

A New Scoring System for Predicting Underlying Vascular Pathology in Non-traumatic Intracerebral Hemorrhage. The Modified SICH Score

Ashley L Barks MD; Murad Alquadi; Junaid Sandozi; Xinjian Du MD MPH; Fady T. Charbel MD; Reza Dashti

Introduction

The secondary intracerebral hemorrhage (SICH) score was developed to predict the risk of vascular pathology in patients with non-traumatic intracranial hemorrhage (ICH). However, the clinical utility is limited as relatively few patients receive the lowest risk score. Our aim was to develop a scoring system to better identify these low risk patients and potentially mitigate complications associated with different neurovascular imaging modalities in the low risk subgroup.

Methods

We performed a retrospective review of 994 adult patients admitted with non-traumatic ICH over 7 years. Exclusion criteria included known underlying pathology, subarachnoid hemorrhage within the basilar cisterns and no neurovascular imaging. A regression model identified independent predictors of vascular pathology and was used to develop a modified scoring system. The modified SICH (mSICH) score was then applied to the cohort and ROC analysis was used to calculate the AUC and MOP of the new scoring system.

Results

Of 577 patients included, 75 had an underlying vascular lesion (13%). Within this cohort, the SICH score yielded a similar predictive value as previous studies. Predictors of vascular pathology included age, female gender, absence of hypertension and coagulopathy, low risk location, volume over 30mL, high risk imaging features and proximity to large vessel containing cisterns. The mSICH score correlated with increasing incidence of vascular pathology [0-1 (0%), 2 (5.8%), 3 (8.3%), 4 (31.8%), 5 (51.7%), 6 (90%), 7-8 (100%)]. When compared to SICH, the mSICH score had significantly more patients allocated to the 0% risk groups [125 (21.7%) vs 11 (1.9%); p < 0.001].

Conclusions

In patients with ICH, the mSICH score may predict the risk of underlying vascular pathology. This may be a useful tool when assessing the need for neurovascular imaging, and may reduce the associated risk of complications in the subgroup of low risk patients.

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Describe the importance of stratifying risk of vascular pathology in intracranial hemorrhages.
- 2) Discuss in small groups risk factors for vascular pathology in intracranial hemorrhage and the potential complications of obtaining neurovascular imaging
- 3) Identify an effective assessment strategy to identify patients at highest risk of harboring an underlying vascular etiology of intracranial hemorrhage

References

Delgado Almandoz JE, Schaefer PW, Goldstein JN, Rosand J, Lev MH, González RG, Romero JM. "Practical scoring system for the identification of patients with intracerebral hemorrhage at highest risk of harboring an underlying vascular etiology: the Secondary Intracerebral Hemorrhage Score." Am J Neuroradiol. 2010 Oct;31(9):1653-60.

Delgado Almandoz JE, Jagadeesan BD, Moran CJ, Cross DT 3rd, Zipfel GJ, Lee JM, Romero JM, Derdeyn CP. "Independent validation of the secondary intracerebral hemorrhage score with catheter angiography and findings of emergent hematoma evacuation." Neurosurgery. 2012 Jan;70(1):131-40.

Van Asch CJ, Velthuis BK, Greving JP, Van Laar PJ, Rinkel GJ, Algra A, Klijn CJ. "External validation of the secondary intracerebral hemorrhage score in The Netherlands." Stroke. 2013 Oct;44(10):2904-6.