Pain in the Neck:
Absence of cervical spine pain in elderly patients with fractures

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TAP TO GO BACK TO KIOSK MENU

Introduction

Goals:

- Examine prevalence of reported neck pain and cervical spine (c-spine) fractures in elderly patients who presented to the emergency department after sustaining a traumatic injury
- Determine if patient characteristics, mechanism of injury, comorbid health conditions, or severity of injury influenced the prevalence of neck pain in this population.

Significance

- Clinical management guidelines (Canadian C-Spine Rule and the National Emergency X-Radiography Utilization Study) are regularly used to determine the need for computed tomography (CT) imaging of the c-spine
- One of the key inclusion criteria for both guidelines is the presence or absence of neck pain
- Our institution's previous research found that >20% of older trauma patients with c-spine fracture did not report the pain or tenderness components of somatic dysfunction on initial musculoskeletal exam

Methods

- Retrospective study performed at Level I trauma center in the Midwest
- Trauma registry was used to identify patients 55+ years old who presented to the hospital with blunt injury during the study period (April 2017 - December 2018)
- Excluded from analysis if Glasgow Coma Scale (GCS) was <14 at time of clinical examination
- 64-99 patients with c-spine fractures were required to detect a moderate effect size with a power of 0.80
- Patients considered "pain-free" if they did not complain of c-spine pain and denied tenderness to palpation on initial musculoskeletal exam

Results

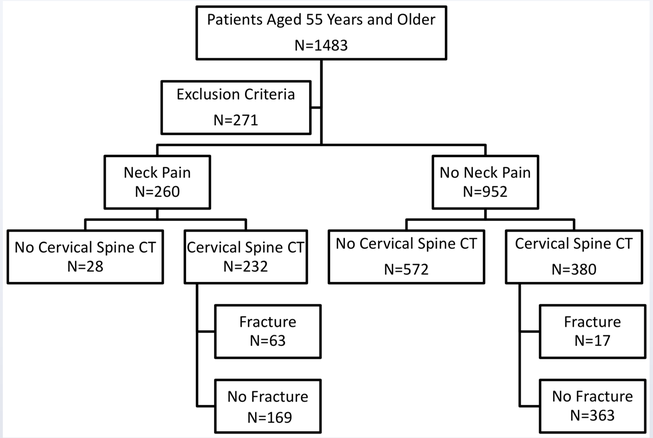

Figure 1. Flow Chart of Reviewed Patients
(click image to enlarge)

Age/ Sex	Mechanism of Injury	AMS in ED	Intoxi-cated	CCR	NEXUS
58 - F	MVC - Highway Speeds	No	No	+ (M)	–
64 - F	MVC - Highway Speeds	GCS=14	No	+ (M)	+ (D, C)
64 - M	Fall - 8 steps	No	Yes (0.15)	+ (M)	+ (D, I)
66 - F	MVC - Highway Speeds	No	No	+ (A,M)	+ (D)
67 - M	Fall - 6-7 steps	No	No	+ (A,M)	–
69 - M	Tractor accident with ejection	No	No	+ (A,M)	+ (D)
69 - M	Bicycle crash - 15mph	No	No	+ (A,M)	+ (D)
70 - M	MVC - Crash into light pole	No	No	+ (A,M)	+ (D)
73 - F	Fall - same level	No	No	+ (A)	–
78 - M	Fall - same level	No	No	+ (A)	–
79 - M	MVC - Highway Speeds	No	No	+ (A,M)	+ (D)
86 - F	Fall - 3 steps	No	No	+ (A)	–
87 - M	Fall - 2 steps	No	No	+ (A)	+ (D)
90 - F	Fall - same level	No	No	+ (A)	–
91 - F	MVC - 45mph	No	No	+ (A)	+ (D)
93 - M	Fall - same level	No	No	+ (A)	+ (D)
96 - F	Fall - same level	GCS=14, dementia	No	+ (A)	+ (C)

Legend
A Age 65+ years
C Altered level of consciousness
D Distracting injury
I Intoxication
M Dangerous mechanism

Table 1. Asymptomatic Fractures
(click image to enlarge)

	No Neck Pain (n=380)	Neck Pain (n=232)	p-value
Male, n (%)	205 (54%)	113 (49%)	.21
Age, median (IQR)	74 (63, 84)	73 (63, 83)	.83
Positive blood alcohol, n (%)	46 (12%)	17 (7%)	.06
Injury severity score (ISS), median (IQR)	9 (4, 14)	9 (4, 11)	.98
Other injured body region:			
Intracranial hemorrhage or skull fracture	130 (34%)	69 (30%)	.25
Face	35 (9%)	25 (11%)	.53
Chest	114 (30%)	65 (28%)	.60
Abdomen	45 (12%)	11 (5%)	.003
Extremity	121 (32%)	66 (28%)	.38
Psychiatric disorder	25 (7%)	42 (18%)	<.001
Mortality	9 (2%)	4 (2%)	.59

Table 2. Demographic and injury characteristics of patients who received a CT Scan of the C-Spine (n=612)
(click image to enlarge)

Data Analysis

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Conclusion

- 21% of elderly patients with a cervical spine fracture did not report neck pain on initial examination
- The absence of neck pain cannot be used to definitively rule out c-spine fractures in this population and is an insufficient criterion for identifying which patients should receive c-spine CT imaging
- 40% of patients without neck pain (n=380) received CT imaging of the c-spine, suggesting that many providers are scanning this population liberally
- Applying the CCR and NEXUS criteria retroactively (Table 1) demonstrates the CCR would have detected all asymptomatic fractures, but the NEXUS criteria would have missed 6 patients
- The CCR's age criteria (age 65+) was responsible for catching 8 fractures that otherwise would have been missed using the CCR alone
- Patients aged 55-64 are not "protected" by the CCR's age criteria and are therefore potentially vulnerable to missed c-spine fractures; liberal imaging should be used in this population
- With the exception of abdominal distracting injuries, there were no detectable patterns to identify patient or injury characteristics that predicted asymptomatic cervical fractures
- Consider applying both CCR and NEXUS criteria when evaluating this population, especially those aged 55-64
- None of the pain-free fractures required an operative procedure, however 15 of 17 asymptomatic patients were discharged with a c-collar or brace

References

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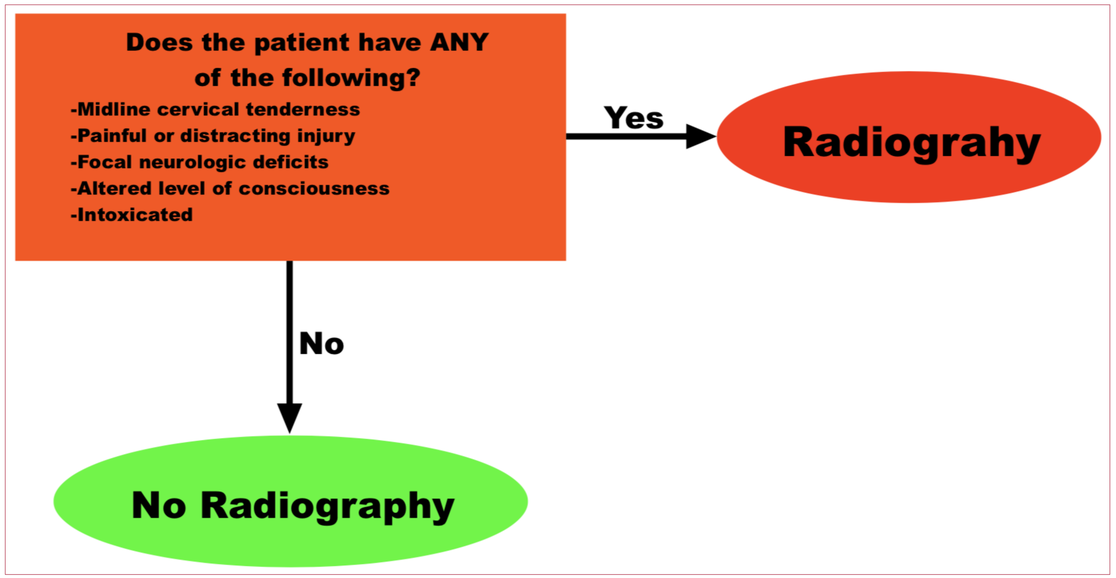
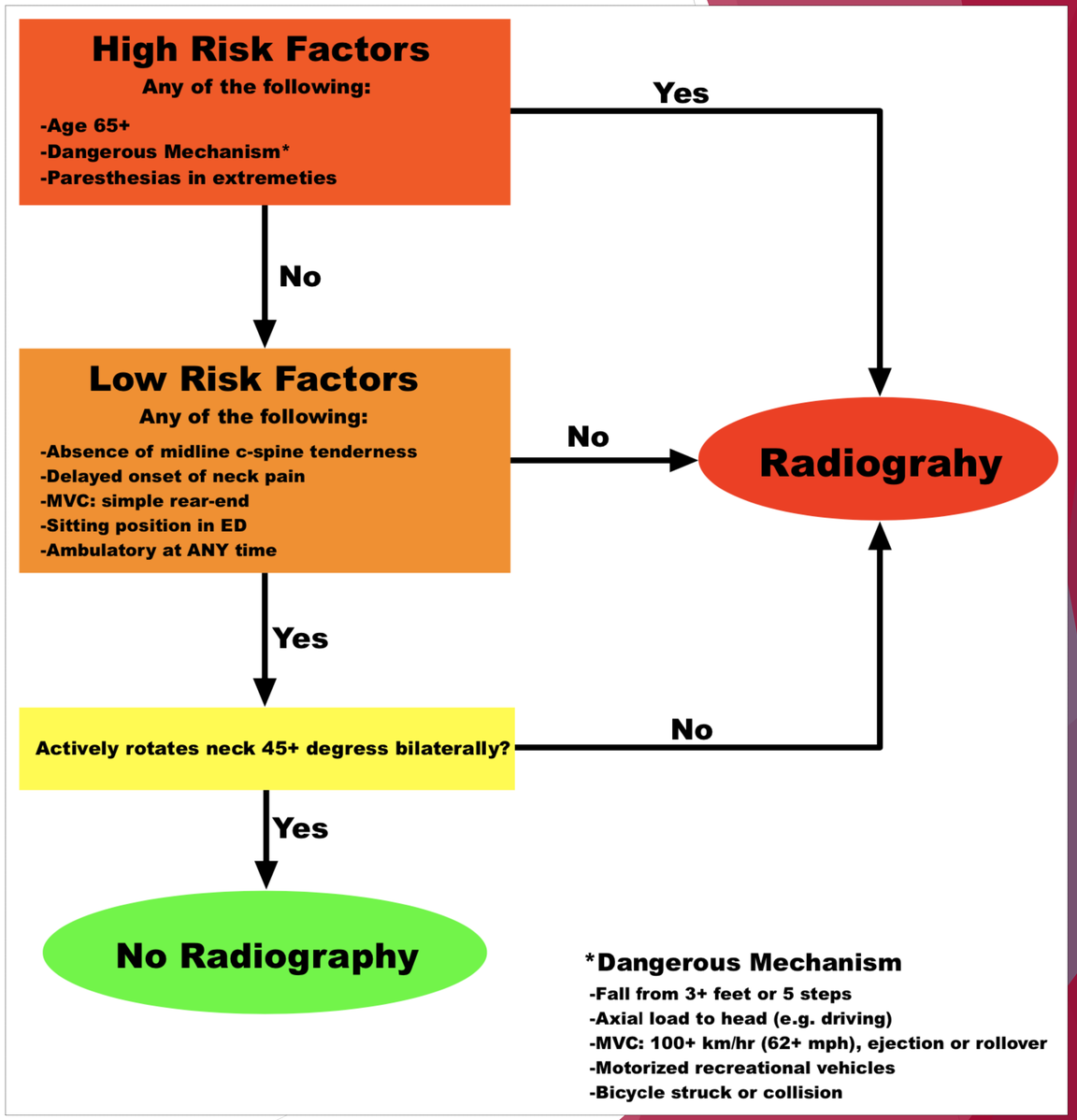
National Emergency X-Radiography Utilization Study (NEXUS)



Canadian C-Spine Rule (CCR)



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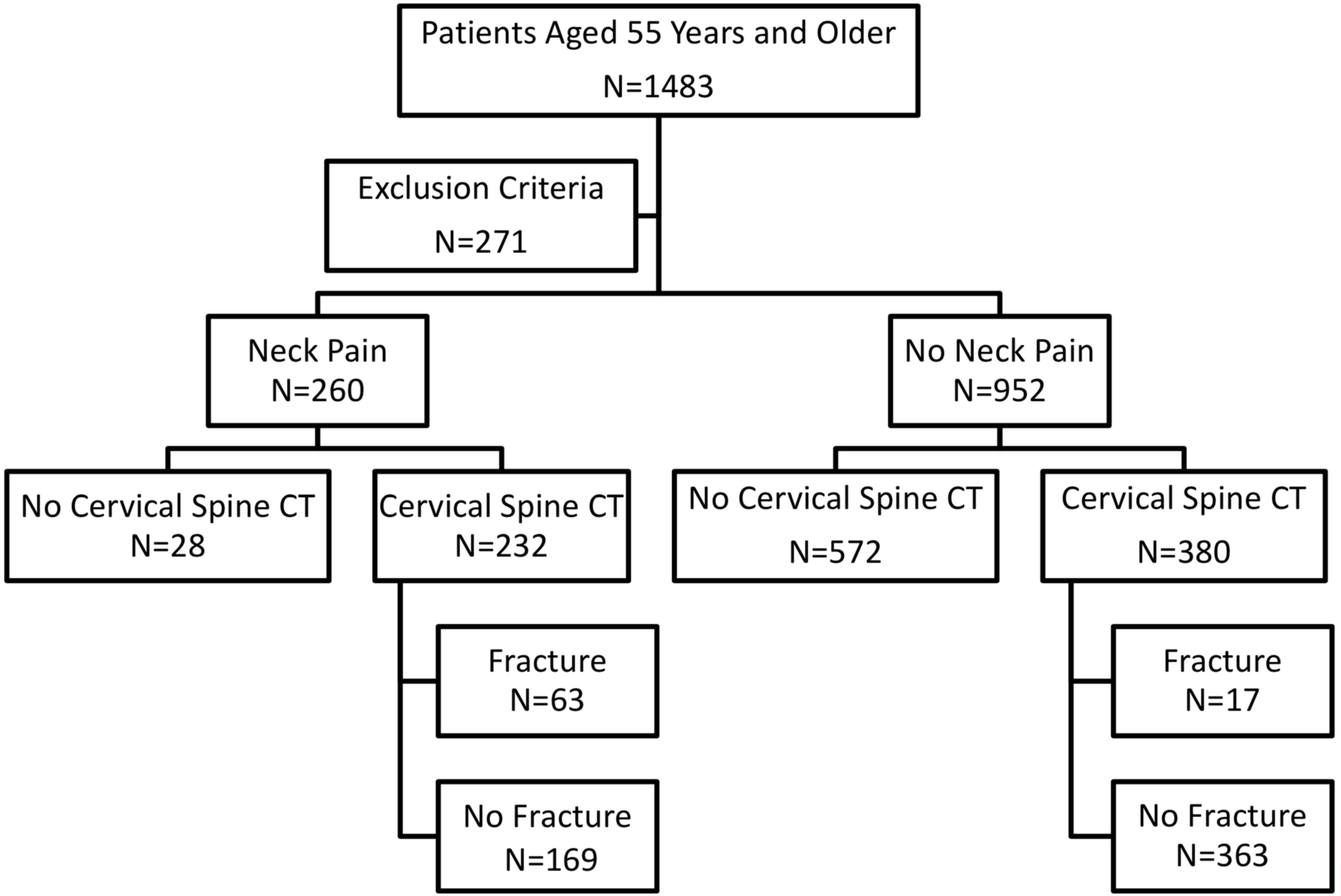

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Data Analysis

All analyses were performed with IBM SPSS Basic Statistics for Windows, version 20.0 (IBM Corp, 2011). Descriptive statistics were examined and reported for continuous data as medians and interquartile ranges; categorical data were reported as counts and percentages. All statistical tests were two-tailed and based on a 0.05 significance level. Because data were not normally distributed and sample sizes were unequal, differences between medians were assessed using the Kruskal-Wallis one-way analysis of variance. Differences between nominal variables were assessed using the chi-square test.

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