



The Children's Hospital

# Research News

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## **Predictions of Traumatic Brain Injury Outcomes in the Pediatric Intensive Care Unit**

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**Background** Traumatic brain injury (TBI) remains one of the leading causes of death and disability in the pediatric population. PICU staff is often put in the position to prognosticate outcomes in order to guide treatment decisions and discussions with families in the early stages after injury.

At the same time, uncertainty of recovery abounds in such cases. The PICU research team believed that the perceived inability to accurately predict outcomes, coupled with the expectations of healthcare providers, patients' families, coworkers, and society as a whole to provide clear answers and treatment recommendations, contributes to the moral distress of the PICU staff as well as to the distress of families. Ultimately, this prognostication regarding potential outcome affects how families are counseled and the aggressiveness of their child's treatment in the critical stages of injury.

**Purpose** The purpose of this study was to determine staff predictions of gross outcomes in pediatric TBI patients in the PICU. The specific research questions included:

1. Does ICU staff accurately predict gross neurologic functional outcomes in pediatric TBI patients?
2. Does the objective Pediatric Risk of Mortality (PRISM) III score correlate with outcomes using the King's Outcome Scale for Childhood Head Injury (KOSCHI)?
3. Upon what factors does staff base their predictions?



**Methods** Using a prospective, correlational study design, all patients 18 years and younger admitted to the PICU with a TBI were eligible to be enrolled. Patients with underlying neurologic disorders or patients with primary anoxic brain injuries were excluded. Staff and parental consent were obtained.

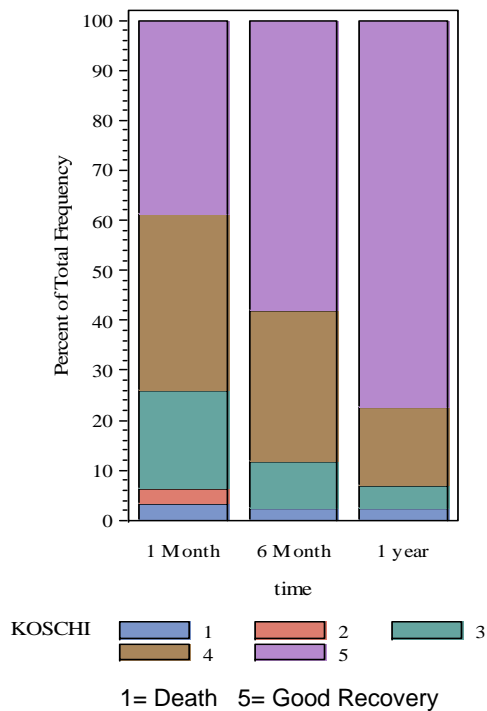
The PICU attending physician, fellow, and RN caring for the TBI patient at 24 hours and 72 hours post-injury were asked to complete a questionnaire predicting the patient's outcome using the KOSCHI at 1 month, 6 months and 1 year. The KOSCHI is a pediatric modification of the adult Glasgow Outcome Score (GOS). It expands the 5 category GOS and includes subcategories to more accurately capture pediatric specific details.

Factors which influenced staff's prediction, their degree of confidence in their prediction, and years of experience were also collected. Based on their prediction, they were also asked to indicate how they felt about caring for the patient and how they would counsel the family. A phone interview was done at 1 month, 6 months and 1 year post injury with the parent or care provider to assess the patient's outcome using the KOSCHI. Nurses completing the follow up calls were not the same nurses who completed the surveys.

**Findings** During the study enrollment period between January 2007 and May 2008, 148 patients were admitted to the PICU with a TBI. Of

those, 10 did not survive and 50 of the 148 patients were enrolled in the study. The average time from admission to death for the 10 patients that did not survive was 61.4 hours. Of the 10 patients who died, only 1 was enrolled in the study, which may have been influenced by staff predictions that the patient would not survive. Sixty-four staff members participated in the study (46 RN, 13 fellows and 5 attending physicians). Mean (SD) age of enrolled patients was 6.6 (5.3) years. Patient follow-up was completed at one month (n=31), 6 months (n=43), and 1 year (n=44) post injury. Patient outcomes improved consistently over the 1 year follow up period based on their KOSCHI scores (see below).

## KOSCHI distribution over time



Results showed PICU staff predictions all significantly correlated with outcomes using the KOSCHI ( $p < 0.05$ ), except for one case. The range of correlations was 0.41 to 0.77, 0.38 to 0.67 and 0.25 to 0.63, respectively for nurses, fellows and attending physicians. Although there was no statistically significant difference, RN predictions had stronger correlation with the actual patient outcomes for all scenarios except when one year prediction was made at 24 hours. There was a weak negative correlation, although statistically significant ( $p < .05$ ), between the PRISM III score and actual patient outcomes using the KOSCHI (Spearman correlation: -0.36, -0.32 and -0.32 respectively for 1 month, 6 months and 1 year).

At 24 hours, PICU staff cited neurologic examination, Glasgow Coma Score and radiographic results influenced their predictions most often. Nurses cited intuition as being important 68% of time. At 72 hours, more factors contributed to staff's prediction but neurologic examination remained the most influential in prediction. Degree of confidence was significantly associated with prediction accuracy; experience was not associated with prediction accuracy.

Based on their predictions, staff was asked to indicate how they felt about caring for the patient and how they would counsel the family. Staff responses highlighted the emotional toll and moral distress PICU staff sometimes feels when caring for critically ill pediatric traumatic brain injured patients.

### Based on your prediction, how do you feel about caring for this patient?

- *Helpless*
- *Frustrated*
- *Sad*
- *Appropriately concerned and anxious about making outcome as good as possible.*
- *While it is a privilege to care for any seriously injured patient, there is some discomfort in being overly aggressive with this patient.*

### Based on your prediction, how would you counsel the family?

- *Would continue full support for now but stress concern for long term outcomes.*
- *I would speak realistically about the severity of the situation and not offer false hope.*
- *Tell them we need to take one day at a time and they have a long journey ahead of them.*

## Implications for Nursing

Despite a relatively low sample size, this study provides insight into the ability of PICU staff to predict outcomes in pediatric traumatic brain injury patients. Additional research is needed in this area as PICU staff often prognosticate patient outcomes. Further evaluation of how these predictions influence patient management and discussions with families are critical.

Additionally, more research is needed on the moral distress that PICU staff experience caring for the pediatric TBI patient. Research focused on whether PICU staff's perceived quality of life for their patients factors into how they would counsel families, and if this contributes to their moral distress, would be invaluable.