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Diagnostic performance of axial T2-weighted MRI sequence for exclusion of brain tumour in paediatric patients with non-localizing symptoms

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Abstract

Objective: To establish diagnostic performance of a single axial T2-weighted sequence for detection of brain tumours in children with non-localizing symptoms, compared to a standard MRI protocol.

Methods: Retrospective analysis of children undergoing MRI brain imaging for suspected brain tumours with non-localizing symptoms over a 3-year period. Axial T2-weighted images were blindly reviewed by 2 experienced paediatric neuroradiologists. Primary analysis was calculation of diagnostic performance metrics for tumour identification using axial T2-weighted image only compared to the standard MRI protocol.

Results: For 312 children undergoing MRI brain during the study period, sensitivity and specificity for brain tumour detection based on axial T2-weighted images in children with non-localizing symptoms were 1.000 (95% CIs 0.598, 1.000) and 0.998 (95% CI 0.990, 0.999), respectively. Based on T2-weighted images alone, 50 patients (16%) were flagged as needing recall for further imaging compared to 14 (4.5%) recalled after the standard protocol.

Conclusions: Axial T2-weighted images have high sensitivity and specificity for detection of brain tumours in children with non-localizing symptoms but are associated with increased imaging recall rates. Prospective evaluation of this approach to identify patients requiring more comprehensive imaging is warranted.

Advances in knowledge: A truncated MRI protocol with single axial T2-weighted sequence has high diagnostic performance for brain tumour detection in children with non-localizing features. Radiologists can be reassured that a child with this presentation who is unable to complete the full MRI scan protocol is very unlikely to have a brain tumour missed provided an axial T2-weighted sequence is obtained.

Keywords: MRI; brain tumour; diagnostic performance; neuro-oncology; neuroradiology; paediatric.