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A scoring system for the identification of the ruptured aneurysm in patients with aneurysmal subarachnoid hemorrhage and multiple intracranial aneurysms.

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Introduction: Identifying the ruptured aneurysm in patients with SAH and multiple potential bleeding sources at the time of SAH ictus can be challenging. We therefore developed a statistical model for the prediction of the ruptured aneurysm according to basic radiological features of the aneurysm.

Materials & Methods: Between 2012-2015, 424 patients harboring 791 aneurysms were admitted to the authors institution. Patients were followed prospectively, and aneurysm and patient characteristics, as well as radiological findings were entered in a computerized database. Gradient boosting techniques were used to derive the statistical model for the prediction of the ruptured aneurysm. Based on the statistical prediction model, a scoring system was produced for the use in the clinical setting. The aneurysm with the highest score poses the highest possibility of being the bleeding. The prediction score was then prospectively applied on 30 patients suffering from SAH and harboring MIAs.

Results: The main factors affecting the aneurysm rupture in patients harboring multiple aneurysms according to the statistical analysis were size, location and shape (regular / irregular) of the aneurysm. In the prospective validation of the prediction score the ruptured aneurysm was correctly predicted in all of the cases. Only one case remained unclear.

Conclusion: This new and simple prediction score might provide support for neurovascular teams for treatment decision in SAH patients harboring multiple aneurysms. However, larger cohorts for prospective evaluation are warranted.