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3 Comparison of the NEXUS II and Canadian Head CT Decision Instruments

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Objective: We sought to compare the applicability of the NEXUS and Canadian Head Computed Tomography (CT) decision instruments, and assess their ability to identify blunt trauma patients with traumatic brain injuries, as well as their potential to reduce CT head imaging.

Design and Methods: We conducted a prospective observational study of consecutive blunt head injury patients selected for CT head imaging. Prior to imaging, clinicians recorded enrollment criteria and risk classification for the NEXUS Head CT rule, as well as for both the high-risk (needing neurosurgical intervention) and medium-risk (CT evidence of significant intracranial injury) versions of the Canadian Head CT rule.

Results: All 11,770 enrolled patients met the NEXUS enrollment criteria, while 7,759 patients (65.9%) met the inclusion and exclusion criteria of the Canadian Head

CT Rule, including 111 patients (1.43%) who required neurosurgical intervention, and 306 (3.94%) who had significant intracranial injuries. The Canadian high-risk criteria for neurosurgical intervention identified 108 of 111 patients requiring neurosurgical intervention to yield a sensitivity of 97.3% (95% confidence interval [CI] [92.3% - 99.4%]), while the NEXUS rule, when applied to this same cohort, identified all 111 patients requiring neurosurgical intervention, yielding a sensitivity of 100% (95% CI [96.7% - 100.0%]). We also found that the Canadian medium-risk factors identified 301 of 306 patients with significant injuries (sensitivity = 98.4%; 95% CI [96.2% - 99.5%]), while the NEXUS rule identified 299 of these patients (sensitivity = 97.7%; 95% CI [95.3% - 99.1%]). In our study the Canadian medium-risk rule exhibited a specificity of 12.3% (95% CI [11.6% - 13.1%]), while the NEXUS rule exhibited a specificity of 33.3% (95% CI [32.3% - 34.4%]).

Conclusion: The NEXUS and Canadian Head CT decision instruments both exhibited high sensitivity in identifying patients with traumatic brain injuries, but less than two-thirds of patients could be evaluated by the Canadian rule. The NEXUS rule exhibited higher specificity in identifying patients with significant injuries and provided a nearly three-fold reduction in imaging in comparison to the Canadian rule.