

Clinical Update

A clinical-decision rule for cervical spine injury

Hoffman JR, Mower WR, Wolfson AB, Todd KH, Zucker MI. Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma. *N Engl J Med* 2000;343:94-9.

Background

Because a missed cervical spine injury can have serious consequences, most physicians exercise caution and order imaging studies in patients who have sustained blunt trauma to the head and neck. A previous study found that a set of clinical criteria identified low-risk patients in whom imaging may be unnecessary.¹

Question

Can 5 clinical criteria be used to identify patients at low risk for clinically significant cervical spine injury after blunt trauma?

Design

This prospective, observational study was performed at university and community hospitals in 21 sites throughout the United States.² Only patients with blunt trauma to the head and neck were enrolled; those with penetrating trauma or the need for a cervical spine film for reasons other than trauma were excluded. Participating emergency department physicians were asked to use their usual clinical decision-making practices when evaluating a patient's need for cervical spine films. Before completing 3 views of the cervical spine in stable patients, physicians obtained demographic data and assessed patients for the following 5 clinical criteria:

- No midline neck tenderness
- No focal neurologic deficits

- Normal level of alertness
- No intoxication
- No clinically apparent injury that might distract the patient from the pain of a cervical spine injury

Patients were considered to be at low risk if they met all 5 criteria. CT scanning of the cervical spine was performed when plain film imaging was not feasible. Radiographic abnormalities were designated as clinically significant or insignificant, according to whether specific intervention or treatment was required. Radiologists were unaware of the clinical information when interpreting the imaging studies.

Results

Of the 34 069 patients who had imaging of the cervical spine after blunt trauma, only 818 (2.4%) had radiographically detectable cervical spine injury. Only 8 of these 818 patients met all 5 criteria for low risk, yielding a sensitivity for the decision rule of 99.0% (95% confidence interval [CI] 98.0%–99.6%) and a negative predictive value of 99.8% (95% CI 99.6%–100%). When clinically insignificant abnormalities were excluded, only 2 of 578 patients were classified as low risk by the decision rule. One of these resulted from misapplication of the rule, while in the other instance the patient had an asymptomatic teardrop fracture of the second cervical vertebra, without swelling or abnormal alignment. Scrutiny of neurosurgical records at participating centres identified 2 patients whose cervical spine injury had not been detected in the emergency department. Neither case was classified as low risk by the decision rule.

Commentary

Considerable discretion was permitted in the physicians' determination of whether patients met the 5 criteria in order to allow for clinical judgement. For instance, deeming an injury to be sufficient to distract a patient from the pain of a neck injury was left to the judgement of the physician, as was the level of intoxication and its effect on a patient's reliability. Nevertheless, interobserver reliability of the instrument had been shown to be acceptable in previous studies (kappa value 0.73).³ In this study, application of the decision rule would have reduced the number of orders for cervical spine films by 12.6%.

Implications for practice

The application of a simple, 5-item instrument can predict which patients with blunt trauma are at low risk for clinically significant injuries to the cervical spine. However, given the potential consequences of an unrecognized injury, physicians must apply such a decision rule with caution. — *Kathryn A. Myers*

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References

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2. Hoffman JR, Mower WR, Wolfson AB, Todd KH, Zucker MI. Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma. *N Engl J Med* 2000; 343:94-9.
3. Mahadevan S, Mower WR, Hoffman JR, Peeples N, Goldberg W, Sonner R. Interrater reliability of cervical-spine injury criteria in patients with blunt trauma. *Ann Emerg Med* 1998;31:197-201.