The Canadian C-spine rule safely reduces imaging rates for cervical spine injuries

Synopsis


Question: Does implementation of the Canadian C-spine rule in emergency departments reduce the proportion of patients referred for diagnostic imaging of the cervical spine without a concurrent increase in unidentified cervical spine injuries or serious adverse outcomes? Design: Matched pair cluster randomised trial. Setting: 12 emergency departments of teaching and community hospitals in Canada. Participants: 11 824 patients with a Glasgow Coma Scale score of 15, normal vital signs, and who had sustained within the previous 48 hours either blunt trauma to the head or neck, or a visible injury above the clavicles and a mechanism of injury that was considered dangerous. Patients were excluded if they were under the age of 16, had a penetrating trauma, acute paralysis or known vertebral disease, or were a return patient for reassessment of injury. Randomisation: 11 824 participants allotted 6895 to the intervention group and 4929 to a control group. Interventions: The Canadian C-spine rule was implemented in the 6 intervention group hospital sites using three strategies: (1) policy agreement among physicians on ordering cervical spine imaging, (2) education initiatives including distribution of manuscripts, pocket card, and poster descriptions of the rule, and a 1-hour teaching session, and (3) a mandatory real-time reminder at the point of requisition for imaging. The control group received no intervention although the rule may have been familiar to some clinicians at these sites. Outcome measures: The primary outcome was the proportion of patients referred for diagnostic imaging of the cervical spine. Baseline ordering rates were measured for 12 months. During the following 12-month period, the three strategies were implemented and imaging rates monitored. Secondary outcomes were the numbers of clinically important cervical spine injuries not identified, serious adverse outcomes and misinterpretations of the rule. Results: 11 824 participants completed the study. From the baseline to implementation periods, the intervention group showed a relative reduction in cervical spine imaging of 13% (95% CI 9 to 16). This differed significantly from the control group, which showed a relative increase of 12% (95% CI 7 to 18). No patient discharged without imaging was subsequently found to have a clinically important cervical spine injury. No serious adverse outcomes occurred. Doctors interpreted the rule accurately for 83% of patients. Conclusion: Imaging rates for cervical spine injuries were reduced significantly in hospitals that implemented the Canadian C-spine rule compared with control hospitals. No cervical spine fractures were missed and no adverse events occurred.

Commentary

A large number of patients in the Western world are treated for possible injuries of the cervical spine. The results of this study suggest that the Canadian C-spine rule has the potential to affect healthcare costs considerably.

The Ottawa group have previously examined the acceptability of the Canadian C-spine rule to clinicians (Brehaut et al 2009). To do this, the rule was rated using the Ottawa Acceptability of Decision Rules Instrument (OADRI), which ranges from 0 (least acceptable) to 6 (most acceptable). Emergency physicians in Australia, Canada, USA, and UK rated the Canadian C-spine rule between 4 and 5 on the OADRI, suggesting good acceptability. Vaillancourt et al (2009) found 100% sensitivity and 38% specificity of the Canadian C-spine rule when used by paramedics. It would be worthwhile repeating these studies with Emergency Department physiotherapists to add to the growing body of evidence to guide this arm of the profession (Jibuike et al 2003, McClellan et al 2006, Webb 2008).

The participating centres were 6 teaching and 6 community hospitals. Surprisingly, the effect of implementation of the Canadian C-spine rule was less in academic centres than in community hospitals. Several of the academic centres had participated in an earlier validation study of the rule, which may have increased their baseline use of the rule.

The procedures to introduce the rule to the active hospitals in this trial were extensive. Given this and the relatively low cost of diagnostic radiography the study could have benefited from a cost effectiveness analysis. Nevertheless, this excellent study shows the efficacy and importance of clinical decision making rules. The authors are to be congratulated on the study.

Malcolm H Pope
University of Aberdeen, UK

References