Accuracy of NEXUS II head injury decision rule in children. A PREDICT prospective cohort study.

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Aims:

Clinical decision rules (CDRs) can be applied in Emergency Departments (EDs) to optimise the use of computed tomography (CT) in children with head trauma. The national Emergency X-Radiography utilization Study II (NEXUS II) CDR, as amended for children, has not been externally validated in a large paediatric cohort. The objective of the study was to conduct a multicentre external validation of NEXUS II CDR in children.

Methods:

We performed a prospective observational study of patients < 18 years presenting with head trauma of any severity to 10 Australian/New Zealand EDs. In a planned secondary analysis we assessed the performance of the NEXUS II CDR for its diagnostic accuracy (with 95% confidence intervals CI) of clinical important intracranial injury (ICI) as identified in CT scans performed in ED.

Results:

Of 20,137 total patients, we excluded 28 with suspected penetrating injury. Median age was 4.2 years. CTs were obtained in ED for 1962 (9.8%), of whom 377 (19.2%) had a clinically important ICI as defined by NEXUS II. 74 (19.6%) patients underwent neurosurgery. Sensitivity for clinically important ICI based on the NEXUS II CDR was 373/377 (98.9%; 97.3%-99.7%) and specificity 156/1585 (9.8%; 8.4%-11.4%). Positive and negative predictive values were respectively 373/1802 (20.7%; 18.8%-22.6%) and 156/160 (97.5%; 93.7%-99.3%). Of the 18,147 children without CT 49.5% had at least one NEXUS II risk criterion.

Conclusions:

NEXUS II had very high sensitivity when analysed with a focus on head injured patient who had a CT performed, similar to the derivation study. With half of unimaged patients positive for NEXUS II risk criteria the use of this rule has the potential to increase the number of CTs.