

## Artery of Percheron Occlusion: A Rare Unusual Cause of Acute Bithalamic and Mesencephalic Stroke – A Case Report

Ankur Malhotra<sup>1</sup>, Swarnava Tarafdar<sup>2</sup>, Rajiv Azad<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Senior Resident, <sup>3</sup>Professor and Head of the Department, Department of Radiodiagnosis, Shri Guru Ram Rai Institute of Medical & Health Sciences & Shri Mahant Indiresch Hospital, Patel Nagar, Dehradun -248001

### \*Corresponding author

Ankur Malhotra

Email: [drankur.m7@gmail.com](mailto:drankur.m7@gmail.com)

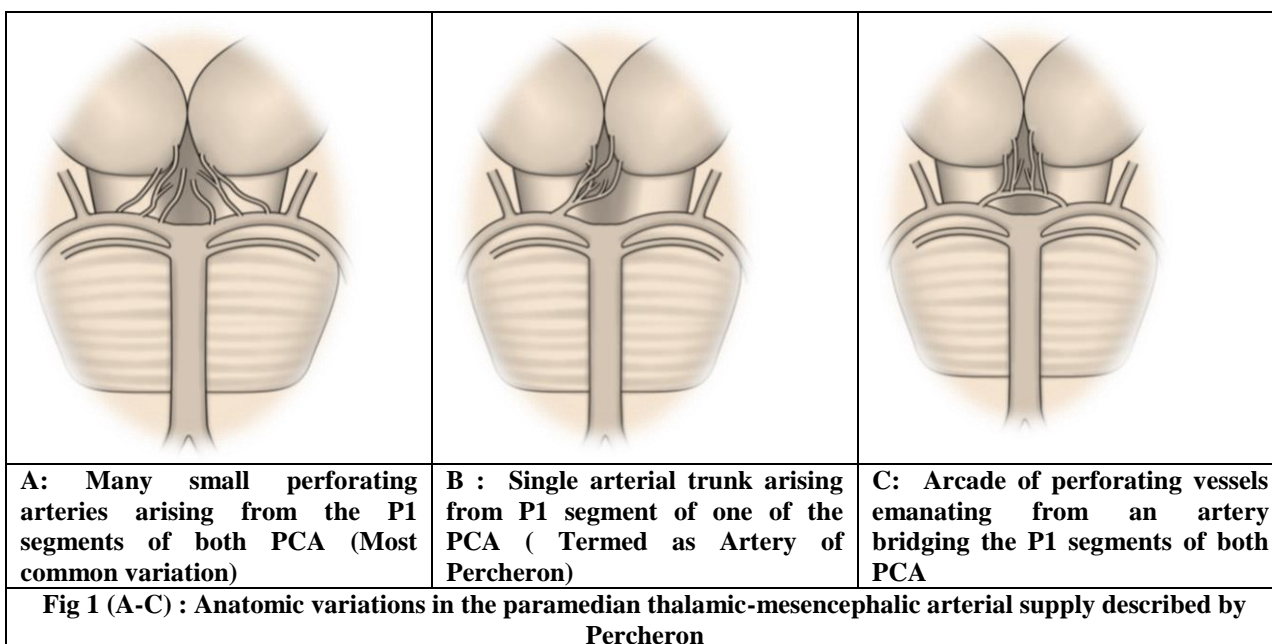
**Abstract:** Arterial supply of thalami and midbrain originates from many perforating vessels with a complex distribution for which many variations have been described. Artery of Percheron is one such variation in which a single arterial trunk arises from proximal segment (P1) of one of the posterior cerebral artery (PCA) and supplies bilateral paramedian thalami and rostral midbrain. Occlusion of this artery, although uncommon results in characteristic pattern of symmetric infarction in bilateral medial thalami with or without mesencephalic infarction. We here describe clinical and MR imaging findings in presumed occlusion of artery of Percheron with typical relatively symmetric infarctions in bilateral paramedian thalami and rostral midbrain.

**Keywords:** Percheron, Thalami, Midbrain, Infarction, MRI, DWI.

### INTRODUCTION

The thalami and midbrain blood supply has a complex distribution with a large number of feeding arteries [1, 2]. There are three normal variations of neurovascular anatomy of thalami and midbrain described by Percheron (Fig 1) [3, 4]. The most important anatomic variation of blood supply is second type, where a single trunk called ‘Type B Artery of Percheron’ which arises from the P1 segment of one of the PCA, supplies bilateral medial thalami and rostral

midbrain [2-8]. Consequently, occlusion of this artery results in acute bithalamic and mesencephalic stroke [1-10]. This is one of the few rare examples where a single artery supplies brain structures on the both sides of midline [7,8]. To date the diagnosis of artery of percheron territory infarction is uncommon with overall incidence of about 0.1 to 0.3% of all ischemic strokes [1,6]. We here describe clinico-radiological findings in a patient who developed infarction in characteristic distribution of artery of Percheron.

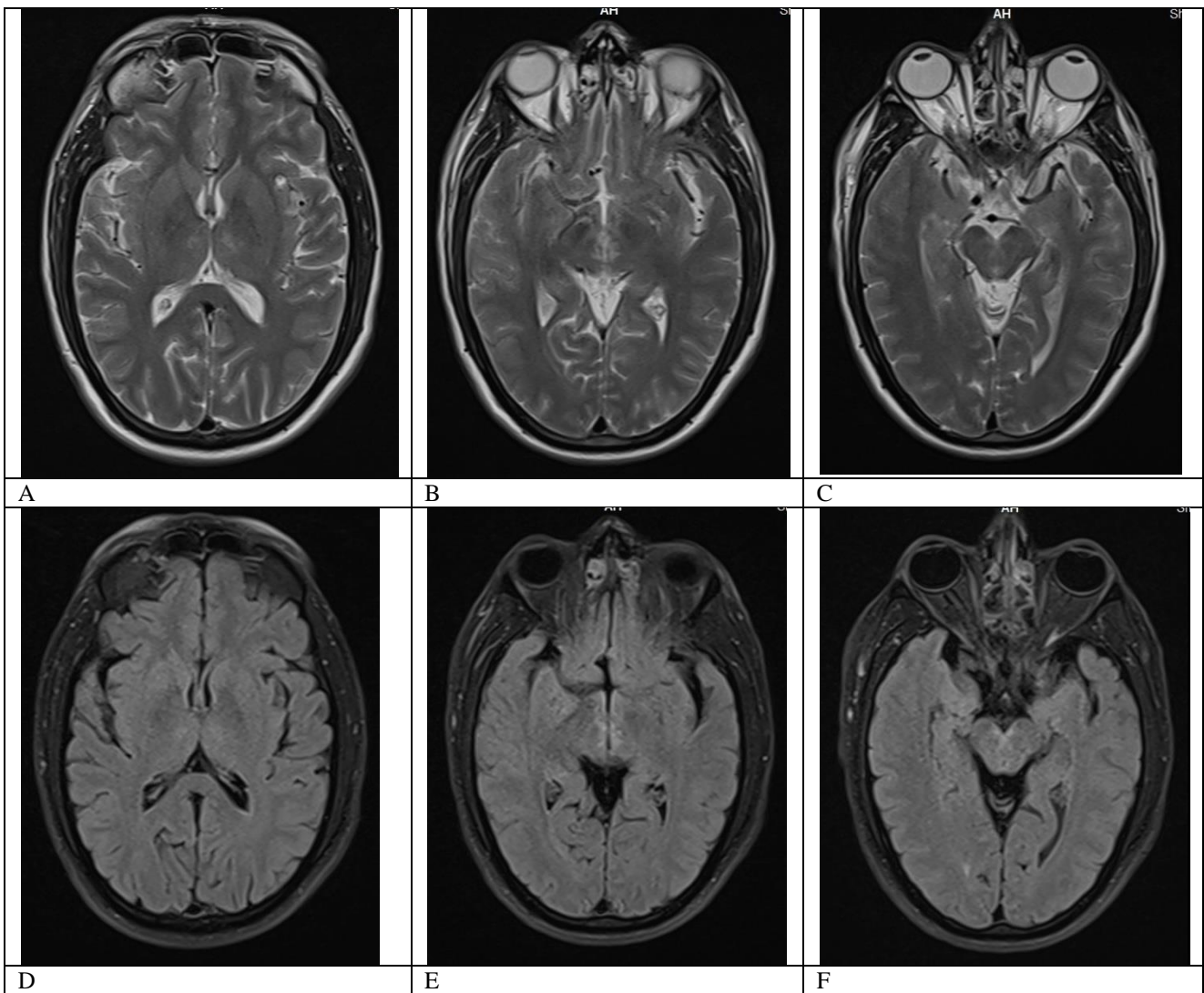


**CASE REPORT**

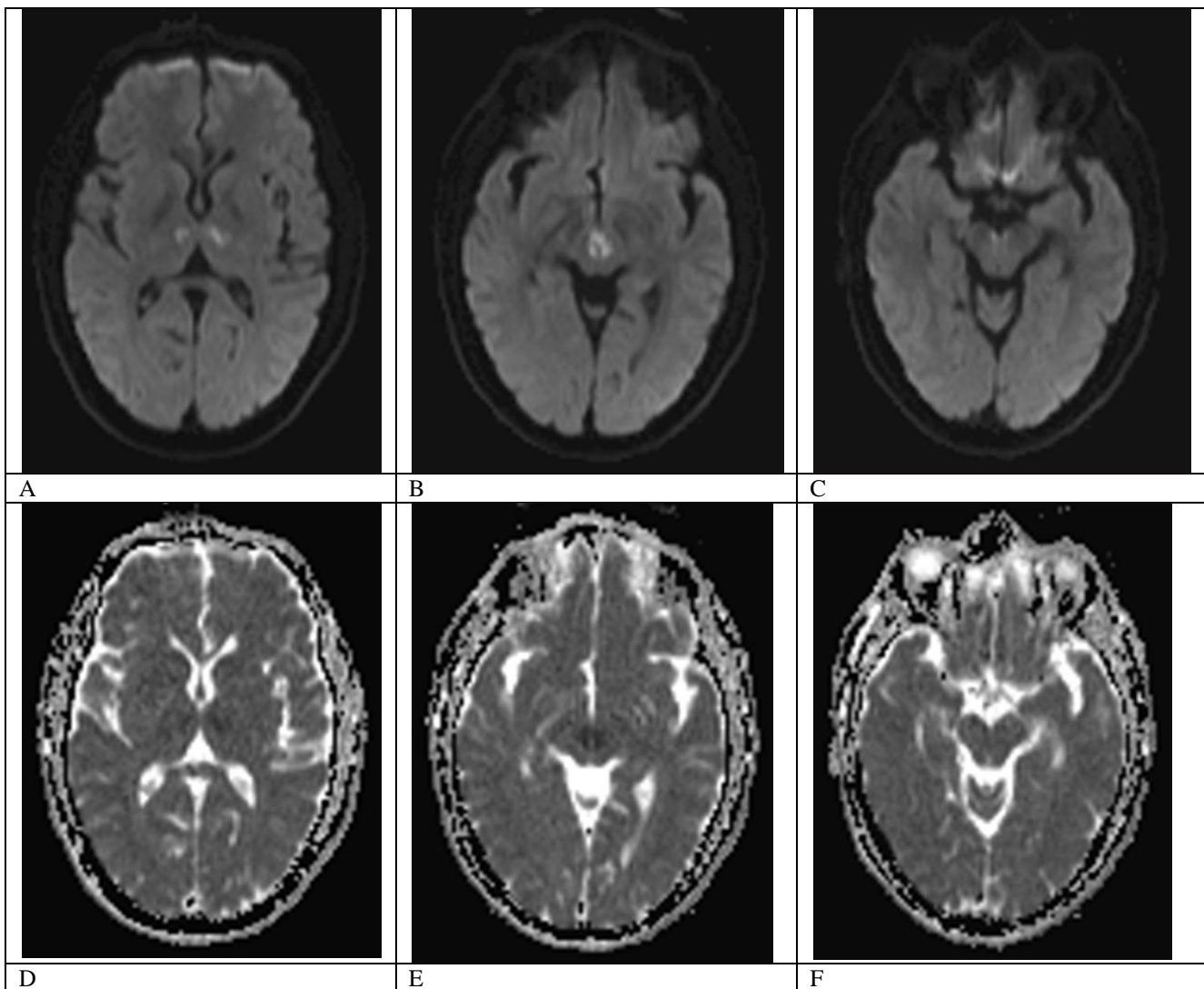
A 60 year old male patient was found unresponsive in his bed in the morning by his son. The patient had past history of hypertension, dyslipidemia and obesity. He was not regular with his medications. On admission in emergency, the patient was afebrile with pulse rate of 80 bpm and respiratory rate of 18 bpm. The blood pressure recorded 152/100 mm Hg. On neurologic examination, the patient was comatose and Glassgow coma scale score was 7. Pupillary light reflex was non reactive in right eye while left eye had normal light reflex. Passive examination of ocular movements showed vertical gaze palsy. Limb movement was noted in response to painful stimuli. Deep tendon reflexes were present and symmetric. Babinski reflex was flexor on both sides. There were no meningeal signs. No significant abnormality was detected in rest of the

systemic examination. All Laboratory blood tests were negative except for hypercholesterolemia.

MRI brain revealed bilateral relatively symmetric areas of high signal intensity on fast spin echo T2W and FLAIR sequences in paramedian thalami and rostral midbrain (Fig 2). Corresponding Diffusion weighted (DW) images and apparent diffusion coefficient (ADC) map at the same level showed diffusion restriction (Fig 3). On basis of imaging findings, diagnosis of bilateral thalamic and mesencephalic stroke due to occlusion of artery of Percheron was made. The standard recommended treatment for stroke was initiated. During hospitalization patient partially recovered his normal mental status with some memory deficit and persistent vertical gaze disturbances.



**Fig 2 (A-F) : Axial T2W (A-C) and FLAIR (D-F) images at the level of thalamus and midbrain respectively reveal sharply demarcated symmetric areas of high signal intensity along the medial aspect of bilateral thalami and along the rostral aspect of midbrain.**



**Fig 3 (A-F) : Axial Diffusion weighted images (A-C) at the level of thalamus and midbrain respectively reveal symmetric areas of high signal intensity with corresponding low signal intensity on ADC map (D-F) along the medial aspect of bilateral thalami and along the rostral aspect of midbrain suggestive of Acute Infarction.**

**DISCUSSION**

Stroke affecting bithalamic paramedian territories are rare and difficult to suspect due to complex neurovascular anatomy causing great clinical variability [1-5]. They account for 22 to 35% of all thalamic strokes [2, 3].

The thalami consist of strategic nuclei which integrate various important cortical functions [3, 4, 6]. Thus stroke at mesencephalic-diencephalic junctions lead to complex clinical spectrum varying from motor deficits to sensory and behavioral disturbances [4]. The four major symptoms reported in literature are vertical gaze palsy (65%), memory impairment (58%), confusion (53%) and coma (42%) [1, 3, 5, 6]. Our patient demonstrated three of above mentioned four symptoms over the course of illness.

Percheron has described three anatomical variations involving paramedian thalami –

mesencephalic arterial supply– Small branches arising from both P1 segments, an asymmetrical single trunk arising from one of the P1 segment ( termed as Artery of Percheron), or an arterial cascade emanating from an artery bridging the two P1 segments [3,4].

Occlusion of artery of Percheron results in bilateral paramedian thalamic infarcts with or without midbrain infarcts [1-7, 9, 10]. It is stated that when artery of Percheron is occluded the thalamic infarcts are always bilateral and medial [4]. In our case also there was relatively symmetric involvement of bilateral medial thalami with involvement of rostral midbrain.

MRI is a sensitive tool in making early diagnosis which is best achieved by utilizing Diffusion weighted MR sequences [1, 6, 11]. The combination of pathologic DW images and normal findings on T2W or FLAIR images suggest an acute stroke. However, if the lesion is already visible on T2W or FLAIR, as in our

---

case, the time window for the thrombolysis is already over [1]. In the case reported here conventional MR imaging along with DW sequences confirmed the presence of infarction in bilateral paramedian thalamic and rostral midbrain typically seen in occlusion of artery of Percheron.

The Top of the 'Basilar artery syndrome' has similar presentation and merits consideration in cases of bilateral thalamic infarcts. However in this latter entity, the infarcts are also noted in the vascular territories of superior cerebellar and posterior cerebral arteries [3, 4, 7]. Performing conventional angiography is not indicated in such cases, as lack of visualization of artery does not exclude its presence [4, 6]. Treatment options include thrombolysis and medical therapy [3]. Long term prognosis is fairly good in thalamic infarcts [5, 9].

### CONCLUSION

When bilateral medial thalamic infarcts are encountered in a patient, the possibility of occlusion of artery of percheron merits consideration. There may be additional involvement of peri aqueductal gray matter of rostral midbrain. Clinical findings are variable but vertical gaze palsy, memory impairment; confusion and loss of consciousness are most common.

### REFERENCE

1. Lamot U, Ribaric I, Popovic KS; Artery of Percheron infarction: review of literature with a case report. *Radiol Oncol*, 2015; 49(2):141-6.
2. López-Serna R, González-Carmona P, López-Martínez M; Bilateral thalamic stroke due to occlusion of the artery of Percheron in a patient with patent foramen ovale: a case report. *J Med Case Rep*, 2009; 3: 7392.
3. Rodriguez EG, Lee JA; Bilateral thalamic infarcts due to occlusion of the Artery of Percheron and discussion of the differential diagnosis of bilateral thalamic lesions. *J Radiol Case Rep*, 2013; 7(7):7-14.
4. Matheus MG, Castillo M; Imaging of acute bilateral paramedian thalamic and mesencephalic infarcts. *AJNR Am J Neuroradiol*, 2003; 24(10):2005-8.
5. Cassourret G, Prunet B, Sbardella F, Bordes J, Maurin O, Boret H; Ischemic Stroke of the Artery of Percheron with Normal Initial MRI: A Case Report. *Case Rep Med*, 2010; 425734.
6. Malik AJ, Ahmad M, Khan A; Artery of Percheron Infarction in a Patient with Atrial Fibrillation: A Rare Stroke Syndrome. *Journal of Case Reports*, 2013; 3(1):96-100.
7. Anderson C, O'Brien R; Occlusion of the artery of Percheron: an unusual cause of bilateral stroke. *BMJ Case Rep*, 2012; 2012.
8. Raphaeli G, Liberman A, Gomori JM, Steiner I; Acute bilateral paramedian thalamic infarcts after occlusion of the artery of Percheron. *Neurology*, 2006; 66(1):E7.
9. Arauz A, Patiño-Rodríguez HM, Vargas-González JC, Arguelles-Morales N, Silos H, Ruiz-Franco A, et al.; Clinical spectrum of artery of Percheron infarct: clinical radiological correlations. *J Stroke Cerebrovasc Dis*, 2014; 23(5):1083-8.
10. Schmähmann JD; Vascular Syndromes of the Thalamus. *Stroke*, 2003; 34:2264-2278.
11. Tarafdar S, Tayade A; MRI evaluation of CVJ anomalies: Report of 7 cases. *Sch J Med Case Rep*, 2015; 3(3): 228-232.