

A rare case of a vertebrojugular arteriovenous fistula: A case report and review of literature

ABSTRACT

Vertebrojugular fistulas have been described in the literature associated with blunt or penetrating injury and iatrogenic or spontaneous development. Its presentation may be broad and may include symptoms of radiculopathy, vertebrobasilar insufficiency, tinnitus, and bruit. However, so far, no direct cardiac complications had been reported. Here, we describe a case of an 86-year-old female who suffered a C5 vertebral fracture secondary to a ground-level fall that was initially treated conservatively due to the onset of new severe atrial fibrillation. However, the patient was later on taken to surgery due to progressive neurologic deterioration. Intraoperative complications led to the diagnosis of a vertebral-jugular fistula that was successfully embolized. The effective obliteration of the fistulae led to the recovery of both neurologic and cardiac symptoms.

Keywords: Arteriovenous fistulae, atrial fibrillation, vertebral artery, vertebrojugular arteriovenous fistulae

INTRODUCTION

Vertebrojugular arteriovenous fistulas (AVFs) have been described in literature secondary to penetrating, blunt or iatrogenic injury, as well as spontaneous development.^[1-3] This pathology is uncommon due to the well-protected location of the vertebral artery circulation. It may have multiple presentations such as radiculopathy, pulsatile tinnitus, vertebrobasilar insufficiency, or bruit.^[4,5] In the past, these entities were mostly treated with open surgical intervention; however, the advantage provided by current endovascular is currently used now for prompt diagnosis and treatment.^[6-8] In this case report, we describe the development of a vertebrojugular fistula after traumatic cervical vertebrae fracture in an elderly woman that led to a symptomatic severe atrial fibrillation that initially prohibited intervention. It was later found that the fistula was the etiology of the cardiac complications.

CASE REPORT

An 85-year-old female arrived to the emergency room after experiencing a ground-level fall. The initial physical examination revealed that the patient had a left upper

limb abduction 4/5 weakness with mild C5 dermatome hypoesthesia. Vitals were found to be stable, and other than a previously diagnosed essential tremor, the patient was found in her usual state of health. Initial neck computed tomography (CT) revealed a C5 fracture involving the body, left transverse process and transverse foramen, and mild anterolisthesis as well as C6 left transverse process comminuted fracture. Neck CT angiography revealed slight contrast extravasation at C6 transverse process region with normal vascular reconstitution above and below the injury level. Cervical spine magnetic resonance imaging disclosed a C4-5 disc bulging with concomitant T2 cord hyperintensity and soft tissue enhancement which in the setting of acute trauma was believed to correlate with spinal cord contusion and an associated ligamentous injury [Figure 1].

FANOR SAAVEDRA-POZO, JUAN VICENTY-PADILLA, RAFAEL RODRIGUEZ-MERCADO

Department of Surgery, Neurosurgery Section, University of Puerto Rico Medical Sciences Campus, San Juan, PR 00936

Address for correspondence: Dr. Fanor Saavedra-Pozo, Department of Surgery, Neurosurgery Section, University of Puerto Rico Medical Sciences Campus, PO Box 365067, San Juan, PR 00936. E-mail: manusp30@gmail.com

Access this article online	
Website: www.jcvjs.com	Quick Response Code 
DOI: 10.4103/jcvjs.JCVJS_49_17	

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Saavedra-Pozo F, Vicenty-Padilla J, Rodriguez-Mercado R. A rare case of a vertebrojugular arteriovenous fistula: A case report and review of literature. *J Craniovert Jun Spine* 2017;8:268-70.

Due to the high suspicion of instability, the patient was admitted for emergency spinal stabilization surgery. Soon after admission, the patient's hemodynamic status was compromised due to an unstable supraventricular tachycardia that required aggressive medical management and prevented from pursuing surgical stabilization due to the high cardiac risk associated. The patient's family was oriented regarding the related risks and at that time family refused surgical treatment.

Soon after the patient's recovery, she was discharged home with a rigid cervical orthosis for conservative management and was subsequently followed in sequential outpatient visits. The patient's clinical course was marked by deterioration of the left upper limb weakness, mainly abduction and handgrip as well as anesthesia. Follow-up imaging revealed worsening of C4-5 anterolisthesis due to vertebral subluxation [Figure 2]. After proper medical and cardiac risk assessment, a decision was made to admit the patient for placement of Gardner-Well Traction for reduction and an attempt at surgical stabilization and fusion.

The surgical plan was to attempt an anterior C4-5 discectomy and fusion. The intraoperative course was marked by an evident arterialized bleed from superficial muscle veins and again from the left interbody area during the distraction procedure for the discectomy and arthrodesis. Hemostasis was successfully and easily controlled with the use of absorbable hemostatic polymers and packing. Instrumentation was not possible due to poor C4 vertebral bone quality. In view of this abnormal venous-arterialized bleeding, a postoperative digital subtraction angiography (DSA) was scheduled.

Postoperative DSA revealed a left vertebral AVF at the cervical portion with drainage into the left internal jugular vein. At the time, the AVF was successfully treated with embolization with fiber and aneurysmal coils for a resulting total occlusion [Figure 3].

The patient's clinical course after both interventions was marked not only by improvement of her neurologic deficits but also of and additional progressive resolution of her cardiac instability including complete wean off the rhythm control medications.

DISCUSSION

The patient presented a posttraumatic AVF that led to serious cardiovascular complications that in the acute phase of her illness imposed a serious threat on her life. The patient's advanced age and the stress created by the trauma were believed at the time to be the inciting or exacerbating factor for the development of the unstable arrhythmia. This may

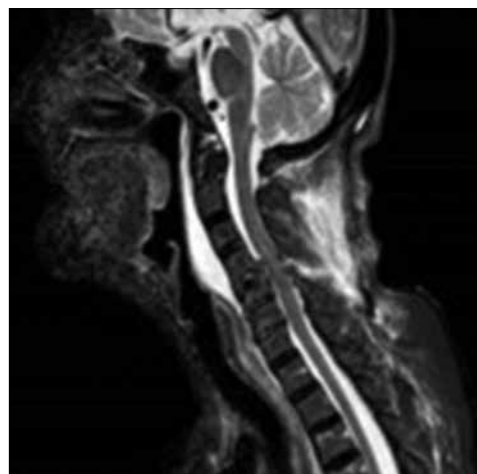


Figure 1: Sagittal T2-weighted demonstrating ligamentous and spinal cord injury

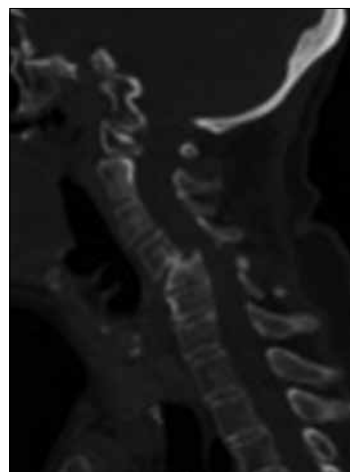


Figure 2: Sagittal computed tomography scan reconstruction demonstrating C4-5 subluxation

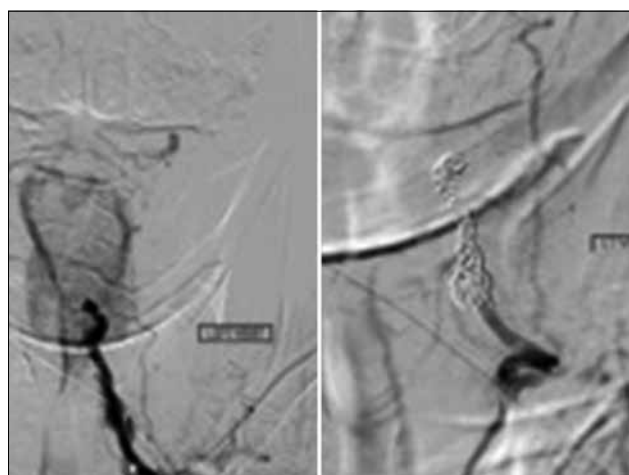


Figure 3: Digital subtraction angiography demonstrating before and after images of fistula and successful embolization

have acted as a confounding agent that likely led to a delay for a prompt diagnosis and treatment.

Although the current literature has described sporadic cases of posttraumatic development of AVFs that have been diagnosed after the onset of vascular insufficiency or neurologic symptoms,^[1-3] development or exacerbation of cardiac conditions must be considered as a manifestation of these entities. That is, the high risk for cardiovascular morbidity/mortality complications of such pathologies needs to be underscored, particularly in elderly patients such as the one presented above, even when conservative management is chosen. Therefore, that is why modern-day endovascular techniques have provided a safe approach for proper diagnosis and treatment of such pathologies.^[6-8] We believe that physicians encountering patients at risk for developing these conditions should be aware of the possible risks, and therefore, an exhaustive workup should be undertaken whenever new symptoms arise. Patients being treated at medical facilities with the advantage of endovascular specialists should have these to their disposal.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Heuer GG, Gabel BC, Bhowmick DA, Stiefel MF, Hurst RW, Schuster JM. Symptomatic high-flow arteriovenous fistula after a C-2 fracture. Case report. *J Neurosurg Spine* 2008;8:381-4.
2. Stock U, Link J, Dütschke P. Iatrogenic vertebrojugular arteriovenous fistula. *Anaesthesia* 1996;51:687-8.
3. Kypson AP, Wentzensen N, Georgiade GS, Vaslef SN. Traumatic vertebrojugular arteriovenous fistula: Case report. *J Trauma* 2000;49:1141-3.
4. Shirakawa M, Nishioka T, Yamashita K, Maeda Y, Arita N. Traumatic vertebro-vertebral arteriovenous fistula manifesting as radiculopathy. Case report. *Neurol Med Chir (Tokyo)* 2008;48:167-70.
5. Madoz A, Desal H, Auffray-Calvier E, Isnard J, Liberge R, Taverneau C, *et al.* Vertebrovertebral arteriovenous fistula diagnosis and treatment: Report of 8 cases and review of the literature. *J Neuroradiol* 2006;33:319-27.
6. Garcia-Cervigon E, Bien S, Laurent A, Weitzner I Jr., Biondi A, Merland JJ. Treatment of a recurrent traumatic carotid-cavernous fistula: Vertebro-basilar approach after surgical occlusion of the internal carotid artery. *Neuroradiology* 1988;30:355-7.
7. Okuchi K, Fujioka M, Konobu T, Fujikawa A, Miyamoto S, Morimoto T, *et al.* A case of Hangman's fracture associated with vertebral arteriovenous fistula treated with trapping. *No Shinkei Geka* 1994;22:55-9.
8. Hung CL, Wu YJ, Lin CS, Hou CJ. Sequential endovascular coil embolization for a traumatic cervical vertebral AV fistula. *Catheter Cardiovasc Interv* 2003;60:267-9.