

EVMS Emergency Medicine Journal Club

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Citation: Abid Z, Kuppermann N, Tancredi DJ, Dayan PS. Risk of Traumatic Brain Injuries in Infants Younger than 3 Months With Minor Blunt Head Trauma. *Ann Emerg Med.* 2021 Sep;78(3):321-330.e1. doi: 10.1016/j.annemergmed.2021.04.015. Epub 2021 Jun 17. PMID: 34148662.

Patient Population: Infants <3 months old with minor blunt head trauma

Methodology (Study design): Secondary analysis of the PECARN data set using only infants <3 months old. Outcomes included clinically important TBI, TBI on CT scan, and skull fracture on CT scan. Descriptive analyses were conducted in 2 main groups: those who met PECARN low-risk criteria and those who did not meet PECARN low-risk criteria. 2 subgroups were also analyzed: those who had no other clinical signs or symptoms suggestive of head trauma beyond those of the PECARN criteria, and those who met the PECARN low-risk criteria but had other clinical findings of head trauma

Primary Outcome: Rate of TBI/TBI on CT/skull fracture in infants who met low-risk criteria vs. infants who did not meet low-risk criteria

Secondary Outcome: Rate of TBI/TBI on CT/skull fracture in infants who had other signs/symptoms of head trauma vs. infants with no other signs/symptoms of head trauma

Results

Among patients who did not meet the PECARN low-risk criteria, the rate of clinically important TBI was 4.2%. TBI on CT was relatively common among those who did not meet the PECARN low-risk criteria 21.3%, as were skull fractures 28.0%.

Among infants who met the PECARN low-risk criteria, only one had a clinically important TBI, 0.2%. 10 had TBI on CT 5.1%, and 9 had skull fractures 4.6%.

Of the 261 infants who were classified as low risk by the PECARN criteria and had no other clinical signs or symptoms, none had clinically important traumatic brain injury and the rate of traumatic brain injury on CT was 4.9%

Post Hoc Analysis:

Strengths:

- Large sample size
- Uses a previously validated prediction tool

Limitations:

- Did not have details on mechanisms of injury other than the general category and whether the mechanism was in the PECARN high-risk stratum or not.
- It is possible that some infants were hospitalized for 2 or more nights based on age alone rather than for concerning signs and symptoms
- Does not contain data on skull fractures identified by plain radiograph
- Clinicians did not obtain CT's on all patients, Therefore, the true prevalence of traumatic brain injuries on CT could be higher or lower.
- Cannot be applied to infants with suspected abusive head trauma

My Clinical Bottom Line:

The PECARN prediction rules are highly sensitive to identify those at low risk of clinically important TBI. However, the rate of TBIs on CT in the low-risk group was more than 5%, suggesting the need to maintain a low threshold for CT. The rate of TBI on CT remained nearly 5% in those infants who both met the PECARN low-risk criteria and had no other clinical findings suggestive of traumatic brain injury. The prevalence of clinically TBI and TBI on CT in those who did not meet the PECARN low-risk criteria suggests that CT use in this population is often appropriate.