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Cervical Spine Imaging in Patients with Non-Traumatic Angiogram-Negative Subarachnoid Hemorrhage: A Retrospective Case Series

Rui Feng MS; Alexander G Chartrain BS; Travis Ladner MD; Alexandra Miner; Justin Robert Mascitelli MD; Christopher P. Kellner MD

[Department of Neurosurgery, Icahn School of Medicine at Mount Sinai, New York, NY, USA]

Mount Sinai

Introduction

In up to 11% of patients who present with subarachnoid hemorrhage (SAH), the origin of the bleed cannot be identified. Cervical spine vascular malformations are known causes of SAH and have been published in several case reports. However, large cohort studies have not found a clear diagnostic benefit in performing cervical spine imaging. There is no clear guideline indicating whether or not cervical spine imaging should be routinely done in these patients. We conducted this retrospective analysis to investigate the diagnostic yield of obtaining cervical spine imaging in patients with digital subtraction angiography (DSA) negative SAH.

Methods

All patients who were admitted to the Mount Sinai Hospital (MSH) for SAH between January 2011 and August 2016 were reviewed. Patients with traumatic etiology were excluded from the study. Patients who had negative findings on initial diagnostic DSA and subsequent cervical spine imaging were identified. The cervical spine imaging results were then analyzed to determine diagnostic yield.

Results

251 patients were admitted to MSH for SAH over a 5 year period. Forty (16%) had negative findings on initial diagnostic DSA. Twenty-five patients (63%) underwent a second DSA, with none showing positive findings. Fifteen patients (38%) underwent cervical spine magnetic resonance imaging (MRI), and none of them demonstrated positive findings. None of these patients had readmissions due to rebleeding. Compared with SAH DSA-positive patients, DSA-negative patients had lower mean Hunt-Hess grade (2.0 versus 2.8, p<0.00001) and lower modified Fisher score (2.2 versus 3, p<0.001), and higher Glasgow Outcome Score at hospital discharge (4.2 versus 3.1, p<0.00001).

DSA-Negative Patients	
Gender	26 Male (65%)
	14 Female (35%)
Average Age	53.5 years
2nd DSA	25 patients (63%)
Perimensencephalic	20 patients (50%)

Table 1. Characteristics of the DSA-negative patient group analyzed including, gender distribution, average age, number of patients that received a second DSA, and number of patients with perimesenphalic SAH.

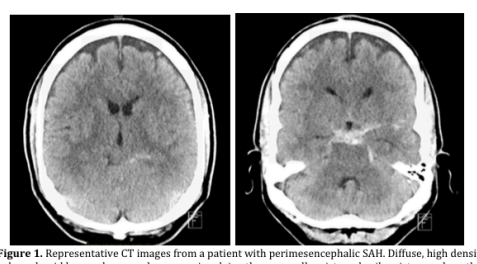

Figure 1. Representative CT images from a patient with perimesencephalic SAH. Diffuse, high density subarachnoid hemorrhage can been seen involving the supresellar cistern, basilar cisterns, along the left sylvian fissure, and with asymmetrically more pronounced left-sided prepontine SAH.

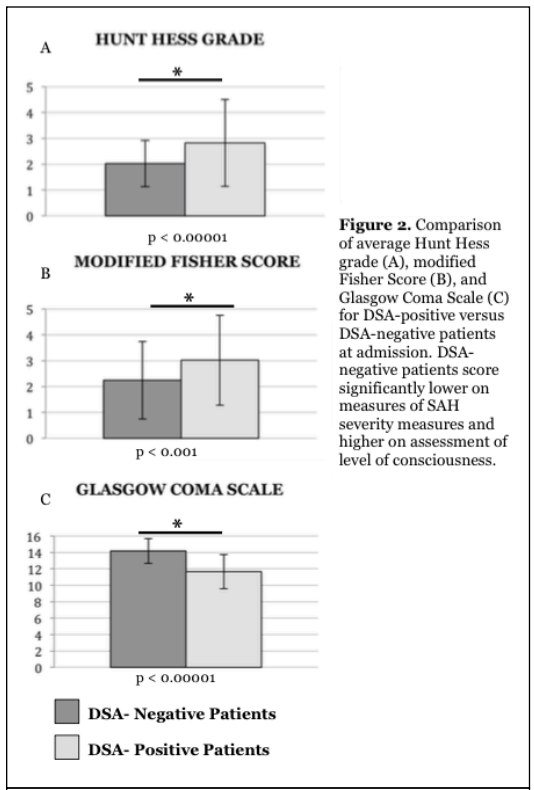

Figure 2. Comparison of average Hunt Hess grade (A), modified Fisher Score (B), and Glasgow Coma Scale (C) for DSA-positive versus DSA-negative patients at admission. DSA-negative patients score significantly lower on measures of SAH severity measures and higher on assessment of level of consciousness.

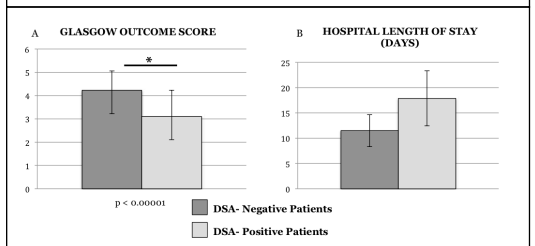

Figure 3. Comparison of average Glasgow Outcome Score (A), and length of hospital stay (B), and modified Fisher Score (C) for DSA-positive versus DSA-negative patients. DSA-negative patients showed shorter time hospitalized and showed significantly higher outcome scores.

Conclusions

Although cervical spine vascular malformations can cause SAH, it is overall exceedingly rare. The diagnostic yield of MRI cervical spine appears to be low, but our numbers are too small to make definitive conclusions. Further study is warranted to replicate and validate our findings.

Learning Objectives

By the conclusion of this session, participants should be able to discuss why cervical spine MRI should not be ordered in these patients.

References

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