

Multidetector computed tomography findings in a case of top of basilar syndrome

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Received – 24 March 2018

Initial Review – 03 April 2018

Published Online – 30 June 2018

ABSTRACT

Stroke is a condition in which poor blood flow to the brain results in cell death. In India, almost 2,00,000 strokes are reported a year. Basilar artery occlusion syndrome accounts for 1–4% of all strokes. Top of the basilar syndrome is a type of basilar artery occlusion syndrome where the distal end of the basilar artery is occluded. Imaging findings include ischemic changes in the areas supplied by the distal branches of the basilar artery. A posterior circulation - acute stroke prognosis early computed tomography score system can be used to evaluate the prognosis of the patient. We are reporting a case of top of the basilar syndrome in an 85-years-old female patient who presented to us with complaints of one episode of seizure.

Key words: *Basilar artery occlusion syndrome, Posterior circulation infarcts, Top of basilar syndrome*

Stroke is the leading cause of death and acquired disability. Approximately 20–25% of all ischemic strokes are attributed to posterior circulation (pc) stroke [1]. Top of the basilar syndrome is a type of basilar artery occlusion which accounts for 1–4% of all strokes [2]. Imaging hallmark of the top of basilar syndrome includes a hyperdense basilar artery and infarcts in the areas supplied by distal artery branches [2]. This case report illustrates the cerebral computed tomography (CT) findings in an 85-years-old female who presented to the emergency department at our hospital with an episode of seizure and altered sensorium.

CASE REPORT

An 85-years-old hypertensive female patient with no history of previous seizure disorder presented to the emergency department with a chief complaint of an episode of seizure that lasted for 10 min. On clinical examination, the patient was in altered sensorium with a Glasgow coma scale (GCS) score of 6/15. The patient had vertical gaze with slowed smooth pursuit movements.

Extensive laboratory investigations revealed mild leukocytosis with normal peripheral smear picture. Arterial blood gas showed metabolic acidosis. Renal function tests, liver function tests, serum electrolytes, and lipid profile were within normal limits.

In view of low GCS score, the patient was intubated and referred to the Department of Radiology for a cerebral CT scan without contrast. A written consent was taken from the patient's attender before performing the CT scan. We used a 128 slice multidetector CT Siemens Somatom perspective equipment and images were obtained at sub-mm section in axial, coronal and sagittal planes with cerebral window. CT images were acquired about 3 h after the episode of seizure. The images revealed

hypodensities in bilateral thalami (Fig. 1), midbrain (Fig. 2), and pons. Further, hypodensities were seen in bilateral occipital and temporal lobes involving both gray and white matter with effacement of adjacent sulci (Figs. 3-5). Superior cerebellar hemispheres also showed hypodensities bilaterally (Figs. 3-5). A hyperdense basilar artery was noted (Fig. 2).

With the above imaging findings, a diagnosis of acute infarcts in pc territories with the level of occlusion being distal basilar artery was made. A pc acute stroke prognosis early CT score (pc-ASPECTS) of 0 was calculated (Fig. 6). The patient was admitted to intensive care unit and was scheduled to undergo CT angiography to localize the clot and plan further management, but unfortunately, she succumbed to her condition in spite of best efforts by the treating physicians.

DISCUSSION

pc stroke accounts for 20–25% of all ischemic strokes. Early recognition of pc stroke may help decrease morbidity and mortality [1]. Basilar artery occlusion syndromes account for 1–4% of all strokes [2]. Top of Basilar Syndrome is a subset of Basilar Artery Occlusion syndromes which involve occlusion of a distal top basilar artery where the superior cerebellar artery and posterior cerebellar arteries represent the final terminal branches [2]. The clinical syndrome of embolism to the top of basilar artery was first described by Caplan in 1980 [3].

Occlusion of the distal top of basilar artery results in ischemia of midbrain, pons, thalami, inferior temporal lobes, occipital lobes, and superior cerebellum. Midbrain and thalamic ischemia are caused by an occlusion of paramedian perforating branches arising from the distal basilar artery [4]. Clinical features include

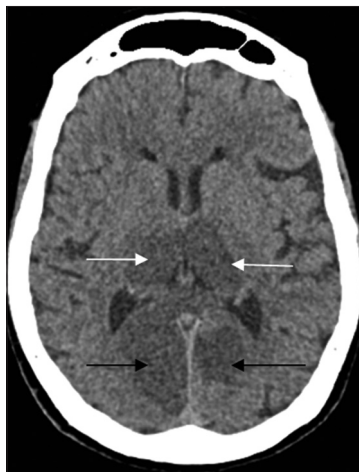


Figure 1: Axial computed tomography section in cerebrum window showing hypodensities in bilateral thalami (white arrows) and bilateral occipital lobes (black arrows)

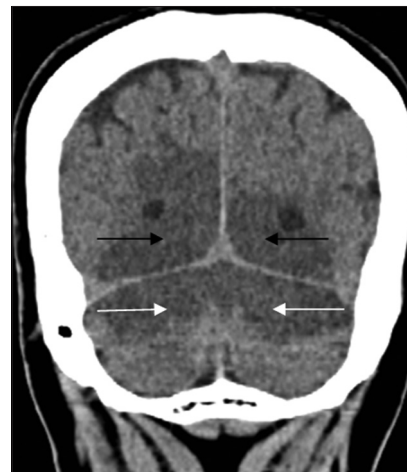


Figure 4: Coronal computed tomography section in cerebrum window showing hypodensities in bilateral superior cerebellar hemispheres (white arrows) and occipital lobes (black arrows)

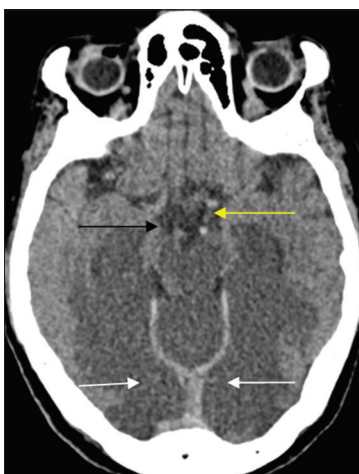


Figure 2: Axial computed tomography section in cerebrum window showing hyperdense distal basilar artery (yellow arrow). Hypodensities in the midbrain (black arrow) and bilateral occipital lobes (white arrows) are also noted



Figure 5: Axial computed tomography section in cerebrum window showing hypodensities in bilateral temporal lobes (white arrows) and bilateral superior cerebellar hemispheres (black arrows)

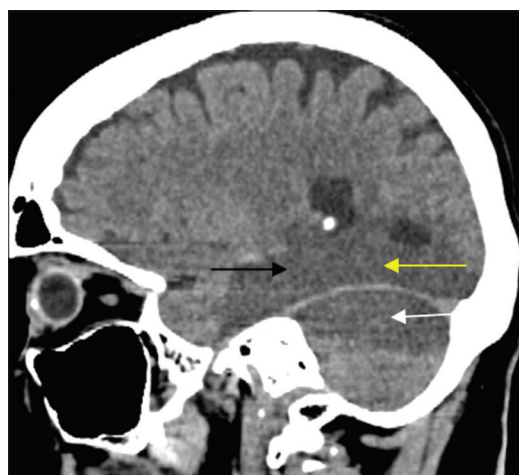


Figure 3: Sagittal computed tomography section in cerebrum window showing hypodensities in the left superior cerebellar hemisphere (white arrow), temporal (black arrow), and occipital lobe (yellow arrow)

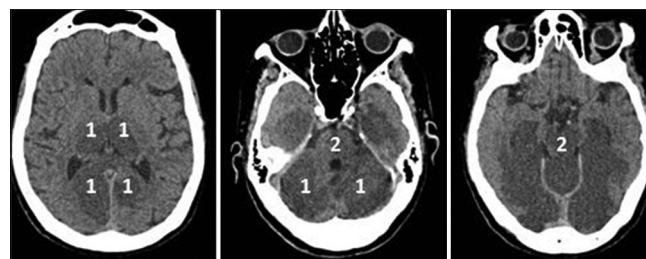


Figure 6: The posterior circulation acute stroke prognosis early computed tomography (CT) score. From 10 points, 1 or 2 points each (as indicated) are subtracted for early ischemic changes (noncontrast head CT) in the left or right thalamus, cerebellum, or posterior cerebral artery territory, respectively (1 point); any part of midbrain or pons (2 points). In our case, the score was 0

inversion of sleep-wake cycle, altered mental status ranging from drowsiness to hypersomnolence/coma, nystagmus, extra-ocular movement abnormalities, and truncal ataxia [5,6]. If the superior cerebellar artery is involved, then dizziness, vomiting, dysarthria, and gait ataxia may also be observed [2]. The most common cause of pc stroke is embolism and atherosclerosis of large arteries [1].

Other causes which result in pc stroke include the traumatic dissection of vertebral artery, cervical spine/skull base fracture, arteritis, meningitis, and aneurysms [2]. Behcet vasculitis more commonly involves pc [7].

All cases of suspected stroke require immediate imaging of the brain [2]. Unenhanced CT images of the brain reveal a hyperdense basilar artery which is presumed to represent acute thrombosis or clot in 50–70% of cases with basilar artery thrombosis [8]. The pc-ASPECTS developed and validated by Peutz *et al.* is used to quantify early ischemia. The scoring system deducts 1 or 2 points each from a total 10 points for early ischemic changes on non-contrast CT in the left/right thalamus, cerebellum or posterior cerebral artery territory. Two points are subtracted from any part of midbrain/pons. A pc-ASPECTS score of 10 indicates a normally perfused pc territory whereas 0 indicates ischemic changes in all the above-mentioned areas in the brain [9].

When acute basilar artery occlusion was first described by Kubik and Adams by postmortem analysis, it was assumed to have 100% mortality [10]. However, in New England registry of pc strokes, a prospective single-institution registry only 29% of patients died or left with a major deficit. Etiology of the occlusion played a major part in the outcome [11]. A pc-ASPECTS score of more than 8 is independently associated with better outcomes [9]. Successful recanalization of the basilar artery appears to be the single most important predictor of good outcome [2].

CONCLUSION

Top of the basilar syndrome has a wide range of clinical features including early diagnosis and intervention that helps in better outcome of the patient. Despite the advances in stroke prevention and treatment, morbidity and mortality of basilar artery occlusion remain high. A pc-ASPECTS score of more than 8 on imaging

of the brain has a good outcome. Multidetector CT provides the advantage of faster scanning time, sub-millimeter sections which make it possible to acquire isotropic data volume and aids in the fast and accurate diagnosis of the patient's condition.

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Funding: None; Conflict of Interest: None Stated.

How to cite this article: Shankar KR, Tyagi V, Shukla AK, Rakesh JP. Multidetector computed tomography findings in a case of top of the basilar syndrome. *Indian J Case Reports*. 2018;4(3):233-235.