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Case Report
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Giant Curved Calcified Basilar Artery Causing Headache: A Case Report

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Abstract

The aim of this paper is to share a rare finding in a geriatric patient. The patent has a chronic headache for many years with no explanations for his condition. Anatomical variations in the circle of Willis are common, but anatomical variations that are causing pain are uncommon findings. This case report will explain these case findings on CT and MRI scans.

Keywords: Basilar artery; Intracranial arterial calcification; Anatomical variations; CT; MRI

Case Report

A 86 year−old male patient started to have chronic headaches in 2013. A CT scan was done for him that showed a calcified curved basilar artery, but due to his age (atherosclerosis changes in arteries), it was considered normal see (Figure 1). The basilar artery is not in the normal location in the pre−pontine groove, but it crosses from the left side to the right side of the pons see (Figure 2). In 2018, he went to the hospital for another head CT scan, and the same normal findings were found, but it was not reported see (Figure 2). In 2020, the patient came to the hospital with the same claims, and a CT scan was done which revealed the same findings see (Figures 3-5). An MRI scan for the brain was requested which revealed a giant curved calcified basilar artery see (Figures 6-9). The artery cross from the left side of the pons to the right side then passes anteriorly to the midbrain to cross to the left side of the brain to join the circle of Willis in a rare fashion. The calcification is really giant that extend from the vertebral arteries until the basilar artery joins the circle of Willis. The entire length of the basilar artery is calcified. When a CT scan performed, it was done without any contrast media, but the scan appeared as if the patient was injected with contrast media intravenously. The artery does not make any bifurcation, but the artery joins the circle of Willis on the left side see (Figure 3).

Figure 1: *CT scan (in 2013) for the brain shows curved basilar artery (brain window).*

Discussion

It's well known in medical practice that there are cases like trigeminal neuralgia and glossopharyngeal neuralgia, but a calcified artery with anatomical variations (curved and not in normal location) that can cause chronic headache is uncommon. The calcification maybe is a result of atherosclerosis and the

aging process. The curvature of the basilar artery could be caused by calcification which created the anatomical variation (curved artery out of the normal location). There are some published papers that stated that anatomical variations can be caused by the aging process [1]. The curved artery is an anatomical variation that occurs in many arteries like the carotids or any part of the circle of Willis [1,2]. The cut-off value of HU in a hyper−dense basilar artery is 46.5 HU [3]. Some suggest that the HU for a calcified artery is above 130 [4].

Figure 2: *CT scan (in 2018) for the brain which shows a calcified basilar artery (brain window). The scan was affected by beam hardening artefact.*

Figure 3: *CT scan (in 2018) for the brain shows the basilar artery join the circle of Willis on the left side without making a bifurcation (brain window) both middle cerebral arteries appear hyper−dense.*

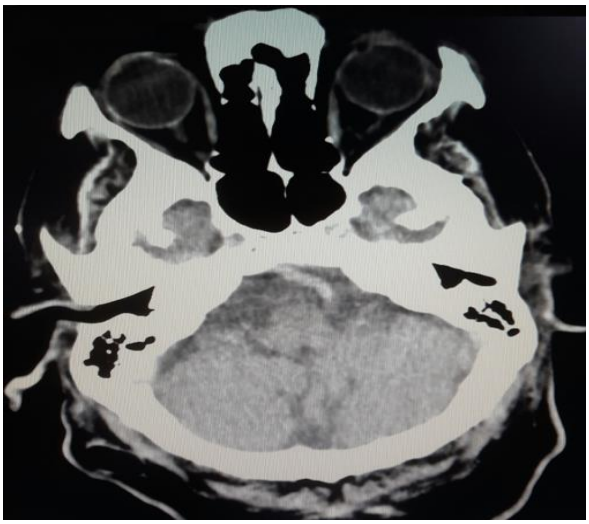

Figure 4: *CT scan (in 2020) for the brain which shows the calcified basilar artery (brain window).*

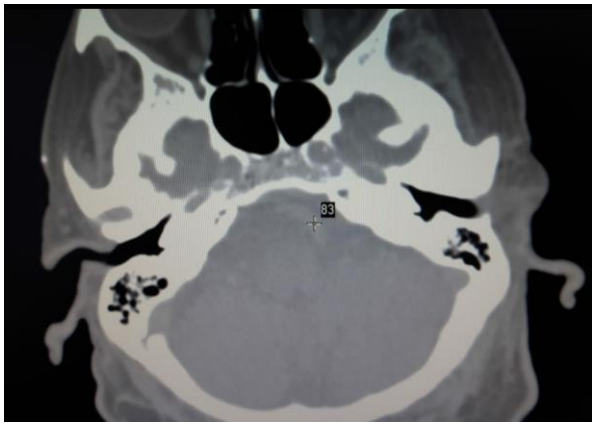

Figure 5: *CT scan (in 2020) for the brain which shows the calcified basilar artery (Hounsfield Unit = 83 and brain window).*

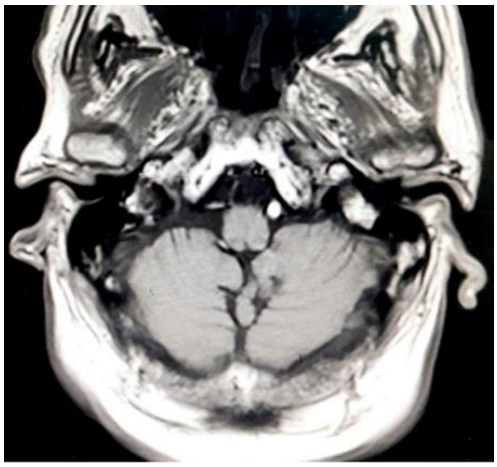

Figure 6: *MRI T1 scan (in 2020) for the brain which shows the beginning and the diameter of the basilar artery at the ponto-medullary junction.*

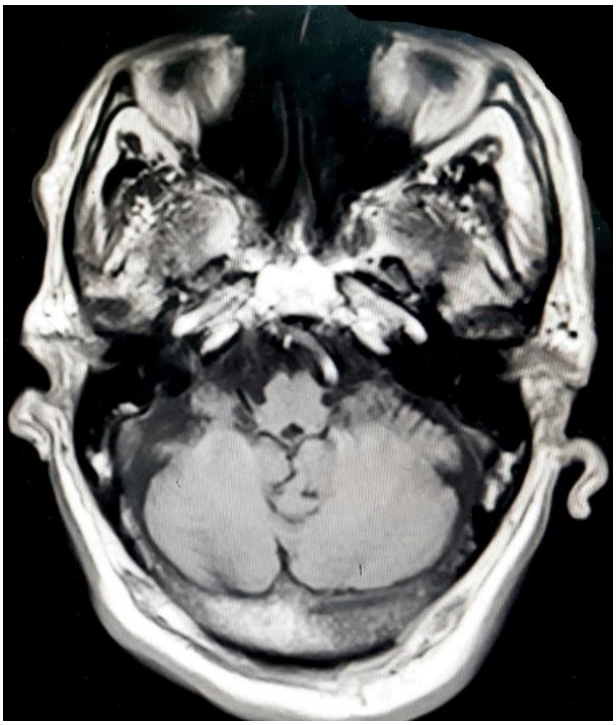

Figure 7: *MRI T1 scan (in 2020) for the brain which shows the basilar artery out of the pre−pontine groove and crossing from the left side to the right side.*

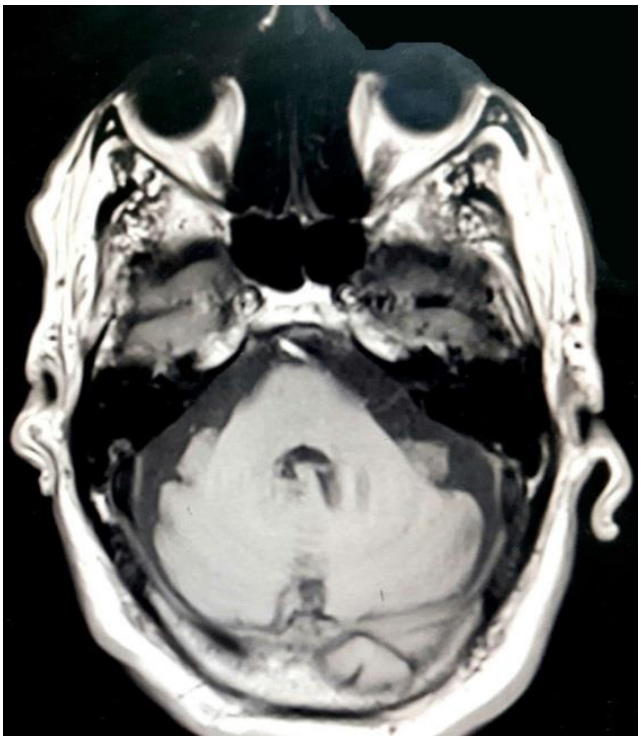

Figure 8: *MRI T1 scan (in 2020) for the brain which shows the cross of the basilar artery from the left side to the right side.*

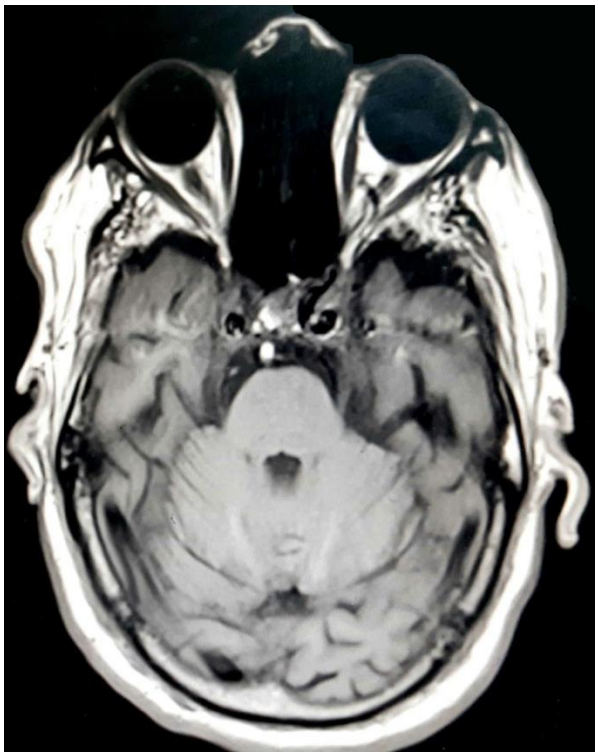

Figure 9: *MRI T1 scan (in 2020) for the brain which shows the basilar artery crossing to the centre.*

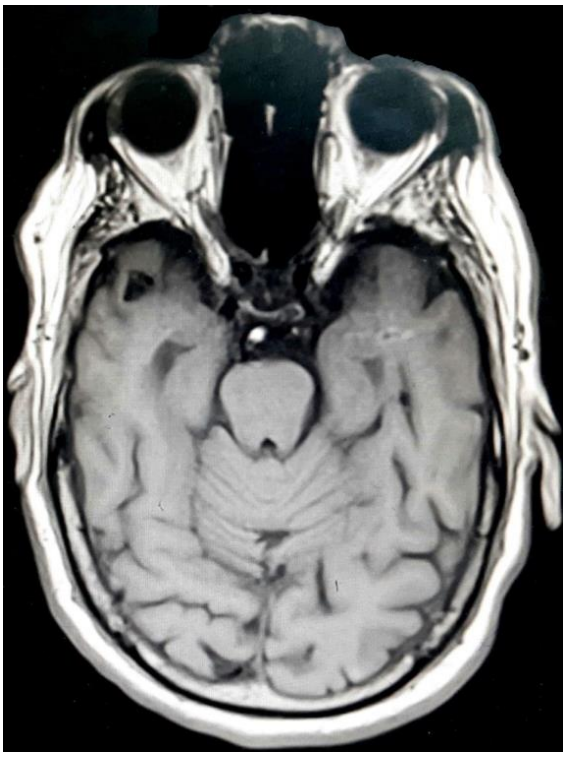

Figure 10: *MRI T1 scan (in 2020) for the brain which shows the basilar artery crossing to the left side again to join the circle of Willis.*

Conclusion

The calcified curved basilar artery could be the cause of the chronic headache. This anatomical variation is caused by the calcification and the aging process. There are no clear criteria for calcified arteries and the criteria that available today are for specific arteries like the carotid, coronary, etc.

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