Research Article ISSN 2639-846X

Anesthesia & Pain Research

Subarachnoid Hemorrhage in Intensive Care Unit

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Received: 14 Aug 2026; **Accepted:** 20 Sep 2026; **Published:** 01 Oct 2026

Citation: Daddy H, Gagara M, Sanoussi M, et al. Subarachnoid Hemorrhage in Intensive Care Unit. Anesth Pain Res. 2026; 10(2): 1-4.

ABSTRACT

Objective: *To assess the management of patients with subarachnoid hemorrhage in the intensive care unit of the National Hospital of Niamey (Niger).*

Methods: *This cross-sectional, analytical study, with retrospective and prospective data collection, was conducted in the intensive care unit of the National Hospital of Niamey from April 1, 2020 to May 31, 2024. All patients diagnosed with subarachnoid hemorrhage, whether traumatic or non-traumatic, were included. The variables studied were epidemiological, diagnostic, therapeutic, and prognostic factors. Data were entered and analyzed using Microsoft 2016 and Sphinx v5 software. The chi-square test was used to compare qualitative variables, with a significance threshold of 5%.*

Results: *The study included 43 patients out of 1373 patients admitted to the intensive care unit, representing a frequency of 3.13%. Males predominated at 74.41% (n=32), with a sex ratio of 2.91. The mean age was 36.47±3.26 years, with ages ranging from 17 months to 90 years. The time to admission was less than 6 hours for 20 patients (46.51%). In this series, 26 patients (60.46%) came from the emergency department, and 21 patients (48.83%) were admitted in a setting of polytrauma. The mean Glasgow Coma Scale score was 8±3, with scores ranging from 3 to 14. Twenty-six patients (60.46%) had a Glasgow Coma Scale score ≤8 on admission, and 28 patients (65.11%) were classified as grade IV according to the WFNS score. All patients underwent brain CT, and 48.83% (n=21) had a Fisher score of 2. Cerebral CT angiography was performed in 4 patients (9.30%). The cause of bleeding was identified in 86.04% (n=37). Trauma was the cause in 69.76% (n=30). The mortality rate was 65.12% (n=28). The median length of stay in intensive care unit was 5 days, ranging from 6 hours to 91 days.*

Conclusion: *Subarachnoid hemorrhage remains a serious condition. It is a real diagnostic and therapeutic emergency requiring multidisciplinary management. Prognosis depends on how quickly care is provided and on the extent of bleeding.*

Keywords

Subarachnoid hemorrhage, Intensive care, National Hospital of Niamey, Niger.

Introduction

Subarachnoid hemorrhage (SAH), is defined by the presence of arterial blood in the subarachnoid space. In addition to ruptured aneurysms and arteriovenous malformations causing spontaneous SAH, head trauma can also cause SAH, usually of moderate severity. Its incidence ranges from 4.5 to 28 per 100,000, depending on the country, with relatively young patients (mean age 50 years) and a higher proportion of women (about 60%). Management of subarachnoid hemorrhage has two main objectives: treating the consequences and treating the cause. In some cases, surgery is necessary in addition to intensive. Surgery, which has undergone major advances, is indicated in cases of vascular malformation; however, according to the literature, interventional radiology has revolutionized the management of SAH [1-5].

Methods

This was a cross-sectional, analytical study with retrospective and prospective data collection, involving patients who stayed

in the intensive care unit of the National Hospital of Niamey (HNN) for subarachnoid hemorrhage of any cause, from April 1, 2020 to May 31, 2024, i.e. 4 years. All patients diagnosed with subarachnoid hemorrhage, whether traumatic or non-traumatic, were included. The variables studied were: age, sex, marital status, personal medical history, time to admission, reason for admission to intensive care, Glasgow Coma Scale score on admission, physical examination findings, WFNS score (World Federation of Neurosurgical Societies), brain imaging findings, Fisher score, etiological diagnosis, treatment, and outcome. Data were entered and analyzed using Microsoft 2016 and Sphinx v5 software. Chi-square tests were used to compare variables and were interpreted using a significance threshold of 5%; 95% confidence intervals were calculated.

Results

The series consisted of 43 patients out of 1373 patients admitted to the HNN intensive care unit over the 4-year period, representing a frequency of 3.13%. Males predominated at 74.41% (n=32), with a sex ratio of 2.91. The mean patient age was 36.47±3.26 years, with ages ranging from 17 months to 90 years. The 20–40-year age group was the most represented, with 34.88% (n=15), and 25.58% (n=11) of patients had a personal medical history. Hypertension was the most frequently reported condition, at 23.25% (n=10) (Tables 1 and 2). In addition to hypertension, smoking and obesity were the most frequently identified cardiovascular risk factors, each accounting for 13.85% of cases (n=6). Other cardiovascular risk factors were alcohol use, 6.97% (n=3), substance use and hormonal contraception, 9.30% (n=4) each. The mean time to admission was 44.03 hours, ranging from 30 minutes to 10 days. Patients were admitted within less than 6 hours in 46.51% of cases (n=20). On admission, the mean Glasgow Coma Scale score was 8±3, with scores ranging from 3 to 14; 60.46% of patients (n=26) had a Glasgow Coma Scale score ≤8 (Table 3). Patients were admitted following trauma in 69.76% of cases (n=30), and therefore had traumatic SAH. Among these trauma patients, 48.83% (n=21) had other injuries associated with the head trauma. SAH was spontaneous in 30.23% (n=13), and cerebral CT angiography was performed in 20.93% (n=9) (Table 4). On neurological examination, neck stiffness, anisocoria, and hemiplegia were the most frequently observed signs (Table 5).

Table 1: Distribution according to the type of personal medical history.

	Values (n=43)	
Personal medical history	**Yes**	**No**
Hypertension	10 (23.25%)	33 (76.74%)
Diabetes	2 (4.65%)	41 (95.34%)
Head trauma	1 (2.32%)	42 (97.67%)

Table 2: Distribution of patients according to age group.

Age group	Number	Percentage (%)
[0-20]	8	18.60
[20-40]	15	34.88
[40-60]	13	30.23
≥60	7	16.27
Total	**43**	**100**

Table 3: Distribution of patients according to Glasgow Coma Scale (GCS) on admission.

GCS	Number	Percentage (%)
≤8	26	63.41
9-13	14	34.15
14-15	1	2.44
Undetermined	2	4.65
Total	**43**	**100**

Table 4: Distribution of patients according to the etiology of SAH.

Etiology	Number	Percentage (%)
Head trauma	30	69.76
Aneurysm rupture	7	16.27
AVM	1	2.32
Idiopathic	1	2.32

Table 5: Distribution of patients according to neurological clinical signs on admission.

Neurological clinical signs	Number	Percentage (%)
Pupils		
Bilateral mydriasis	5	11.62
Bilateral miosis	4	9.30
Anisocoria	12	27.30
Normal	9	20.93
Motor deficit		
Hemiplegia	11	27.58
Hemiparesis	1	2.32
Meningeal syndrome		
Neck stiffness	41	95.34
Kernig	36	83.72
Brudzinski	36	83.72
Vomiting	20	46.51
Headache	11	25.58
Seizure	1	2.32

Table 6: Distribution of patients according to WFNS score.

WFNS grade	Number	Percentage (%)
Grade I	0	0.00
Grade II	4	9.30
Grade III	3	6.97
Grade IV	28	65.11
Grade V	6	13.95
Total	**43**	**100**

The WFNS score was documented in 95.34% (n=41) of patients, and 65.11% (n=28) were classified as grade IV (Table 6). All patients underwent brain CT; 48.83% (n=21) had a Fisher score of 2 and 25.58% (n=11) had a Fisher score of 3 (Figure 1). Surgical management was provided for 46.51% (n=20) of patients.

All patients received oxygen therapy, fluid and electrolyte replacement, and analgesic treatment. For airway control, 23.25% (n=10) were intubated with sedation and ventilatory support. Arterial antispasmodic treatment was administered to 39.53% (n=17).

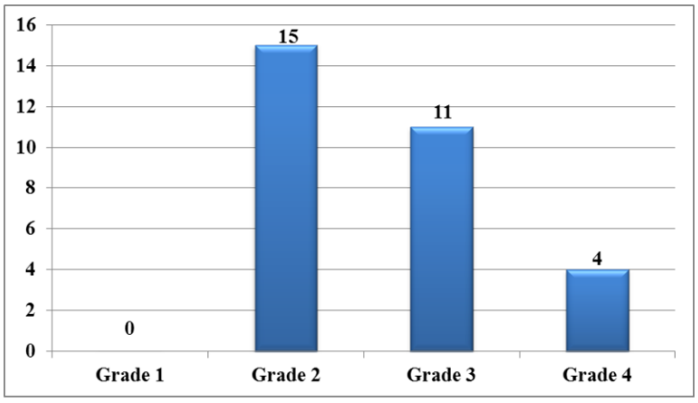


Figure 1: Distribution of patients according to Fisher score.

The mortality rate was 65.11% (n=28). The median length of stay in intensive care was 5 days, ranging from 6 hours to 91 days.

Bivariate analysis showed more deaths among patients with WFNS grade 4, with a statistically significant correlation (p=0.05), as well as more deaths among patients with Fisher grade 3, also with a statistically significant correlation (p=0.05).

Discussion

During the study period, 43 patients were included out of 1373 hospitalized patients, representing a frequency of 3.13%. The mean age was 36.47±3.26 years, with ages ranging from 17 months to 90 years. The 20–40-year and 40–60-year age groups were the most represented, with frequencies of 34.88% and 30.23%, respectively. We observed a clear male predominance, with 74.41% (n=32) men and a sex ratio of 2.91. A 2018 study on subarachnoid hemorrhage in the neurosurgery department of the same hospital reported almost similar results, with a young mean patient age of 34.2 years, a predominance of the 20–40-year age group, and male predominance with a sex ratio of 2.1. In contrast, our results differ from those reported by a study conducted in Japan in 2023, where the mean patient age was 62.1 ± 15.4 years and women predominated, accounting for 60.9% [6,7].

Hypertension and smoking were the most frequently identified cardiovascular risk factors in our series, at 23.25% and 13.95%, respectively. Several authors have reported hypertension and smoking as the most frequently observed cardiovascular risk factors [6,8].

The patients were in a critical condition: 60.46% (n=26) had a Glasgow Coma Scale score ≤8 on admission, and the mean Glasgow Coma Scale score was 8±3, with scores ranging from 3 to 14. Among these patients, 65.11% (n=28) were classified as WFNS grade IV, 48.83% (n=21) had a Fisher score of 2, and 25.58% (n=11) had a Fisher score of 3. These results are close to those reported by Faprazafindraibe F, who found that 55% (n=12) of patients had a WFNS score of IV and 64% had a Fisher score of 3 [8]. All patients underwent brain CT, and 9 patients (20.93%) underwent cerebral angiography. In our study, meningeal hemorrhage was most frequently caused by head trauma, accounting for 69.76%. These results differ from those of Sawa B, in whose study aneurysmal rupture was the most common cause of SAH, accounting for 46.67%, followed by head trauma at 36.67% [6]. The mortality rate was 65.12%. The mean length of stay in intensive care was 8.47 days, ranging from 6 hours to 91 days. A study conducted in the same hospital found different results, with a mortality rate of 23.33%. This could be explained by the fact that our patients were severely ill, with a high WFNS grade. Similarly, the higher the Fisher grade, the greater the risk of mortality and morbidity. According to the literature, the higher the WFNS grade, the worse the prognosis, with an increased risk of death or severe disability, even when aggressive intensive care protocols have been implemented. This correlation between WFNS grade, Fisher score, and risk of death is confirmed by our study. Another African author reported a similar mortality rate of 67% in an intensive care unit [9].

Conclusion

Subarachnoid hemorrhage remains a serious condition. It is a diagnostic and therapeutic emergency requiring multidisciplinary management. Prognosis depends on how quickly care is provided and on the extent of bleeding. Young adult males are the most affected. The most common cause is head trauma, followed by aneurysm rupture. Equipping our healthcare facilities with qualified human resources and appropriate equipment, and establishing interventional radiology services, will undoubtedly improve the prognosis of this condition.

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