

# Stent placement to treat positional occlusion of the vertebral artery: A report of two cases

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## Abstract

Positional occlusion of the vertebral artery is suspected in patients who present with posterior circulation signs or symptoms related to a specific head position. So far, the only reported treatment is surgery with the aim of relieving the position-dependent pressure that is applied to the vessel. We report on two patients who were treated successfully with stent placement.

**Key words:** positional occlusion, vertebral artery, stent.

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## Introduction

Positional occlusion of the vertebral arteries is an established, albeit rare, cause of posterior circulation ischemia. It is known to occur as a consequence of chiropractic manipulation,<sup>1</sup> surgical positioning,<sup>2</sup> trauma,<sup>3</sup> or simple head rotation.<sup>1</sup> In many cases, it is a benign phenomenon that can be observed in asymptomatic individuals.<sup>4</sup> Posterior circulation ischemia (often referred to as bow hunter's syndrome) is more likely to ensue if the contralateral vertebral artery is hypoplastic or diseased.<sup>5</sup> Compression of the vertebral artery can occur at three levels: At the V1-segment (caused by muscles), at the V2-segment (usually caused by osteophytes) or at the V3-segment (caused by muscles, the atlanto-occipital membrane, or trauma). The V3-segment seems to be the most common site of compression, especially at the atlanto-axial joint.<sup>5</sup>

Dynamic angiography; i.e., angiography of a vessel performed in different head positions is the gold standard for diagnosis.<sup>5</sup> Invasive treatment, when deemed necessary, is decompression by means of surgery.<sup>1,5-7</sup>

## Abbreviations, in the order used in this report.

MRA: magnetic resonance angiography  
CT: computed tomography

## Commercial products, in the order referenced in this report.

TAXUS® Express™	Boston Scientific, Natick, Massachusetts, USA
Acculink™	Guidant Corp., Santa Clara, California, USA
Maverick®	Boston Scientific, Natick, Massachusetts, USA

## Case 1

A 61-year old man presented with multiple strokes in the posterior fossa. A reliable history regarding symptoms relating to head position could not be elicited. MRA showed a hypoplastic or stenotic left vertebral artery and a focal stenosis of the right vertebral artery at the C4-C5 level (Figure 1). Cerebral angiography was performed to further evaluate the posterior circulation. The left vertebral artery was shown to be hypoplastic. The right vertebral appeared normal in a neutral neck position (Figure 2A). Head turning to the left had no effect (Figure 2B). However, turning of the head to the right beyond 45 degrees caused near-occlusion at the C4-C5 level (Figure 2C).

The decision was made to stent the affected segment of the vertebral artery. Due to excessive tortuosity in the proximal vertebral artery, the procedure was performed via a brachial artery approach. A 3x20 mm *Taxus Express* stent was successfully deployed across the affected segment of the vessel. A

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**Figure 1.** MRA of the cervical vessels shows a stenosis of the right vertebral artery at the C4-C5 level.

repeat angiogram, two weeks after stent placement, showed no compromise of the vertebral artery upon head turning (Figure 2D). The patient reported no further neurological symptoms. CT of the cervical spine (Figure 3) showed an unciniate spur abutting the stent.

## Case 2

A 70-year old woman presented with a one-year history of dizziness and ataxia upon turning her head to the left. The patient had undergone anterior cervical discectomy and fusion at C5-C6 for treatment of cervical spondylosis and disc herniation at approximately the time when her symp-

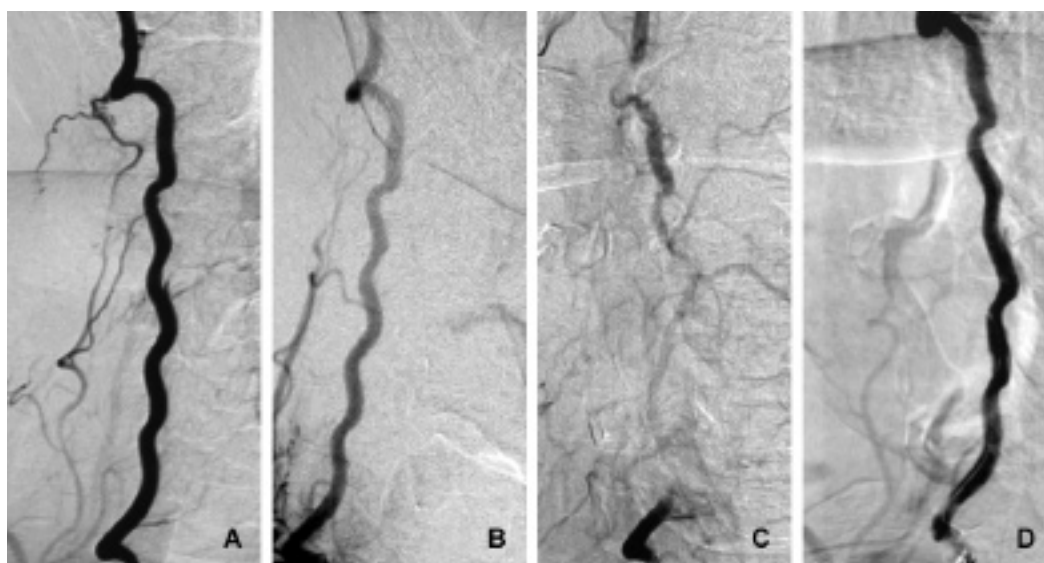
toms started. Cardiac evaluation was negative. An MRA of the head and neck was then performed and it revealed a left cervical vertebral artery stenosis.

Dynamic angiography showed a focal stenosis of the left vertebral artery at the C5-C6 level which became near-occlusive with head turning to the left. The right vertebral artery was hypoplastic and ended at the level of the posterior inferior cerebellar artery.

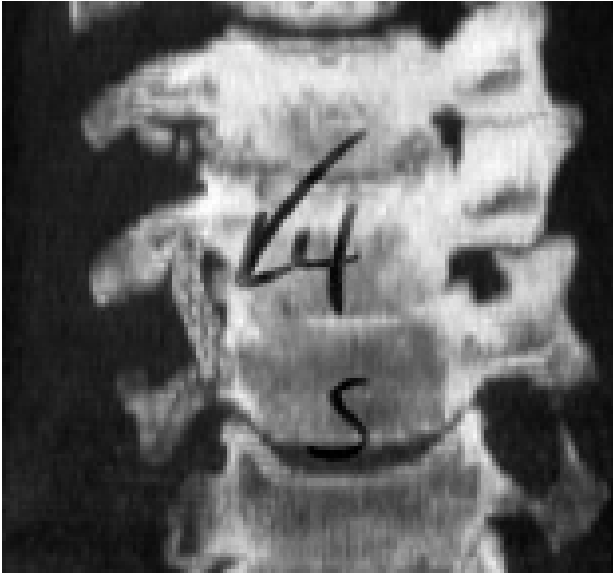
After discussion with the patient, it was decided to treat the lesion by placing a stent. A 5x20 mm *Acculink* stent was placed across the lesion and deployed. There was some residual stenosis, therefore post-stent angioplasty was performed with a 3.5x12 mm *Maverick* balloon. Some contrast extravasation was noted on subsequent runs, originating near the distal rim of the stent. A second 5x20 mm *Acculink* stent was deployed distal to the original one with overlap over the area of extravasation. No further contrast extravasation was seen. The patient has remained asymptomatic for 3 months following the procedure.

## Discussion

Both patients had symptomatic positional occlusion of a vertebral artery associated with hypoplasia of the contralateral vertebral. Unlike in most reported cases, the compromise of the vertebral was induced by head turning to the same and not to the opposite side. In both cases, we believe that treatment was warranted in order to prevent more episodes of posterior circulation ischemia and stroke. To our knowledge, there are no other published reports of vertebral artery stent placement for this indication. Treatment, when performed, has invariably been surgical. In our two cases stent placement was efficacious in abolishing symptoms for at least two weeks and three months respectively. Clearly, follow-up of more patients over longer periods of time will be needed, before stent placement can be widely recommended for this indication. However, stent placement may prove to be a less invasive alternative to surgery for treating this rare condition.



**Figure 2.** Antero-posterior projections following right vertebral artery injection. The right vertebral artery appears normal with the head in neutral position (A) and turned to the left (B). There is severe compromise of right vertebral artery flow with the head turned to the right (C). Figure 2D shows After stent placement, right vertebral artery flow returned to normal with the head turned to the right (D).



**Figure 3.** CT of the cervical spine. The arrow points to a spondylotic spur that abuts the vertebral artery at the level where the stent was placed.

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