Prediction rule

CT should not be relied on for cases of isolated vomiting in children with blunt head trauma

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Findings

Of 43 904 enrolled patients, 5392 children were included in the study. A total of 4577 (84.9%) had non-isolated vomiting, while 815 (15.1%) had isolated vomiting. Head CTs were performed in 3284 children (71.8%) with non-isolated vomiting and in 298 (36.6%) children with isolated vomiting. All patients with vomiting and clinically-important TBI had TBI on CT. Patients with isolated vomiting had a low prevalence of clinically-important TBI. Clinically-important TBI occurred in 2 of 815 (0.2%) patients in the isolated vomiting group, versus 114 of 4577 (2.5%) in the non-isolated vomiting group. TBI on CT occurred in 5 of 298 (1.7%) patients in the isolated vomiting group versus 211 of 3284 (6.4%) in the non-isolated vomiting group.

The authors conclude that TBI on CT is uncommon and clinically-important TBI is very uncommon in children when vomiting is the only clinical symptom. CT is consequently not required in these children; however, they should be observed for progression of symptoms. TBI is more frequent in children when vomiting is accompanied by other signs suggestive of TBI. In these children head CT should be considered.

Commentary

This study evaluates an easy-to-collect clinical marker (isolated vomiting) for risk stratification of intracranial lesions in paediatric blunt TBI. The authors conclude that clinically-important brain injury is rarely present in children with TBI when vomiting is the only clinical sign. Consequently, the authors suggest that head CT is generally not required. I partially disagree with this statement. It may be true that no findings are to be expected that require emergent neurosurgical treatment in this setting; however, a negative CT does not mean that the brain is not injured—instead the injury may not be visible on the acute CT. It is well known that CT may underestimate the degree of TBI. MRI may identify TBI, while CT appears unremarkable. In particular, diffuse axonal injury may only be seen on advanced sequences such as susceptibility-weighted or diffusion-weighted imaging. In addition, ^1^H MR spectroscopy, diffusion tensor imaging or functional MRI may reveal diffuse injury to the neuroarchitecture and neurofunction. This injury may have an impact on acute neurocognition or neurofunctionality, as well as ongoing and future paediatric brain development, which may remain undetected on acute clinical evaluation, especially if the child is very young. Neurobehavioural tests and follow-up multimodality MRI should be considered if the child has persisting symptoms.

Controversy about potentially harmful exposure to ionising radiation (CT) should not blind us to the possible long-lasting effects of diffuse brain injury that remained undetected by CT. This may delay or prevent neuroprotective or neurostimulation treatments. Whenever possible and indicated, MRI should also be considered in the emergent diagnostic work up. Ultrafast, highly sensitive and specific MR protocols can give valuable information about outcome, can guide and validate acute and long-term treatment and help parents in their decision-making in combination with the clinical data.

Competing interests None.

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Reference