Use of a mild traumatic brain injury guideline to reduce inpatient hospital imaging and charges

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study evaluated the impact of guidelines for the treatment of mild traumatic brain injury in paediatric patients, in reducing hospital charges and computed tomography (CT) scans. The implementation of the guideline resulted in a significant reduction in CT scans, length of stay, and patient charges. There were limitations to the methods and some were not well reported. The limitations in the effectiveness data and benefit measures, make it difficult to assess the cost-effectiveness of the guidelines.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to evaluate the impact of guidelines for the treatment of mild traumatic brain injury, in reducing hospital charges and repeated imaging. The patients were aged zero to 16 years and initially presented with a Glasgow Coma Scale (GCS) score between 13 and 15; they had received at least one head computed tomography (CT) scan.

Interventions
The guideline for the assessment of mild traumatic brain injury, in paediatric patients, was created to avoid unnecessary secondary CT scans, to provide more consistent care, and to increase the early implementation of a care plan. This guideline was compared with no guideline implementation.

Location/setting
USA/secondary care.

Methods
Analytical approach:
A retrospective cohort study was used to assess the impact of the guideline on repeated imaging and hospital charges. The time horizon was until patient discharge from hospital. The authors did not explicitly state the perspective.

Effectiveness data:
The effectiveness data were from a retrospective cohort study. Patients were identified by a review of four years of data from the registry for a paediatric trauma centre. This covered two years before the guideline implementation and two years after its implementation. A total of 712 patients met the inclusion criteria and were analysed, with 368 from before the guideline and 344 from after the guideline implementation. The primary outcome was the number of repeat CT scans performed.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The measure of benefit was the reduction in in-patient follow-up head CT scans. The length of hospital stay was also reported.

Cost data:
The total hospital charges for patients with mild traumatic brain injury, before and after the guideline implementation, were included. The costs were reported in US dollars ($).

**Analysis of uncertainty:**
T-tests, Wilcoxon's rank sum test, and Χ² analyses were performed, with statistical significance defined as a probability of less than 0.05.

**Results**
The number of patients undergoing repeat head CT scans was 147 (40%) before the guideline and 90 (26%) after the guideline (p<0.0001).

The average length of stay in hospital was 2.4 days before the guideline, compared with 1.7 days after the guideline (p<0.0001).

The total hospital charges per patient were $22,282 before the guideline and $14,133 after the guideline (p<0.05).

**Authors’ conclusions**
The authors concluded that the implementation of the guideline resulted in a significant reduction in CT scans, length of stay, and patient charges, which improved hospital flow and patient satisfaction with care.

**CRD commentary**
**Interventions:**
The interventions were described and appear to have been appropriate comparators.

**Effectiveness/benefits:**
The effectiveness data were from a retrospective before-and-after cohort study. The details of the cohort study were reported, including the inclusion criteria, patient sample, and follow-up period. The authors showed that the patients were comparable in their age, gender, and initial CT results, but it is possible that they differed in other characteristics. The reduced length of stay could have been due to changes in the general care and management of patients, rather than the guideline itself. The outcome measures were process related, rather than health or patient benefits, which reduces the generalisability of the benefit measure.

**Costs:**
The perspective was not stated, but seems to have been that of the health care provider (the hospital). The cost analysis was very simple; only the total hospital charges were analysed and the cost categories within this were not reported. This means it is not possible to determine if all the relevant costs were analysed. The price year was not reported, which will hamper any future inflationary exercises.

**Analysis and results:**
The statistical analyses used to test whether the differences between the two patient groups were significant were reported. The results were adequately presented. As the main limitation to their study, the authors reported that there was a lack of information on follow-up care. They stated that no child required hospital re-admission and there were no documented missed injuries, but they were unable to discover how many follow-up visits occurred, if there were any complications, and if there were any further scans at follow-up.

**Concluding remarks:**
There were a few limitations to the methods and some were not well reported. The analysis was based on a retrospective before-and-after cohort study and the outcome measures were process rather than health related, making it difficult to assess the cost-effectiveness of the guideline.

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