



## UPDATES ABOUT THE USE OF SAFARI SCORE IN ASSESSING THE RISK OF SEIZURES DURING ADMISSION FOR ANEURYSMAL SUBARACHNOID HEMORRHAGE

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*Background:* Seizures appear at about 5–10% of patients admitted in hospital with subarachnoid hemorrhage from ruptured intracranial aneurysms. A number of grading systems based upon the initial neurologic examination and the appearance of blood on the initial head CT are used in practice to standardize the clinical classification of patients with SAH.

*Objective:* To demonstrate that SAFARI score is useful in evaluating patients with seizures after subarachnoid hemorrhage.

*Methods:* The SAFARI score is the first risk score specifically designed for patients with subarachnoid hemorrhage and includes 10 predictors: stroke location, persisting neurological deficit, stroke subtype, presence of vascular encephalopathy, early and late-onset seizures. It can be considered a stratifying tool usefully to decide which admitted patients with subarachnoid hemorrhage and seizures have to receive prophylactic anticonvulsants and permits medical team adopt a better cost-efficiency management and treatment.

*Results:* Jaja *et al.* published in 2018 an 852 patients study that aimed to develop and validate a score to support risk stratification for seizures after subarachnoid hemorrhage that can be considered a protocol of these cases.

*Conclusion:* The SAFARI score can be considered a good stratifying tool that can be used to decide the treatment protocol for patients with subarachnoid hemorrhage and seizures.

*Keywords:* subarachnoid hemorrhage, intracranial aneurysm, SAFARI score, seizure.

### INTRODUCTION

Patients with subarachnoid hemorrhage from ruptured intracranial aneurysms have poor survival rates and usually present a lot of complications such as seizure, vasospasm, motor disability and cognitive delay.

Seizures appear at about 5–10% of patients admitted in hospital with subarachnoid hemorrhage from ruptured intracranial aneurysms. In practice, many patients with subarachnoid hemorrhage receive antiepileptic drugs in the acute care period<sup>1,2</sup>. The recent data about this routine use of antiepileptic drugs associated functional and cognitive delays after subarachnoid hemorrhage.

The choice of the patients at risk and the antiepileptic drug match have been a challenge for the medical team. The most important difficulties appeared at these patients are the misinterpretation of the electroencephalogram due to the subjectivity of the technicians, the extra costs and personnel needed for managing these cases and the rigorous follow-up studies.

Currently, there are a number of grading systems used in practice to standardize the clinical classification of patients with subarachnoid hemorrhage. The grading systems are based upon the initial neurologic examination and the appearance of blood on the initial head CT. The most commonly used subarachnoid hemorrhage grading scales are the Hunt and Hess Scale or a slightly modified version and the Fisher Scale<sup>3</sup>.

	Hunt and Hess	Fisher	Modified Fisher Scale
<b>Grade 0</b>			No subarachnoid or intraventricular hemorrhage
<b>Grade I</b>	Asymptomatic or minimal headache and slight nuchal rigidity	No blood visualized	< 1 mm subarachnoid blood detected, no intraventricular hemorrhage
<b>Grade II</b>	Moderate to severe headache, nuchal rigidity, no neurologic deficit other than cranial nerve palsy	Diffuse blood that does not appear dense enough to represent a large, thick homogenous clot	< 1 mm subarachnoid blood detected and intraventricular hemorrhage
<b>Grade III</b>	Drowsiness, confusion or mild focal deficit	Dense collection of blood that appears to represent a clot > 1mm thick in the vertical plane or > 5x3 mm in longitudinal and transverse dimensions in the horizontal plane, severe spasm predicted	≥ 1 mm subarachnoid blood detected, no intraventricular hemorrhage
<b>Grade IV</b>	Stupor, moderate severe hemiparesis, possible early decerebrate rigidity and vegetative disturbances	Intracerebral or intraventricular clots, but with only diffuse blood or no blood in basal cisterns	≥ 1 mm subarachnoid blood detected and intraventricular hemorrhage
<b>Grade V</b>	Deep coma, decerebrate rigidity, moribund appearance		

Adapted after Ferro JM, Canhão P, Peralta R. Update on subarachnoid haemorrhage. *J Neurol*.2008; 255:465–479 and World Federation of Neurosurgical Societies.

These systems proposed until now measure the severity of initial neurological injury of the patient with subarachnoid hemorrhage in order to provide a prognostic outcome, to have treatment decisions and elaborate a guideline for these situations across medical centers around the world<sup>3</sup>.

The Hunt and Hess Scale was made to guide the surgeon's decision of operating patients with subarachnoid hemorrhage at a proper time and includes information about the intensity of meningeal inflammatory reaction, the severity of neurological deficit, the level of arousal and the presence of associated disease<sup>3</sup>.

The Fisher Scale was designed to predict cerebral vasospasm after subarachnoid hemorrhage. The scale evaluates the gravity of the situation based on the initial computed tomography scans that visualize the pattern of the blood<sup>3</sup>.

## MATERIAL

In 2018, Jaja *et al.* published an 852 patients study that aimed to develop and validate a score to support risk stratification for seizures after subarachnoid hemorrhage that can be considered a protocol of these cases<sup>1,5-6</sup>.

Jaja *et al.* used international trailistsrepositories and they validated patients with subarachnoid hemorrhage that received antiepileptic drugs during acute admission. They considered seizures

all the motor paroxistic events with or without loss of consciousness, focal or generalized. The candidate predictors used by Jaja *et al.* were identified after a long and structured research and included terms as: age, sex, history of hypertension, admission neurological status, aneurysm size, modified Fisher grade of subarachnoid hemorrhage thickness, intracerebral hemorrhage, hydrocephalus, location of the ruptured aneurysm and the occurrence of the onset seizures. All the data were statistical analyzed, validated and interpreted resulting in developing a SAFARI score point – The Seizure After Aneurysmal Subarachnoid Hemorrhage Risk<sup>1</sup>.

## DISCUSSION

The SAFARI score is the first risk score specifically designed for patients with subarachnoid hemorrhage and includes 10 predictors: stroke location, persisting neurological deficit, stroke subtype, presence of vascular encephalopathy, early and late- onset seizures<sup>1,8,9</sup>.

Jaja *et al.* also included in their study predictive values such as: age, hydrocephalus and aneurysm location. They considered the early onset seizures as physiological or cellular dysfunction due to hydrocephaly or rebleeding, and they associated it with younger age, clots, MCA and anterior communicating artery location of the aneurysm<sup>1,10-14</sup>.

The late-onset seizures have been attributed to the surgical manipulation of the tissue and were associated with onset seizures, hydrocephalus, bad neurological status, clot burden, MCA aneurysm and others. Considering the difference of mechanisms Jaja *et al.* explain why the SAFARI score cannot be generally suitable<sup>1,10-16</sup>. The study shows that SAFARI score can be considered a stratifying tool usefully to decide which admitted patients have to receive prophylactic anticonvulsants and permits medical team adopt a better cost-efficiency management and treatment<sup>1,17,18</sup>.

Jaja's study has also a number of limitations: it is a single center experience, the treatment modality is not included as a predictor, some observations were subjective being told by the patient's families, there were no data about the antiepileptic drugs- dosage, type, duration of treatment and does not assess the value for the nonconvulsive seizures. Despite all these problems we can say that the study has enough strength to be mentioned<sup>1</sup>.

## CONCLUSION

The SAFARI score can be considered a good stratifying tool that can be used to decide the treatment protocol for patients with subarachnoid hemorrhage and seizures and allows medical team adopt a better cost-efficiency management of patient.

**Abbreviations:** CT – computed tomography, SAH – subarachnoid hemorrhage, SAFARI – The Seizure After Aneurysmal Subarachnoid Hemorrhage Risk, MCA – middle cerebral artery.

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