tumour on MR spectroscopy. These regions can be identified in both the contrast-enhancing and non-enhancing parts of the tumour, and can predict outcome. My group has used diffusion tensor MRI as a method of detecting subtle white matter disruption to identify tumour invasion. We have shown we can identify abnormalities in the peritumoural region of GBMs but not metastases. We have characterised these regions with a novel method taken from geomechanics and confirmed invasive tumour by image guided biopsies. Probing the microenvironment of these regions with advanced MRI shows aggressive tumour. Follow up studies seem to suggest it can predict where the tumour will recur. This is now being explored in the multicentre PRaM-GBM study. By looking at the extent of resection of these regions shows they may be a better, individualised target for precision surgery.