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Subarachnoid Hemorrhage

# Nonaneurysmal nonperimesencephalic subarachnoid hemorrhage: is it a benign entity?

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**Abstract**

**Background:** Although the clinical profile of patients with PMN SAH is well documented, there are scarce data available for patients with nonaneurysmal n-PMN SAH. In the present study, the clinical characteristics of patients with n-PMN SAH were analyzed and compared with those of PMN SAH and aneurysmal SAH.

**Methods:** Patients with spontaneous SAH, in whom the initial DSA or 3-dimensional CTA result was normal, underwent another investigation (CTA/DSA). If the results of both of these were negative, a second\ DSA was done after 4 to 6 weeks. Patients in whom even the second DSA failed to reveal an aneurysm or any other vascular abnormality were labeled as nonaneurysmal SAH. Within this group, 2 different types were identified: PMN SAH and n-PMN SAH.

**Results:** There were 61 patients in whom the results of the first DSA and CTA were both negative. In 2 of these patients, an aneurysm was demonstrated at a second DSA. Seven patients died before a second DSA could be done. After excluding these, there were 18 patients with PMN SAH and 34 with n-PMN SAH. There was no mortality in these patients; and at a mean follow-up of 1.8 years, all patients with PMN SAH and 94.1% of patients with n-PMN SAH had a good outcome. Associated comorbid illnesses were more frequent in patients with PMN SAH and n-PMN SAH as compared with the aneurysmal SAH patients.

**Conclusions:** Once an aneurysm is definitely excluded, patients with n-PMN SAH have a good outcome, and like PMN SAH, have a benign clinical course. However, a second DSA is mandatory to avoid missing an aneurysm or any other vascular lesion.



*Keywords:* Subarachnoid hemorrhage; Negative angiography; Nonperimesencephalic hemorrhage; Perimesencephalic hemorrhage

## 1. Introduction

In about 15% of patients with spontaneous SAH, no vascular abnormality is demonstrated on a DSA [3,9,12,16,21,23]. About 21% to 68% of these patients are known to have perimesencephalic hemorrhage [11], wherein the blood is confined to the cisterns around the midbrain and the center of bleeding is immediately anterior to the midbrain [25]. The clinical course of patients with perimesencephalic hemorrhage is much better than that of patients with aneurysmal SAH; and therefore, this entity has been labeled as benign SAH [18,19,25]. There are, however, a significant percentage of patients within this nonaneurysmal spontaneous SAH group where the pattern of blood on CT scan is not perimesencephalic. There is abundant literature available on PMN SAH. However, the incidence, clinical course, and outcome of patients with nonaneurysmal n-PMN SAH are not well described. In the

*Abbreviations:* COPD, chronic obstructive pulmonary disease; CTA, computed tomographic angiogram; DSA, digital subtraction angiography; GOS, Glasgow outcome score; H&H, Hunt and Hess; MCA, middle cerebral artery; n-PMN SAH, nonperimesencephalic subarachnoid hemorrhage; PMN SAH, perimesencephalic subarachnoid hemorrhage; SAH, subarachnoid hemorrhage.

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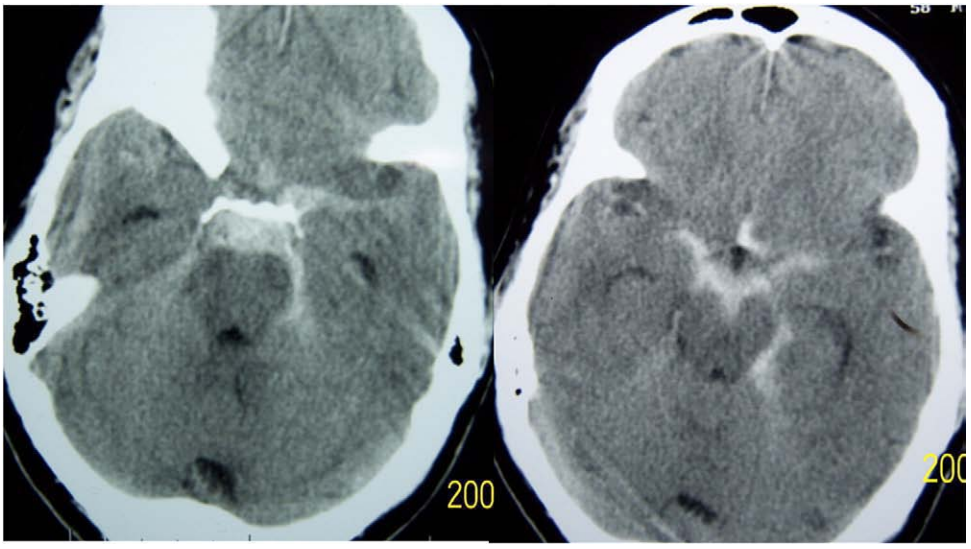


Fig. 1. Computed tomographic scans of 2 patients with PMN SAH.

present study, all patients with spontaneous SAH in whom no vascular abnormality could be identified were studied; and the differences between the PMN SAH and n-PMN SAH were analyzed.

## 2. Material and methods

A prospective study was done on patients of spontaneous SAH admitted to the department of neurosurgery during a 15-month period (March 2005-July 2006). In all patients, a CT scan was done to demonstrate the subarachnoid blood. Patients with a radiological and/or clinical diagnosis of SAH underwent a DSA and/or a 3-dimensional CTA. Patients in whom an aneurysm was demonstrated underwent either clipping or coiling of the aneurysm. Patients in whom the initial investigation (DSA/CTA) did not demonstrate an aneurysm were subjected to another investigation (CTA/DSA). If both these failed to demonstrate any aneurysm or any other cause of SAH, these patients were managed conservatively as per standard SAH protocol, which included adequate hydration, anticonvulsants, steroids, and calcium channel blockers (nimodipine). Coagulation studies were performed in all patients. The demographic profile and clinical details of all patients including their clinical status at arrival, CT scan findings, neurologic deficits, course in the hospital, and status at discharge were recorded. Patients in

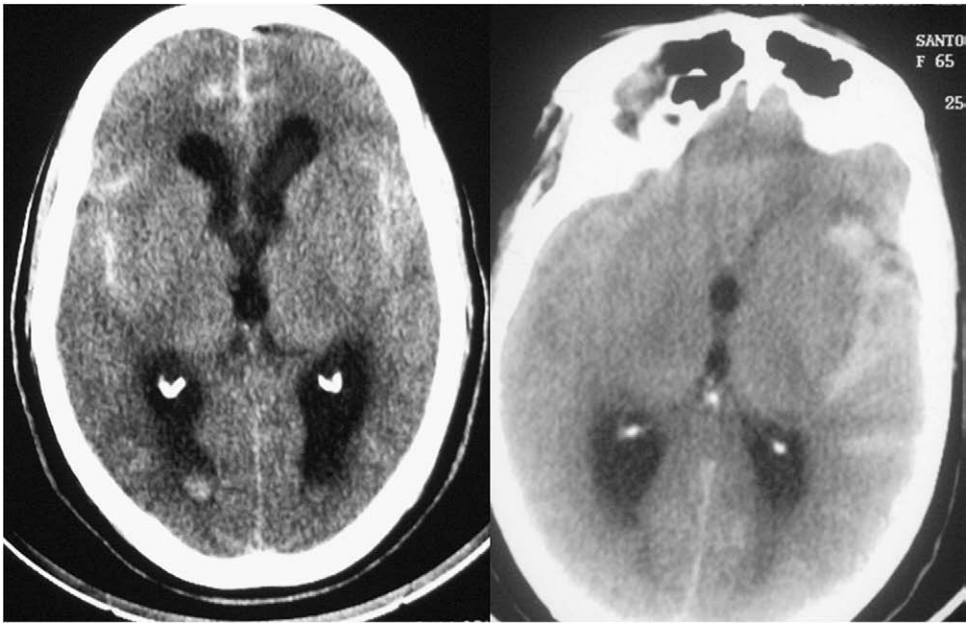


Fig. 2. Computed tomographic scans showing the pattern of SAH in patients with n-PMN SAH.