

Hospitalizing children with normal CT scans after blunt head trauma is not necessary

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A large, national multi-center study of thousands of children taken to emergency departments with minor blunt head trauma has found that most of those with normal computed tomography (CT) scans do not require hospitalization for further observation.

Of the more than 13,500 children included in the study, less than 1 percent had subsequent abnormal CT scans or MRIs and none required neurosurgical intervention.

The study was conducted under the auspices of the groundbreaking Pediatric [Emergency](#) Care Applied Research Network (PECARN). It is published online today in the [Annals of Emergency Medicine](#).

"We now have definitive evidence supporting discharging most neurologically normal children with [head trauma](#) after negative CT scans home from the [Emergency Department](#)," said James Homes, professor of emergency medicine in the UC Davis School of Medicine and the study's lead author and co-investigator.

"Sending these patients home with their parents not only provides good, safe care but it also saves costs. It is a win for everyone concerned."

While blunt head trauma is the leading cause of death in children older than 1 year old, the authors said the finding shows that children with minor blunt head trauma with normal CT scans are at very low risk for subsequent traumatic findings on neuroimaging. More importantly, they are at extremely low risk of needing neurosurgical intervention.

Nevertheless, children fitting this profile frequently are admitted to hospitals for additional observation following normal CT scans. The study authors conclude that "hospitalization of children with minor head trauma after normal CT scan results for

neurologic observation is generally unnecessary."

"One of the goals in the evaluation of children with minor head trauma is to try to avoid CT scan use, if possible. If you do a CT scan and the scan is negative, and the child is well, then for goodness sakes let the child go home," said study senior author Nathan Kuppermann, professor of [pediatrics](#) and emergency medicine and chair of the Department of Emergency Medicine in the UC Davis School of Medicine.

"Admitting these children after normal CT scans is costly, causes them to spend time away from their families and loved ones, and potentially exposes them to other health risks, such as hospital-borne infections," Kuppermann said.

Kuppermann is founding chair and a principal investigator of PECARN, the first federally funded pediatric emergency research network in the country, and oversees the Academic Centers Research Node. In addition to UC Davis, the group includes hospitals in Milwaukee, Wis.; Philadelphia, Penn.; St. Louis, Mo.; Cincinnati, Ohio and Salt Lake City, Utah. He also is the lead investigator of the PECARN head injury study published in the *Lancet* in 2009, from which the current study is derived.

Children often are admitted to the [hospital](#) for additional observation after blunt head trauma to allow frequent neurologic examinations. However, studies in adults have found that neurological problems following minor blunt head trauma are rare and that hospitalization after a normal cranial CT scan is unnecessary.

Enrolled in the study were 13,543 children 18 years old or younger with minor blunt head trauma who were treated in 25 emergency departments across the United States from June 2004 to September 2006. The patients' median age was about 9 years old; 63 percent were boys. The study included both

children with "isolated head trauma" and head trauma and other injuries.

For the study, the authors obtained initial CT results for each patient. Study participants were considered to have normal CT scans if their radiological scans did not reveal intracranial hemorrhage, cerebral concussion, cerebral edema, or skull fractures. Those who were discharged from the emergency department received follow-up telephone calls at least one week after their [emergency department](#) visit, to determine whether their child received additional CT or MRI scans. Their families also were asked about neurologic complications, including neurosurgical interventions. Nearly 80 percent of the study participants were reached for follow-up either by telephone or mail. Those who were hospitalized were followed during their hospitalization for any deterioration.

Hundreds of the patients who were either hospitalized or discharged were found to have received repeated neuroimaging - either CT scans or MRIs or both -but none of the patients required neurosurgical intervention, indicating that there is a very low risk for patients to deteriorate after an initially normal cranial [CT scan](#).

The authors said that the [children](#) involved in the study may have required hospitalization for injuries that were not confined to the head, and some also may have been vomiting and so admitted for intravenous fluid administration. But of the patients hospitalized, more than half only had blunt head trauma and no other injuries or ailments, and most were likely hospitalized simply for neurologic observation.

Provided by University of California - Davis

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