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Case Report

Cervical Spine Injury and Subsequent Cerebellar Ischemia in a Post-Trauma Patient

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Abstract:

Cerebellar infarction is a rare but significant complication following cervical spine trauma, particularly in cases involving vertebral artery injury. We report a case of a 45-year-old male who developed acute cerebellar infarction after a road traffic accident resulting in cervical spine injury. MRI confirmed the infarction and MR angiography was advised to diagnose underlying vertebral artery dissection. Prompt diagnosis with either CT angiography or MR angiography and multidisciplinary management, including antithrombotic therapy and cervical spine stabilization, lead to significant neurological recovery.

Key Words: *Cervical spine trauma, Cerebellar infarction, CT angiograpgy, MR angiography, Vertebral artery dissection.*

Introduction

Cervical vertebral injuries are a significant concern in road traffic accidents (RTAs). These injuries can lead to spinal cord compression and associated neurological deficits. Vertebral artery dissection (VAD) is a rare yet critical condition that can arise following cervical spine trauma. This can result in impaired blood flow to the brain, increasing the risk of ischemic events such as cerebellar infarcts. This case report presents a unique instance of a cervical vertebral injury accompanied by spinal cord compression and suspected vertebral artery dissection, which ultimately led to a cerebellar infarct in a patient involved in a RTA

Case description

After a road traffic accident (RTA), a 45-year-old man with quadriparesis arrived at a district medical college hospital on the day of incidence. 2 days after initial management serious cervical spine damage with surrounding soft tissue swelling extending from C2-C6 vertebral level was discovered by CT scan of cervical spine. He was moved to the intensive care unit (ICU) of a government run tertiary care hospital on 4th day of incidence for further treatment. His Glasgow Coma Scale (GCS) score upon admission was E4V2M4, along with bilateral extensor plantar reflexes and exaggerated deep tendon reflexes, indicating severe upper motor neuron gdamage. In addition, he developed aspiration pneumonia and Type 2 respiratory failure as a result of respiratory muscle weakness due to phrenic nerve involvement, which necessitates immediate intubation and mechanical ventilation. The patient underwent anterior cervical discectomy and fusion (ACDF) at C2-C6 level under general anesthesia to address the spinal cord compression. But gradually he became unresponsive most likely due to intracranial hemorrhage or raised ICP causing brainstem compression. Subsequently CT scan of brain excluded hemorrhage and MRI brain showed right sided cerebellar infarct. This was explained by a likely dissection of the vertebral arteries, which is a known consequence of trauma to the cervical spine. Non-dominant vertebral artery compression, which could have resulted from soft tissue or bony structures at the location of damage, was one of the differential diagnoses. Unfortunately, the patient's clinical deterioration prevented the completion of additional assessment using duplex ultrasonography and MR angiography. The patient ultimately succumbed to septic shock, a consequence of severe aspiration pneumonia.

Figure 1: MRI cervical spine showing spinal Cord contusion from **C2-C6**

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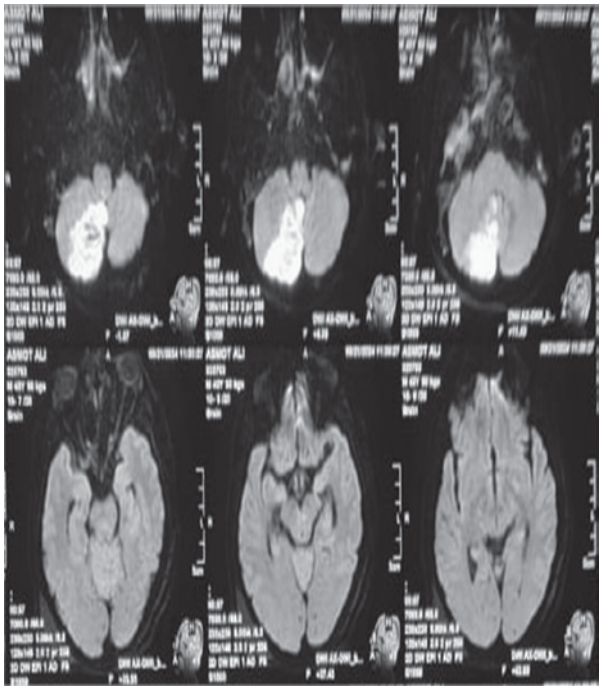

Figure 2: MRI of brain DWI imaging showing right Cerebellar infract

Discussion:

Although neurological impairments and spinal stability receive a lot of attention, vascular problems such as vertebral artery dissection (VAD) are typically overlooked but serious aftereffects of such accidents. Cerebellar infarctions and other posterior circulation ischemic strokes have been linked to traumatic VAD. An intimal rupture in the vertebral artery wall causes intramural hematoma formation, arterial dissection and luminal stenosis or occlusion as part of the pathogenesis of VAD[1]. In certain instances, this process puts the patient at risk for ischemic strokes due to thromboembolic events. Because the vertebrobasilar system supplies vital tissues such the brainstem, cerebellum, and occipital lobes[2]. From the cavernous sinus to the common carotid artery, the carotid artery may sustain damage [3]. Just past the bulb is where carotid dissection occurs most frequently. The intima in this area may have increased wall tension as a result of head motions [4]. In one case series, however, only 3.9% of carotid dissections originated in the proximal third of the internal carotid artery, 96.1% affected the distal two-thirds, and 49.0% solely involved the distal third[5].

The most effective method for identifying acute cerebellar infarctions is magnetic resonance imaging (MRI) combined with diffusion-weighted imaging (DWI). Additionally, vascular anomalies such arterial dissection, stenosis, or occlusion can be detected using computed tomography angiography (CTA) or magnetic resonance angiography (MRA)[6].

A combination of medicinal and surgical procedures is used to treat posterior circulation strokes and VAD[7]. The mainstay of treatment to stop additional thromboembolic episodes is antithrombotic therapy, which includes antiplatelet or anticoagulant medications. Endovascular procedures like stenting or angioplasty might be necessary in situations of increasing ischemia or hemodynamic instability. Surgical stabilization is frequently required for patients who have concurrent cervical spine injuries in order to stop additional vascular impairment[8].

Conclusion

The significance of early detection and thorough treatment of cervical spine injury complications, such as infection, vascular sequelae, and respiratory failure, is highlighted by this case. To maximize results, a multidisciplinary strategy combining neurosurgery, neurology, critical care, and rehabilitation is essential.

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