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A Case of Quadrigeminal Variant of Perimesencephalic Nonaneurysmal Subarachnoid Hemorrhage

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Abstract

The incidence of perimesencephalic subarachnoid hemorrhage (PMSAH) is rare, 0.5 in 100,000 adults. It comprises 5 to 10% of all SAHs and approximately 33% of all nonaneurysmal SAH. Quadrigeminal SAH is a variant of perimesencephalic nonaneurysmal subarachnoid hemorrhage (PMNASAH) that is not well described in the literature. It may comprise up to one-fifth of PMNASAH cases and carries a similar benign prognosis. This variant of PMSAH is characterized by blood centered in the quadrigeminal cistern and limited to the superior vermian and posterior perimesencephalic cisterns. Noncontrast computed tomography of the brain is the initial investigation of choice, while four-vessel cerebral angiogram is the gold standard for the diagnosis of SAH.

We report a case at our institute.

Keywords

- cerebral angiography
- perimesencephalic
- subarachnoid hemorrhage
- quadrigeminal cistern
- nonaneurysmal SAH

Case Report

A 30-year-old female presented to emergency room with a history of severe sudden onset headache and fall followed by drowsiness at home. She was not able to recall incidents post-fall. No known comorbidities were found. On examination in emergency room, she had a Glasgow Coma Scale of 15. She had no focal neurological deficits or meningeal signs on examination. Her fundoscopy was normal. Routine bloods including full blood count, renal profile, coagulation screening, and cardiac enzymes were unremarkable. Her baseline chest X-ray and electrocardio-gram were also normal.

Noncontrast computed tomography (NCCT) scan done was suggestive of subarachnoid hemorrhage (SAH), seen in perimesencephalic space—quadrigeminal and ambient cistern (►**Fig. 1**).

Magnetic resonance imaging brain done showed T2 hypointensity in posterior perimesencephalic space (►**Fig. 2**).

Four-vessel cerebral digital subtraction angiography (DSA) done showed no aneurysm/arteriovenous fistula (►**Figs. 3** and **4**).

Diagnosis of perimesencephalic nonaneurysmal SAH (PMNASAH) was established based on the radiological features. The patient received prophylactic nimodipine and made a good recovery prior to being discharged home. Repeat NCCT head done on postictal day 7, prior to discharge, showed perimesencephalic bleed resolution.

DSA done after 6 weeks was normal.

Discussion

PMNASAH can be a diagnostic challenge, especially in an alert, neurologically intact patient.

The most widely accepted definition emphasizes the presence of blood ventral to the midbrain or pons on early CT. PMNASAH appears to have an etiology and natural history distinct from aneurysm rupture.

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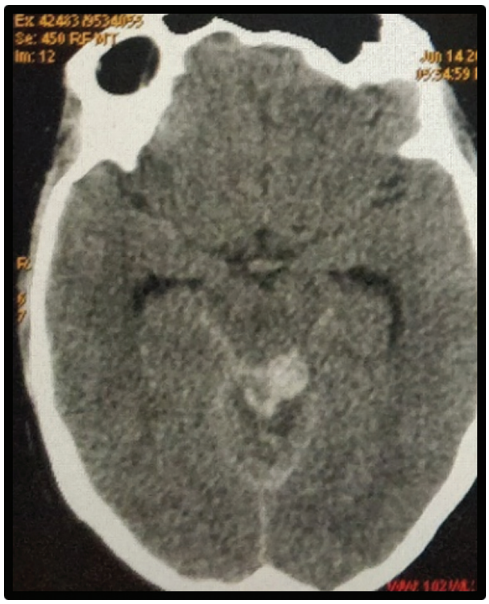

Fig. 1 Blood in the quadrigeminal cistern.

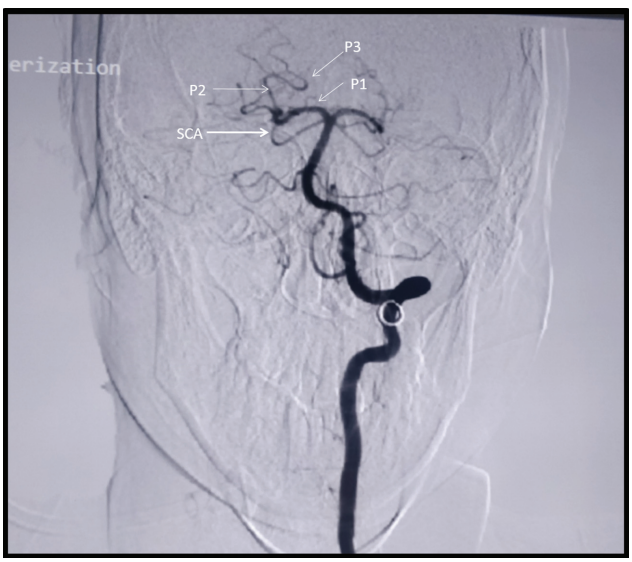

Fig. 3 Anteroposterior angiogram. Postictal day 1—No aneurysm seen. P1, P2, P3, segments of posterior cerebral artery; SCA, superior Cerebellar artery.

Incidence of PMNASAH is estimated at 0.5 per 100,000 people per year and accounts for about 5% of all SAHs.[1,2] Bleeding is thought to be appear from low-pressure venous origin due to the limited extension of blood and low rate of subsequent rebleeding. The most common complaint is a headache usually starting within minutes. Patients usually present with a Glasgow Coma Scale score of 15, oftentimes associated nausea, vomiting, and rarely loss of consciousness of approximately less than 1 minute. As it can clinically mimic an aneurysmal SAH, it is important to distinguish between the two.

Key Diagnostic Features

PMSAH, as opposed to aneurysmal SAH, is classically located in the lateral basal cisterns, primarily involving the

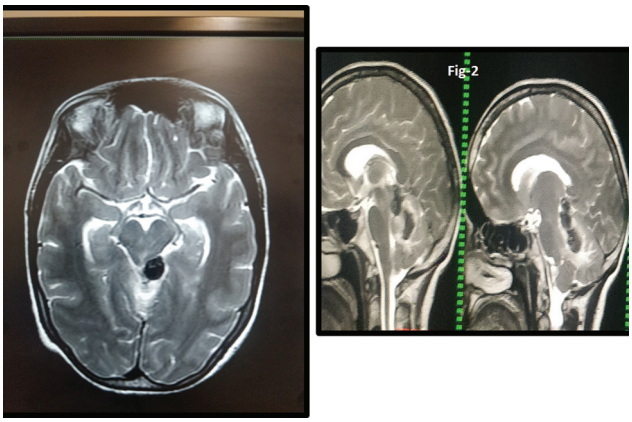

Fig. 2 Magnetic resonance imaging brain—T2-weighted image showing acute blood in posterior perimesencephalic space.

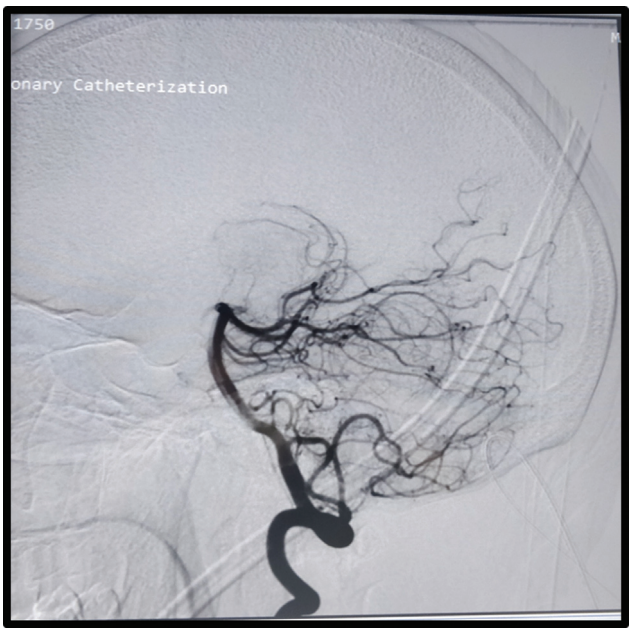

Fig. 4 Lateral angiogram—no aneurysm seen.

quadrigeminal cistern, ambient cistern, and cerebellopontine angle cistern. It may secondarily extend into the remaining basal cisterns.

Four-vessel cerebral DSA should be performed to rule out aneurysmal rupture as a cause of the bleeding due to high mortality from an aneurysmal bleed. Treatment is usually supportive.

Rebleeding is rare and life expectancy is usually not affected.

Death is rare from PMNASAH.

Conclusion

PMNASAH appears to have an etiology and natural history distinct from aneurysm rupture, with good clinical outcomes.[3–5]

The radiographic pattern of PMSAH is relatively distinct, with hemorrhage centered anterior to the midbrain or pons,

with or without extension of blood around the brainstem, into the suprasellar cistern, or into the proximal Sylvian fissures. Referral-based studies suggest that approximately 15% of SAH patients have no discernable cause of bleeding, but the incidence of PMSAH, its risk factors, and its epidemiologic relation to other forms of SAH are not well defined.[6–8]

PMNASAH represents approximately 5% of all SAHs that are a small subset of patients. The posterior variant is an even rarer subtype. Etiology of this posterior pattern may be similar to that of the classic pretruncal variant.

However, patients with quadrigeminal PMSAH must still undergo thorough vascular imaging, including at least two DSAs, to exclude a ruptured aneurysm.

Diagnostic cerebral angiography is gold standard as aneurysm rupture may produce similar pattern of bleeding.

In majority of cases, the etiology remains unknown and there are no specific treatments for PMNASAH.

Aneurysmal SAH	PMSAH
Poor prognosis	Good prognosis
Risk factors	Risk factors
Older	Younger
Female	Less likely to be female
Hypertension	Less likely to be hypertensives
Smokers	Less likely to be smokers
More common	Rare (posterior variant being rarest)
	Incidence—5 per 10 lakh

Implication

- Prompt diagnosis and early recognition of PMNASAH are prudent as it carries an "excellent long-term prognosis" with good clinical outcomes compared with aneurysmal SAH.
- Perimesencephalic region should be reviewed in all patients undergoing CT scan for suspected SAH.

Conflict of Interest
None declared.

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