



Vertebral Arterial Injury in Patients with Isolated Transverse Process Fractures

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Introduction

Our institution has routinely obtained CT angiograms on all trauma patients presenting with cervical spine fractures. We sought to assess the rate of vertebral artery injury in patients with isolated transverse process fractures, with and without extension into the transverse foramen.

Methods

The University of Oklahoma Medical Center Trauma Registry was queried from dates January 2009 to July 2014 for ICD-9 codes pertaining to cervical spine fractures. Out of these 345 patients, 45 had fractures limited to the transverse process and were selected for the study population.

Example of CTA-diagnosed vertebral injury



Occlusion of right vertebral artery with reconstitution superior to transverse foramen of C7

Results

A total of 69 fractures were identified in 45 patients. Fifteen patients (33%) had transverse process fractures (TPFs) at multiple cervical levels. Twenty-eight patients (62%) had C7 fractures, and 14 patients (31%) had C6 fractures. Twenty-two patients had no fractures extending into transverse foramen (TF), and 23 patients had at least one fracture extending into TF.

On CT angiogram (CTA), one patient without and four patients with TPFs extending into TF were diagnosed with vertebral artery injuries (VAIs; **4.5 % vs. 17.4%, p = 0.35**). None of 17 patients with isolated C7-level TPFs was diagnosed with VAI (**C7 only vs. all others, 0% vs. 18%, p = 0.14**). None of the 30 patients with one-level TPFs (with or without extension into TF) was diagnosed with VAI, which was statistically significant (**0% vs. 33%, p = 0.003**).

Conclusions

In this series, patients with multiple-level TPFs were more likely than single-level TPFs to have VAIs. Routine CTA may be unnecessary in patients with one-level cervical spine TPF.

Learning Objectives

By the conclusion of the session, participants should be able to: 1) Name the incidence of vertebral artery injuries in patients with cervical spine isolated transverse process fractures with and without extension into the transverse foramen, 2) Cite the difference in injury rates for single level and multiple level fractures.

Factors associated with VAIs

Characteristic	VAI	No VAI	p-value ¹
Number	5	40	
Age			
Mean ± SD	48.8 ± 27.2	46.2 ± 16.4	0.76
Range	21 - 88	19 - 74	
Fractures			
Mean ± SD	3.0	1.4	<0.001²
Range	2 - 4	1 - 4	
1 fracture	0	30	0.002
>1 fracture	5	10	
Fractures into TF			
Mean ± SD	2.0	0.63	0.01²
Range	0 - 4	0 - 4	
0	1	21	0.35
1+	4	19	

¹ Values in bold are statistically significant

² Mann Whitney U test

Results of univariate analysis