**RESEARCH LETTER**

**COMPARATIVE EFFECTIVENESS RESEARCH**

**Association Between Parental Preference and Head Computed Tomography in Children With Minor Blunt Head Trauma**

Natale et al recently reported that race/ethnicity is independently associated with head computed tomography (CT) use among children with minor blunt head trauma. They showed parental anxiety as an important factor influencing head CT orders in non-Hispanic white children regardless of brain injury risk. In a Japanese pediatric cohort of patients with minor blunt head trauma, we conducted a study with similar objectives attempting to identify factors that influence a physician’s decision to order a head CT in children.

**Methods.** As part of a larger hospital quality improvement activity, we conducted a cohort study comprising children younger than 15 years seen at the St Luke’s International Hospital outpatient emergency clinic after experiencing a minor blunt head trauma between October 2007 and July 2012. Inclusion was limited to patients with available quality improvement data recorded by the physician onto a data collection template regarding the parents’ preference for a head CT examination (deferred to physician’s decision, strongly preferred, favored, and opposed) and relevant clinical data that were used to classify patients into brain injury risk categories (low, intermediate, and high) based on a validated prediction rule. Electronic medical records were accessed to obtain data on whether a head CT scan was performed within 12 hours of being seen, child’s age and sex, time of visit (working hours, evening, and night), and department of attending physician (pediatrics, emergency department, and other). Complete data for all variables were available for 2020 patients. This series of patients showed similar demographic characteristics and proportion of available quality improvement data recorded by the attending physician (pediatrics, emergency department, and other). Complete data for all variables were available for 2020 patients. This series of patients showed similar demographic characteristics and proportion of available quality improvement data recorded by the attending physician (pediatrics, emergency department, and other).

We used Poisson regression specifying a robust error variance and calculated relative risks (RRs) and 95% confidence intervals to evaluate factors associated with head CT order and, additionally, used a recursive partitioning method, Chi-squared Automatic Interaction Detection (CHAID), to explore and visualize potential higher-order relationships that are often difficult to detect with traditional regression procedures. SPSS statistical software version 20.0 (IBM Japan Ltd) was used.

![Figure](https://www.jamapediatrics.com/issue/167/5/491/491.png)  

**Figure.** A graphical representation of the Chi-squared Automatic Interaction Detection (CHAID) analysis. Through a process of recursive partitioning based on degree of statistical significance of the χ² tests for independence, the CHAID algorithm evaluated which explanatory variables (eg, parental preference and brain injury risk categories), if split, most “explain” the dependent variable (head computed tomography [CT] scan). Cut points for child’s age were selected by the CHAID algorithm.
Results. Of 2020 patients, 310 (15.3%) underwent head CT scan. Using multivariate Poisson regression, head CT scan was independently associated with older age (age ≥7 years vs <2 years: RR=2.01; 95% CI, 1.57-2.57), strong parental preference (vs deferred to physician: RR=4.39; 95% CI, 3.43-5.60), high brain injury risk classification (vs low: RR=6.61; 95% CI, 4.85-9.01), and emergency department attending physician (vs pediatrics: RR=1.54; 95% CI, 1.21-1.97) (eTable, http://www.jamapeds.com). Complementary to these results, recursive partitioning based on CHAID first selected parental preference as providing the most evidence in discriminating whether a head CT scan was performed (Figure). Stratification also showed that nearly 40% of children in the low injury risk group underwent a head CT scan if their parents “favored” one, in contrast to only 2% of children in this risk group if the decision was deferred to the physician (Figure). Evidence suggesting higher-order interactions with child’s age was observed.

Comment. The overuse of cranial CT in children, even for minor blunt head trauma, is a concern particularly in light of a recent report that showed CT scans in children for minor blunt head trauma, is a concern particularly in light of a recent report that showed CT scans in children for minor blunt head trauma. Radiation doses from CT should be kept as low as reasonably achievable, and alternative procedures would help to clarify these higher-order relationships.递归partitioning based on CHAID first selected parental preference as providing the most evidence in discriminating whether a head CT scan was performed (Figure). Stratification also showed that nearly 40% of children in the low injury risk group underwent a head CT scan if their parents “favored” one, in contrast to only 2% of children in this risk group if the decision was deferred to the physician (Figure). Evidence suggesting higher-order interactions with child’s age was observed.

Although clinical benefits likely outweigh the small risks in most cases, radiation doses from CT should be kept as low as reasonably achievable, and alternative procedures should be considered, when appropriate.

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Online-Only Material: The eTable is available at http://www.jamapeds.com.