THE ROLE OF DWI IN POSTOPERATIVE HIGH GRADE GLIOMA TRIALS

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Purpose

The RANO (Response Assessment in Neuro-Oncology) criteria[1] are an evolving set of criteria and considered to be clinically applicable, reasonably reproducible and accurate for patients with high grade glioma (HGG). Although diffusion-weighted imaging (DWI) is recommended by RANO working group in the immediate postoperative MRI scan in determining whether new enhancement developing in the subsequent weeks is caused by ischemia or by tumor recurrence[2,3], DWI is not currently endorsed for differentiating treatment effect from recurrent tumor due to lack of sufficient specificity. However, since changes in tumor water diffusivity can occur secondarily to changes in cell density, DWI might also be a maker for response to therapy and an early predictor of therapeutic efficacy[4]. The roles of DWI in patients with postoperative HGG trial are reviewed along with imaging examples.

Outline of content

1. Current challenges in post-operative HGG trials
   a. MRI application of HGG response assessment after surgery
   b. Conventional MRI challenges in post-operative HGG trials
2. Review the publications of DWI in post-operative HGG trials
   a. Post-operative changes vs residual tumor
   b. Monitoring recurrent disease progression
3. Discuss the potential utilities and limitations of DWI in post-operative HGG trials
   a. Evaluation of non-enhancing component of tumor
   b. As a secondary endpoint in clinical trials
4. Conclusion

Summary

The critical point in management of HGG patients is how best to define residual tumor following surgery. Peritumoral infarctions are more common and larger in HGG patients with acquired deficits after surgery[5]. Early postoperative DWI is a critical tool to distinguish ischemia from residual tumor. Recent studies suggest that DWI can detect nonenhancing tumor progression[6] and is an attractive method to monitor disease progression[7], which should be included in postoperative MRI follow-ups.

References

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