Artery of Percheron Infarction in a Patient with Atrial Fibrillation: A Rare Stroke Syndrome

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Abstract
The artery of Percheron uncommon anatomic variant that provides bilateral arterial supply to the paramedian thalami and the rostral midbrain. Occlusion of this artery results in bilateral thalamic and mesencephalic infarctions. The clinical diagnosis is difficult because of the large clinical variability. We report the clinical and MR imaging findings in a patient who developed infarction in the typical distribution of the artery of Percheron.

Introduction
The thalami and midbrain have a complex blood supply. An important anatomic variation of the blood supply of bilateral median part of thalamus is the origin of both paramedian arteries from a single pedicle which is known as the type B artery of Percheron.²

Occlusion of the artery of Percheron causes bilateral paramedian thalamic infarction with or without midbrain infarction. The prevalence of arteries of Percheron is unknown. Due to a large number of blood supply variants, an ischemic infarction in this territory presents with variable and non-specific clinical symptoms. The goal of this paper is to report a case where the diagnosis of an artery of Percheron infarction was made retrospectively, due to an unspecific clinical presentation.

A Case Report
58 yrs. married female who was a known case of Rheumatic heart disease with mitral stenosis and atrial fibrillation presented to our hospital with symptoms of altered sensorium since 3 days.

Patient was apparently alright 3 days back when she went to sleep, she slept through an entire day and was difficult to arouse. She would wake up to painful stimuli and would lapse back into sleep as soon as stimulus was withdrawn. After much effort when patient was awakened, relatives noticed that the she was disoriented in time and place and had irrelevant talk. Medical help sought on 3rd day of symptoms.

There was no fever, headache, vomiting, convulsions.
On admission, her heart rate was 110/minute and irregularly irregular, blood pressure was 150/100 mm Hg, respiratory rate was 18/minute. On neurologic examination, her Glasgow Coma Scale (GCS) score was 7/15 (E1M5V1).
Cranial nerves examination revealed bilateral ptosis, bilateral divergent squint, no nystagmus, upward gaze palsy was present, pupils bilaterally dilated 5-6 mm, sluggishly reacting to light
Other cranial nerves examination normal
On motor system; all limbs were moving in response to painful stimuli. All brainstem and deep tendon reflexes were present. Plantar reflex was flexor on both sides.
No abnormal involuntary movements were seen
Investigations are shown in Table 1
Chest X-ray was normal
Capillary blood glucose was found to be 123 mg/dL. The electrocardiogram showed atrial fibrillation.
MRI brain showed an abnormal hyperdensity seen in bilateral paramedian midbrain and in bilateral medial part of thalami corresponding with areas of restricted diffusion suggestive of acute infarct in territory of artery of Percheron with mild cortico-cerebellar atrophy (Figures 1 to 4)
MR angiography of brain was normal.
The patient was started on mannitol, aspirin, atorvastatin, metoprolol in standard recommended dosages. Low molecular heparin was also given which was later overlapped with and then switched to oral warfarin, with dose titration to achieve an INR of

Table 1: Investigations

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Hemoglobin</td>
<td>13.8 gm%</td>
</tr>
<tr>
<td>Total protein</td>
<td>7.1 g/dl</td>
</tr>
<tr>
<td>TLC</td>
<td>5400 cumm albumin 4.1 g/dl</td>
</tr>
<tr>
<td>Platelets</td>
<td>3.4 lac/ cumm albumin 1.8 mg/ cumm dl</td>
</tr>
<tr>
<td>BUN</td>
<td>8 mg/dl</td>
</tr>
<tr>
<td>Creatinine</td>
<td>1.1 mg/dl</td>
</tr>
<tr>
<td>Na+</td>
<td>145 mg/dl</td>
</tr>
<tr>
<td>K+</td>
<td>3.6 mg/dl</td>
</tr>
<tr>
<td>Cl-</td>
<td>106 mg/dl</td>
</tr>
<tr>
<td>Uric acid</td>
<td>6.8 mg/dl</td>
</tr>
<tr>
<td>Bilirubin total</td>
<td>1.8 mg/dl</td>
</tr>
<tr>
<td>SGOT</td>
<td>23 IU/L</td>
</tr>
<tr>
<td>SGPT</td>
<td>18 IU/L</td>
</tr>
<tr>
<td>S. Cholesterol</td>
<td>228 mg/dl</td>
</tr>
<tr>
<td>S. triglyceride</td>
<td>112 mg/dl</td>
</tr>
</tbody>
</table>

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2.5. Telmisartan was also added later to optimise blood pressure control. Patient’s level of consciousness started improving with GCS Score of 12/15 (E4M6V2) on day seven of admission, although she remained disoriented.

Patient’s somnolence improved over a period of 2-3 days

**Discussion**

The thalami contain important nuclei and integrate several important cortical functions. The posterior communicating artery contributes to thalamic blood supply in 60% of population. Percheron described possible variations involving the paramedian thalamic-mesencephalic arterial supply.\(^2\) Our patient demonstrated infarcts in bilateral paramedian thalami. The obstruction was likely a consequence of cardiac embolism occurring as a result of atrial fibrillation.

Occlusion of the artery of Percheron results in bilateral medial thalamic and rostral midbrain infarctions with symmetrical distribution.\(^4\) Infarcts in this region result in complex clinical syndromes, with patients manifesting varying symptoms and signs ranging from motor deficits to behavioral and sensory symptoms. The four main symptoms found in literature are vertical gaze palsy (65%), memory impairment (58%), confusion (53%), and coma (42%).\(^5\) This patient presented with typical features of this stroke syndrome over her course of time. The changes in mental status may be due to involvement of reticular activating system and the interruption of connections between the thalamus and parts of the prefrontal cortex involved in behavioral control. Early diagnosis is best made by a diffusion-weighted imaging (DWI) sequence MRI.\(^6\)

In the case reported here, conventional MR imaging and the diffusion-weighted imaging confirmed the presence of infarction in bilateral thalamic and left anteromedial midbrain region typically seen in occlusion of the artery of Percheron.\(^1\) These infarcts should be recognized as due to occlusion of a possible single rare artery that is a normal anatomic variant showing its peculiar supply and not be blamed on occlusion of multiple vascular territories or other pathologic conditions such as vasculitis or infectious disease. Performing conventional angiography is usually not indicated in such cases. Because of the small size of the artery and its highly variable origin and course, lack of visualization of the artery does not exclude its presence, however interventional explorations focused on potential treatment of occlusion of the artery of Percheron may be encouraged.

**Conclusion**

- In patients presenting with bilateral paramedian thalamic infarction the possibility of Percheron infarction should be considered.
- In artery of Percheron of infarction, there can be additional involvement of periaqueductal grey matter of the midbrain.
- Clinical features may vary but loss of consciousness, memory impairment, vertical gaze palsy and behavioural disturbances are most common.

**References**