Carotid artery dissection following posterior neck trauma

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Abstract

Introduction: Dissection of the carotid arteries can occur in the general population as a result of blunt trauma to the neck, such as a car accident or a fall, or from hyperextension of the neck in sports or exercise. According to recent studies, the incidence of carotid artery dissection as a result of blunt injuries (mainly high-speed motor vehicle accidents) ranges from less than 1% to 3%.
Methods: We present a case of dissection of the right common carotid artery in a 25 years old patient after blunt neck trauma at the workplace.
Results: The patient complained of neck pain. The radiologic exam revealed a dissection of the right CCA associated with the stenosis of the lumen up to 75 – 78 %. The angiosurgeon of the case confirmed the radiologic diagnosis.
Conclusion: During the traumas of the neck region, performing the right protocol of examinations will improve treatment and prognosis.

Key words: Common Carotid artery dissection, neck trauma, Doppler ultrasound, Angio CT.

Introduction

Carotid artery dissection begins as a tear in one of the carotid arteries of the neck, which allows blood under arterial pressure to enter the wall of the artery and split its layers. The result is either an intramural hematoma or an aneurismatic dilatation, which can be both a source of micro emboli, with the latter causing also a mass effect upon the surrounding structures. Dissection of the internal carotid artery can occur intracranially or extracranially, with the latter being more frequent (1). Internal carotid artery dissection can be caused by major or minor trauma, or it can be spontaneous, in which case, genetic, familiar, or inherited disorders are likely etiologies (2). The actual incidence may be higher; some dissections are asymptomatic or cause only minor transient symptoms and remain undiagnosed (3,4). The cause of Carotid Artery Disease (CAD) is usually a form of trauma, possibly superimposed

upon a predisposing condition such as fibromuscular dysplasia (5). The trauma, which is often the immediate cause, may be major or minor. Traumatic events which have been reported to precede CAD include sport injuries, road accidents (including deceleration trauma from airbags (6), etc. The diagnosis should be suspected in any individual who presents with transient unilateral weakness or transient unilateral blurred vision that occurs after direct trauma or hyperextension of the neck. Workplace activities that might give rise or have risk to cause CAD can be roughly divided into two: those that involve acute traumatic events and delayed traumas. Most acute traumatic events have a sudden and unexpected character — a quick blow to the neck or an abrupt turning of the head with lateral flexion of the neck, which may be enough to compress the internal carotid artery against the transverse process of one of the upper cervical vertebra, causing the initial intimal tear in an otherwise healthy vessel. Perhaps, of more relevance in the workplace are the manifold situations in daily life that involve forced neck positions that might lead to CAD.

Aim

Our objective is to highlight the role of performing the correct protocol of examinations in the case of traumas as a basic step and as a major role in the treatment and prognosis of disease.

Case report

The patient, P.M. 25 years old, presented initially at the ER of University Trauma Hospital in Tirana, after a marble tile fall on the neck at the workplace. The patient's conditions were stable, without motor and sensor deficits, without neurological problems, only with presence of subcutaneous emphysema on the right cervical region. In these conditions was performed an urgent CT scan of the chest, which revealed no rupture of the bronchi, no sign of lung collapse, neither esophageal rupture. After that, the ENT specialist excluded the injury of trachea and oropharynx. Further diagnostic examinations were performed. Doppler ultrasound of the neck revealed a right common carotid artery (CCA) dissection, with 75-78% stenosis of the lumen. AngioCT scan of the neck revealed rupture of the intima in the right CCA, with significant stenosis of the lumen, without having the possibility of measuring the extension of the dissection. The intracranial arteries were within the normal limits and flow voids.

Carotid Doppler sonography examination showed right CCA, with Dmax 7 mm. A dilatation was noted 3 cm from the bifurcation, extending up to 9.7 mm, continuing with a dissection of the intima and presence of a false lumen. The lumen below the dissection was D_{max} 7.2 mm.

The real lumen was D_{max} 3.8 mm. At the level of the stenosis the flow velocity was 220 cm/ sec, (Figure 1).

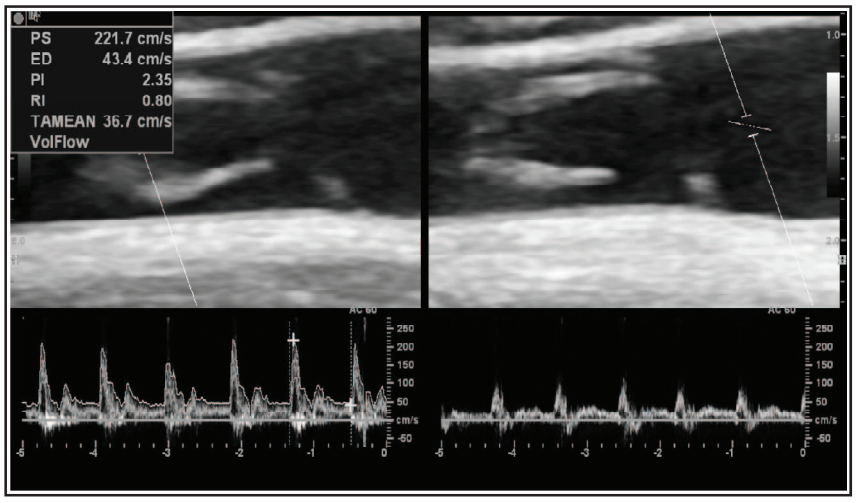

Figure 1 . Spectral analisys of the right CCA and speed velocity differences in the false and real lumen

The dissection caused a stenose of about 75 – 78 % (Figure 2).

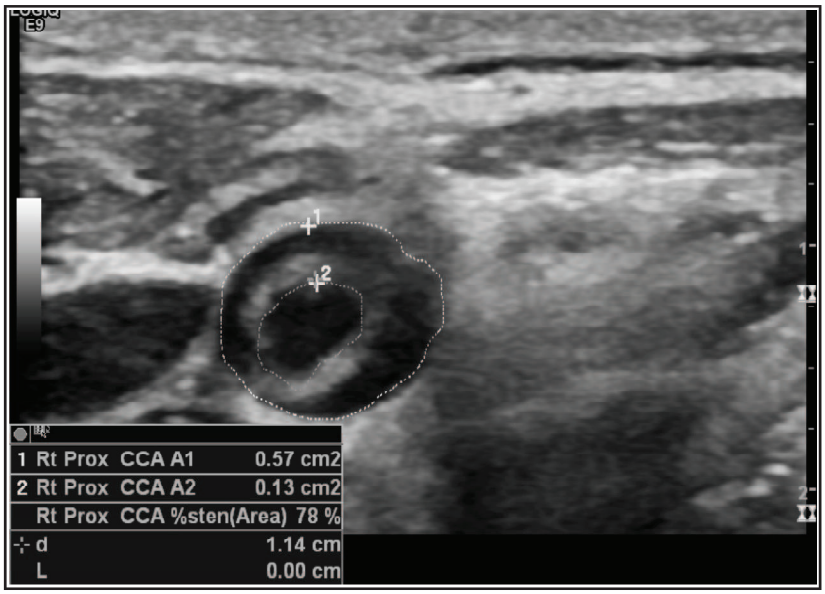

Figure 2. Right CCA stenosis of about 78 %

AngioCT of the neck and head confirmed the rupture of the intima in the right CCA associated with significant stenosis **(Figure 3**).

Figure 3. Stenosis of the right CCA noted during the angioCT of the neck

It was difficult to evaluate the extent of the dissection through the lumen of the right CCA, because of the orientation of the dissection and the displacement of the intima freshly dissected from the blood flow.

The intracranial circulation was unremarkable. There

was no evidence of right and left ACI and ACE damage. There was no evidence of vertebral arteries injury, bilaterally.
The patient underwent carotid surgery. An arterial bypass was performed. The actual conditions of the patient are satisfying.

Discussion

Carotid artery dissections should be considered in patients presenting with localized signs after severe trauma. They have varied presentations that depend on the location and the vessel involved. The heterogeneous clinical pictures associated with carotid artery dissections often lead to delays in diagnosis and treatment. The condition may be asymptomatic or result in minor symptoms, in stroke, or even death.
The diagnostic protocol for the neck arteries injuries included Doppler sonography. When a carotid bruit is auscultated, a duplex ultrasound examination should be done with quantification of the injuries. The report of the duplex ultrasonography findings should stratify the degree of stenosis based on a combined view of spectral Doppler ultrasonography velocity broadening (1,7).
If the patient is found to have a greater than 60% asymptomatic stenosis, then evaluation should include additionally a CT scan of the region (2,8).
If CT scan results negative for stroke or bleeding and the patient has a stenosis greater than 60%, then a carotid endarterectomy should be considered.
In our case, performing the right protocol was very important in diagnostication of this traumatic pathology. This influenced the prompt treatment with very satisfied results.
In conclusion, carotid artery dissections are rare lesions following head and neck injuries. They are usually suspected in the case of direct trauma to the neck, or if there is evidence of osseous fractures along the course of one of the major cranial arteries. They should be considered in patients after severe trauma presenting with localizes signs and minimal findings on CT scan, as is the case reported above. A multidisciplinary approach is needed to establish the diagnosis and initiate the appropriate treatment.

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