A Pediatric Cervical Spine Clearance Protocol to Reduce Radiation Exposure in Children

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Abstract

Objective: To minimize radiation exposure in children and reduce resource utilization, an age-specific algorithm to evaluate cervical spine injuries was implemented at a level I trauma center. The effects of protocol implementation on CT use in children (≤ 10 years) were determined. Methods: With IRB approval, a retrospective review was conducted using the institutional trauma registry. All pediatric (≤ 10 years) patients (374) between 1/2007 to present were reviewed. Patients whose imaging was performed at other hospitals were excluded. The patients were evaluated by physical exam alone, with the aid of plain radiograms or with cervical spine CT. All patients who required head CT also had CT of cervical spine to 1-3. Demographic, injury, and outcome data were analyzed using STATA to perform chi-square, t-test, and P-value. P<0.05 was defined significant. WinDose Program was used to calculate radiation effective dose used in cervical spine CT. Results: There were 125 and 127 patients in the pre-protocol and post-protocol group respectively. Demographics, GCS, and injury analysis specifically head/neck and face ISS scores showed no significant difference between the two groups. There was a 60% (p<0.001) decrease in the use of full CTs after protocol implementation. We estimated that the protocol reduced the exposed area by 50% and decreased the radiation dose to the thyroid by greater than 80%. We extrapolated the combined effect results in a 3-fold reduction in radiation exposure. Conclusion: Implementation of a cervical spine protocol led to a significant reduction in radiation exposure among children.