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Case Report

A Case of Internuclear Ophthalmoplegia due to Vertebral Artery Dissection after Trauma by Football in A 26-Year-Old Male Patient: A Case Report

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Abstract

Background: Internuclear Ophthalmoplegia (INO) is a specific gaze abnormality of horizontal eye movement that indicates a lesion involving the medial longitudinal fasciculus (MLF), a lesion that could also involve neighbouring structures at the pontine and mid-brain levels, which mandates further investigations to facilitate early diagnosis.

Case Report: 26 year old male presented with right sided INO, slurred speech and gait imbalance, following a trivial sport related trauma. CT-Angio revealed right vertebral artery dissection and MRI showed multiple lacunar pontine and cerebellar infarcts.

Conclusion: Internuclear Ophthalmoplegia following even minor trauma should raise the suspicion of vertebral artery dissection, and signs and symptoms of pontine or cerebellar infarction should be sought in order to establish early diagnosis, and prevent devastating consequences.

Keywords: *Internuclear Ophthalmoplegia (INO); Vertebral Artery Dissection*

Background

Internuclear Ophthalmoplegia is a specific gaze abnormality characterized by impaired horizontal eye movements with weak adduction of the affected eye, and abduction nystagmus of the contralateral eye. It is one of the most localizing brainstem syndromes, resulting from a lesion in the medial longitudinal fasciculus (MLF) in the dorsomedial brainstem tegmentum of either the pons or the midbrain.

Pathophysiology

During horizontal eye movement the PPRF burst cells (i.e. paramedian pontine reticular formation which is the conjugate gaze center for horizontal eye movements) send signals to the abducens nucleus, from which axons directly innervate the ipsilateral lateral rectus muscle. Axons of the abducens interneurons cross the midline to become the MLF, which carries this signal to Oculomotor Nucleus, as illustrated in (Figure 1) which in turn innervates the contralateral medial rectus muscle, and produce conjugate eye movement [1,2].

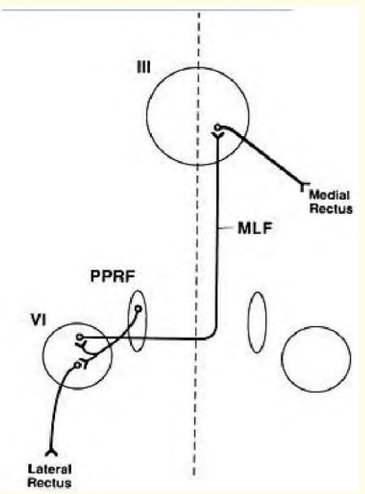

Figure 1: *Schematic illustration of the brainstem structures involved in horizontal conjugate eye movement.*

Any injury or insult to the MLF will compromise this pathway resulting in internuclear ophthalmoplegia [2].

Origins of internuclear ophthalmoplegia can be one of the following: demyelinating disease (MS), infarction, hematoma, mass effect, trauma, infection, neoplasm, drugs, radiation, metabolic disorder, degenerative disorder, syphilis, or Chiari malformation [1].

With the realisation that polyp cancers detected, usually on screening, presents a particular management challenge guidelines have been produced to help minimise unnecessary subsequent surgery in this group [12].

Findings

A 26 years old Bahraini male known case of Sickle Cell Trait and G6PD deficiency was referred from neurology department complaining of blurring of vision and diplopia for one-day duration. He was playing football a day prior to his symptoms during which he sustained a trauma to the (chest and neck area) by the ball. The patient also gave history of left upper limb numbness and weakness, left facial numbness, tinnitus, gait imbalance and some difficulty in speech. Patient is not using any medications, has no history of prior neurological symptoms, also denies any history of worsening of symptoms with high temperature (Uhthoff's phenomenon) or any history of electrical sensation on flexion of the neck (Lhermitte's sign).

On examination: Visual Acuity: OD 6/9, OS 6/6 p, there was no color desaturation in either eyes. Upon examining extraocular motility, impairment of adduction was noted on levoversion of the right eye with nystagmus of the left eye. The rest of eye examination was unremarkable.

Impression: Right Internuclear Ophthalmoplegia.

Computed tomography was done and was unremarkable, followed by CT angiography which showed right vertebral artery dissection with a focal bulge in the vessel at C5-C6 level followed by a segment of narrowing which then reverts back to normal caliber (Figure 2).

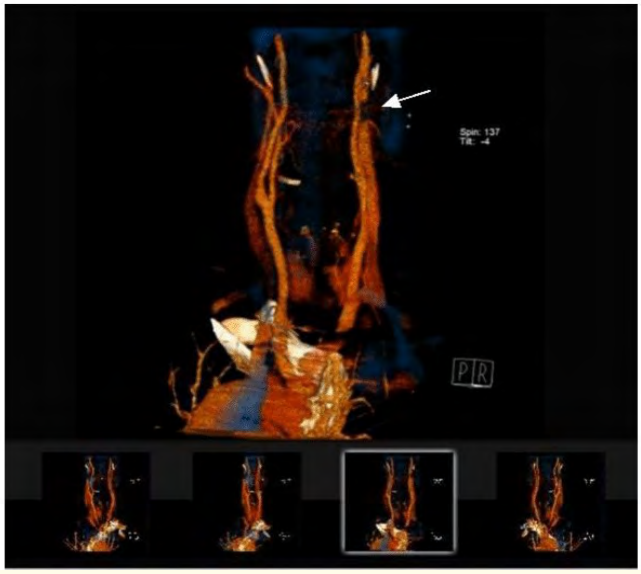

Figure 2: *CT-Angio showing the area of Dissection within the right vertebral artery (white arrow)*

Magnetic Resonance Imaging was done and revealed multiple well defined foci of altered signal intensity seen in the right side of the pons and right middle cerebellar peduncle, suggestive of acute ischemic insult leading to pontine infarction and cerebellar infarction (Figures 3 A, B and C).

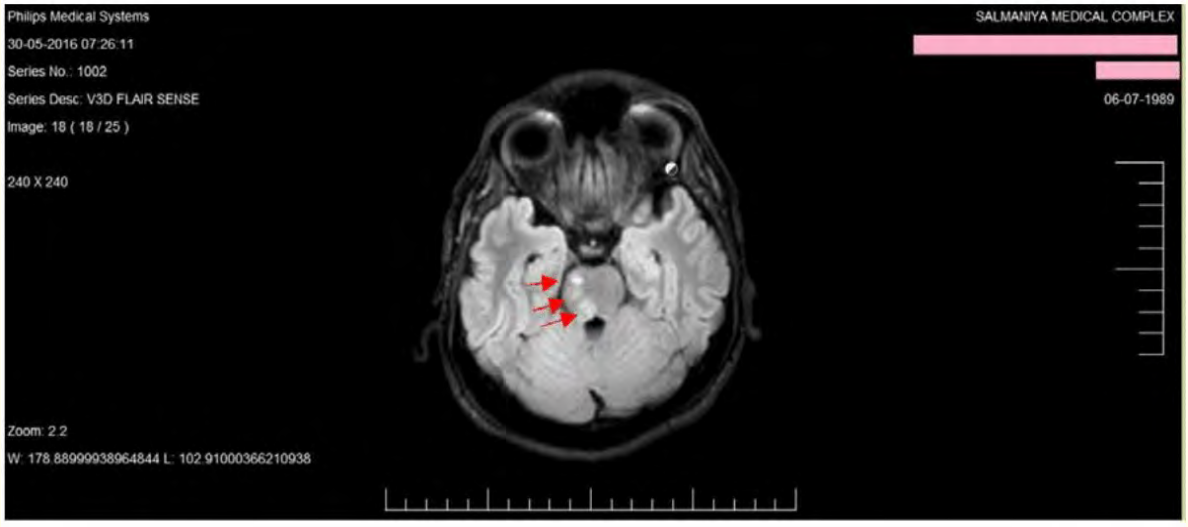

Figure 3A: *Axial T1-weighted MRI showing multiple foci of altered signal intensity in the right aspect of the pons (red arrows).*

Figure 3B: *Sagittal T1-weighted MRI image showing the same foci of altered signal intensity in the right aspect of the pons involving the middle cerebellar peduncle (red arrow).*

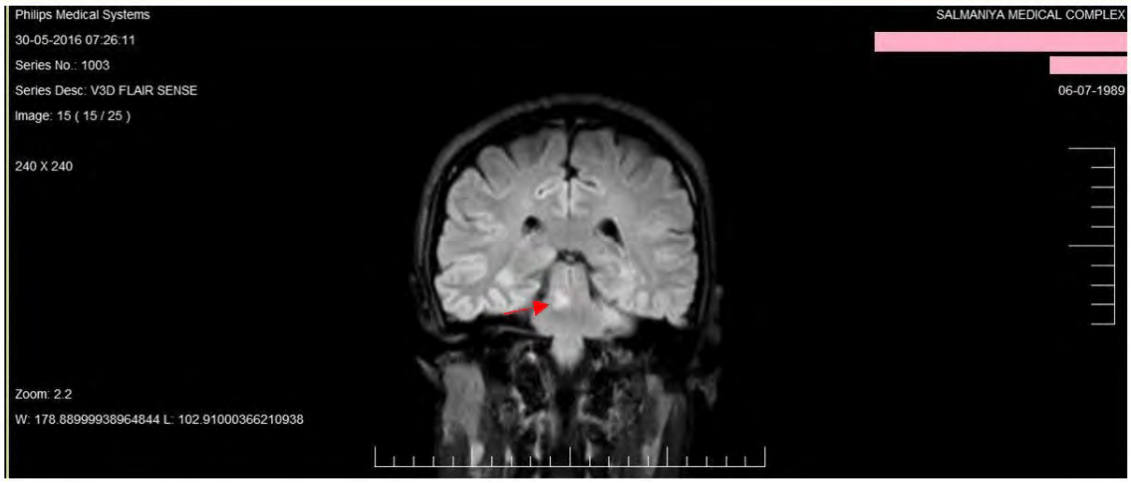

Figure 3C: *Coronal T1-weighted MRI image a focus of altered signal intensity in the right aspect of the pons at the level of the middle cerebellar peduncle (red arrow).*

Definite diagnosis

Pontine and cerebellar infarction due to right vertebral artery dissection.

Management

The patient was admitted and started on anti-coagulation therapy and physiotherapy, with remarkable improvement in the following week. The patient was seen one month later and his ocular motility reverted back to normal. He didn't complain of diplopia, his gait was normal, and he showed no other neurological signs.

Discussion

To the best of our knowledge, this is the first case of Internuclear Ophthalmoplegia due to Vertebral Artery dissection to be reported in the Kingdom of Bahrain. On literature review few similar cases were reported worldwide, where stroke occurred in the setting of a sport related injury. In those cases, arterial dissection was the main pathophysiological mechanism [3].

Jickling G., *et al*. reported a case in 2008 of a 21 year-old woman with bilateral internuclear ophthalmoplegia following a fall with trauma to the posterior aspect of the neck. In that case dissection of the Left Vertebral Artery was diagnosed [4]. Therefore, the laterality of INO may not necessarily reflect the laterality of the vertebral artery affected [5].

In 2000, 5 cases of vertebral artery dissection were reported by McCory P all of which occurred in sport [6], making this a very important diagnosis to consider in young patients with signs and symptoms of brainstem insult. It is also important to consider Vertebral Artery dissection as a differential diagnosis in any young patient with cranio-cervical pain, as this condition can present with a spectrum of signs and symptoms starting from simple headaches and neck pain, to the more worrisome presentation of severe cerebellar insult or posterior lateral medullary syndrome as reported by Chang A., et al. in 1999 [7].

Conclusion

In conclusion, Ophthalmologists and Neurologists alike, need to be aware of the diagnosis of vertebral artery dissection, and keep a high index of suspicion for such cases when faced with a young patient with otherwise unexplained INO or other brainstem signs specially when there is history of minor or major trauma, or sport-related injury.

Consent

Informed consent was obtained from the patient for the use of his data in a case report for educational and research purposes.

Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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