

Neuro Oncol. 2026 Aug 20;noag194. doi: 10.1093/neuonc/noag194. Online ahead of print.

ESTRO, ESNR and EORTC consensus-based definition for MRI abnormalities after radiotherapy for intracranial central nervous system tumours

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PMID: 42623110 DOI: [10.1093/neuonc/noag194](https://doi.org/10.1093/neuonc/noag194)

Abstract

Magnetic resonance imaging (MRI) is essential for post-treatment surveillance of patients with intracranial central nervous system (CNS) tumours. However, interpretation is often complicated due to post radiotherapy MRI abnormalities. Current literature demonstrates substantial heterogeneity in terminology and definitions used to describe these MRI abnormalities, limiting clinical decision-making and comparability across studies. To address this, an international multidisciplinary Delphi consensus was conducted within the Radiation Imaging and Neuro-Oncology Group (RING). Questionnaires were developed by the steering committee and distributed to experts in radiation oncology, neuroradiology, neuro-oncology, medical oncology, and neurosurgery. A three-round Delphi method was employed, with consensus defined as $\geq 75\%$ agreement. Consensus was reached on the applicability and definitions with adoption of the term Treatment-Related Imaging Abnormality (TRIA). Clear definitions for potential and confirmed TRIA were established. Subcategorization based on imaging features all demonstrated high agreement. For consistent application of the framework minimal essential elements for MRI request forms were identified. The final consensus was endorsed by ESTRO, ESNR and EORTC. This Delphi consensus provides a standardized framework for MRI abnormalities following radiotherapy for intracranial CNS tumours. The framework aims to harmonize reporting, support clinical decision-making, and improve comparability in future neuro-oncology research. Central nervous system neoplasms - Radiotherapy - Magnetic resonance imaging - Delphi Technique - Treatment-Related Imaging Abnormality (TRIA).

Plain language summary

After radiotherapy for brain tumours changes can appear on follow-up MRI scans. These changes may represent treatment reactions, clinically relevant complications or tumour-related growth and distinguishing between them can be challenging. Many terms and definitions are currently used to describe these reactions, which complicates communication, clinical decision-making and research. This project brought together international experts in brain tumour treatment to agree on a standardised set of definitions. Using structured online surveys, the panel reached consensus on a concept called Treatment-Related Imaging Abnormality (TRIA). This standardised approach should improve clinical practice, support clearer communication, and enhance research in this field.

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