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Prediction Score for Cervical Spine Fracture in Trauma Patient

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Background: Cervical spine (C-spine) injury may cause cervical spine fracture due to various mechanisms. The incidence of cervical spine fracture is approximately 2-5%. NEXUS criteria and Canadian C-spine rule are recommended by ATLS® to identify patients with lower likelihood of C-spine fracture and therefore do not require diagnostic imaging. In Thailand, unavailable 24/7 CT scan and high costs are important limitations. We aim to develop more accurate clinical decision tool to decide which trauma patients require C-spine CT scan for evaluating C-spine fracture, in order to minimize cost, resource utilization and unnecessary exposure to radiation.

Method: A diagnostic prediction rule, retrospective cross-sectional study was conducted between 2016, 1 August and 2018, 31 December at the Emergency Medicine department in Ramathibodi Hospital. Our study included all C-spine injury were age over 16 years and having received a cervical spine CT scan at Emergency department. The predictive model and prediction score for C-spine fracture were developed by multivariate logistic regression analysis. Discrimination of the prediction score was presented as AUROC curve and 95% CI of the clinical risk score for C-spine fracture. Calibration of the prediction score was presented by using the Hosmer– Lemeshow goodness-of-fit test.

Result: 375 patients were met study criteria. 29 patients (7.73%) were found C-spine fracture in CT. Whereas 346 patients didn't have C-spine fracture. Five independent factors (High risk mechanism of injury, paraparesis, paresthesia, limit range of motion of neck and associated injury with chest or facial) were found to be good predictors of C-spine fracture. Clinical prediction score for C-spine fracture was developed with accuracy of 79.03% by divided patient in 3 probability groups (low; score0-1, moderate; score 2-5 and high; score 6-11). Score 2-5 had LR+ of C-spine fracture by 1.46 times. Furthermore, score 6-11 had LR+ of C-spine fracture by 7.16 times.

Conclusion: Clinical prediction score greater than or equal to 2 was associated with cervical spine fracture. Patients who met moderate-high probability groups should be performed C-spine CT scan for evaluate cervical spine fracture.

Keywords: Cervical spine injury, Traumatic neck injury, Cervical spine fracture, Cervical spine CT scan, risk score