

# Spontaneous Non-aneurysmal subarachnoid hemorrhage

Recent data showed increasing numbers of cases of spontaneous nonaneurysmal [subarachnoid hemorrhage](#).

Spontaneous Subarachnoid Hemorrhage with Negative [Angiography](#) can be determined in 14-22 %.

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[Intracranial arteriovenous malformation](#) (AVM): 45% of cases (AVMs more commonly cause ICH & IVH than SAH)

Certain vasculitides that involve the CNS

Rarely due to tumor

Cerebral artery dissection (may also be posttraumatic)

Rupture of a small superficial artery

Rupture of an infundibulum

Coagulation disorders:

Iatrogenic or bleeding dyscrasias:

Thrombocytopenia

Dural sinus thrombosis

Spinal AVM: usually cervical or upper thoracic

Pretruncal nonaneurysmal SAH

[Perimesencephalic nonaneurysmal subarachnoid hemorrhage](#)

Rarely reported with some drugs: e.g. cocaine

Sickle cell anemia

Pituitary apoplexy

## Outcome

The studies show a low complication rate for subarachnoid hemorrhage (SAH) patients with a normal angiography, especially in the [perimesencephalic subarachnoid hemorrhage](#) group. The prognosis appears to be less favorable in terms of a more frequent need for external ventricular drainage (EVD), so a more cautious approach is recommended in this subgroup <sup>1)</sup>.

## Case series

### 2015

Between 1999 and 2013, 214 patients suffered from [nonaneurysmal subarachnoid hemorrhage](#) (NASAH), 14% of all patients with SAH. Outcome was assessed according to the [modified Rankin Scale](#) (mRS) at 6 months. Risk factors were identified based on the outcome.

The number of patients with NASAH increased significantly in the last 15 years of the study period. There was a statistically significant increase in the rate of nonperimesencephalic (NPM)-SAH occurrence and [antiplatelet](#) agents use, while the proportion of elderly patients remained stable.

Favorable outcome (mRS 0-2) was achieved in 85% of cases, but patients treated with antiplatelet agents had a significantly higher risk for an unfavorable outcome. Further analysis showed that elderly patients, and especially the subgroup with a [Fisher Scale](#) 3 bleeding pattern, had a high risk for an unfavorable outcome, whereas the subgroup of NPM-SAH without a Fisher Grade 3 bleeding pattern had a favorable outcome, similar to [perimesencephalic subarachnoid hemorrhage](#) (PM)-SAH.

Over the years, a significant increase in the number of patients with NASAH has been observed. Also, the rate of aCP use has increased significantly. Risk factors for an unfavorable outcome were age > 65 years, Fisher Grade 3 bleeding pattern, and aCP use. Both "PM-SAH" and "NPM-SAH without a Fisher Grade 3 bleeding pattern" had excellent outcomes. Patients with NASAH and a Fisher Grade 3 bleeding pattern had a significantly higher risk for an unfavorable outcome and death. Therefore, for further investigations, NPM-SAH should be stratified into patients with or without a Fisher Grade 3 bleeding pattern. Also, cases of spontaneous SAH should be stratified into NASAH and aneurysmal SAH <sup>2)</sup>.

### 2014

From 1999 to 2009, data of 125 patients with non-aneurysmal SAH were prospectively entered into a database. All patients underwent repetitive cerebral angiography. Outcome was assessed according to the [modified Rankin Scale](#) (mRS) (mRS 0-2 favorable vs. 3-6 unfavorable). Also, patients were divided in two groups according to the distribution of blood in the [CT scan](#) (perimesencephalic and non-perimesencephalic SAH).

106 of the 125 patients were in good WFNS grade (I-III) at admission (85%). Overall, favorable outcome was achieved in 104 of 125 patients (83%). Favorable outcome was associated with younger age ( $P < 0.001$ ), good admission status ( $P < 0.0001$ ), and absence of hydrocephalus ( $P = 0.001$ ). 73 of the 125 patients suffered from perimesencephalic SAH, most patients (90%) were in good grade at admission, and 64 achieved favorable outcome. 52 of the 125 patients suffered from non-perimesencephalic SAH and 40 were in good grade at admission. Also 40 patients achieved favorable outcome.

Patients suffering from non-aneurysmal SAH have better prognosis compared to aneurysm related SAH and poor admission status was the only independent predictor of unfavorable outcome in the multivariate analysis. Patients with a non-perimesencephalic SAH have an increased risk of a worse neurological outcome. These patients should be monitored attentively <sup>3)</sup>.

Non perimesencephalic subarachnoid hemorrhage.

[Non-aneurysmal perimesencephalic subarachnoid hemorrhage](#).

[Traumatic subarachnoid hemorrhage](#), the most common cause of SAH.

## Outcome

see [Non aneurysmal subarachnoid hemorrhage outcome](#).

## Case series

From 2006 to 2017, 154 patients suffering from non-aneurysmal SAH were admitted to the Department of Neurosurgery, Rheinische Friedrich-Wilhelms-University [Bonn, Germany](#).

Patients were stratified according to the distribution of cisternal blood into patients with [perimesencephalic subarachnoid hemorrhage](#) (pSAH) versus non-perimesencephalic SAH (npSAH). [C reactive protein](#) (CRP) and [white blood cells](#) (WBC) assessments were performed within 24 h of [admission](#) as part of routine laboratory workup. [Outcome](#) was assessed according to the [modified Rankin Scale](#) (mRS) after 6 months and stratified into favorable (mRS 0-2) vs. unfavorable (mRS 3-6).

The multivariate regression analysis revealed "CRP > 5 mg/l" ( $p = 0.004$ , OR 143.7), "WBC count > 12.1 G/l" ( $p = 0.006$ , OR 47.8), "presence of IVH" ( $p = 0.02$ , OR 13.5), "poor-grade SAH" ( $p = 0.01$ , OR 45.2) and "presence of CVS" ( $p = 0.003$ , OR 149.9) as independently associated with unfavorable outcome in patients with non-aneurysmal SAH.

Elevated C-reactive protein and WBC count at admission were associated with unfavorable outcome after non-aneurysmal SAH <sup>4)</sup>.

1)

Canneti B, Mosqueira AJ, Nombela F, Gilo F, Vivancos J. Spontaneous Subarachnoid Hemorrhage with Negative Angiography Managed in a Stroke Unit: Clinical and Prognostic Characteristics. J Stroke Cerebrovasc Dis. 2015 Nov;24(11):2484-90. doi: 10.1016/j.jstrokecerebrovasdis.2015.06.011. Epub 2015 Sep 12. PubMed PMID: 26375795.

2)

Konczalla J, Platz J, Schuss P, Vatter H, Seifert V, Güresir E. Non-aneurysmal non-traumatic subarachnoid hemorrhage: patient characteristics, clinical outcome and prognostic factors based on a single-center experience in 125 patients. BMC Neurol. 2014 Jul 1;14(1):140. doi: 10.1186/1471-2377-14-140. PubMed PMID: 24986457; PubMed Central PMCID: PMC4088361.

3)

Konczalla J, Platz J, Schuss P, Vatter H, Seifert V, Güresir E. Non-aneurysmal non-traumatic subarachnoid hemorrhage: patient characteristics, clinical outcome and prognostic factors based on a single-center experience in 125 patients. BMC Neurol. 2014 Jul 1;14:140. doi: 10.1186/1471-2377-14-140. PubMed PMID: 24986457; PubMed Central PMCID: PMC4088361.

4)

Schuss P, Hadjiathanasiou A, Brandecker S, Güresir Á, Vatter H, Güresir E. Elevated C-reactive protein and white blood cell count at admission predict functional outcome after non-aneurysmal

subarachnoid hemorrhage. J Neurol. 2018 Oct 13. doi: 10.1007/s00415-018-9091-5. [Epub ahead of print] PubMed PMID: 30317466.

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