

## *The Role of Stenting in Management of Isolated Symptomatic Basilar Artery Stenosis*

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### ABSTRACT

Isolated basilar artery stenosis (BAS) is a rare etiology of ischemic neurologic conditions. First-line treatment of symptomatic stenosis is typically medical therapy as outlined in the Warfarin–Aspirin Symptomatic Intracranial Disease (WASID) trial and the Stenting versus Aggressive Medical Therapy for Intracranial Arterial Stenosis (SAMMPRIS) trial.<sup>1,2</sup> We present the case of a male in his 60s with isolated BAS who failed maximal medical treatment but experienced a decrease in transient ischemic attacks and acute ischemic stroke occurrences after angioplasty and stenting.

### KEYWORDS

Isolated Basilar Artery Stenosis, Medical Management

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### BACKGROUND

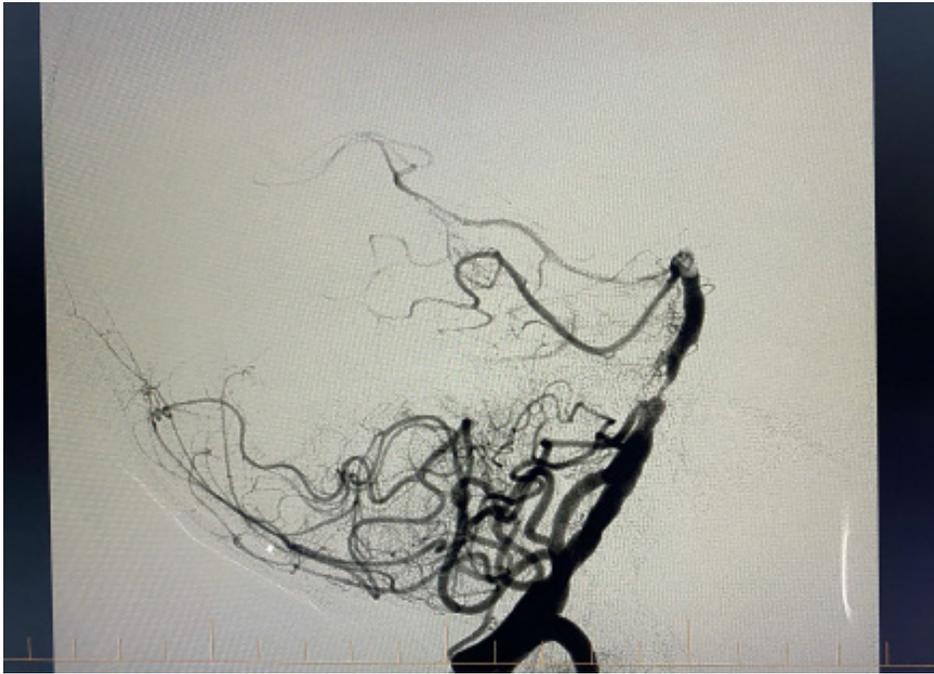
Isolated basilar artery stenosis (BAS) is a rare etiology of transient ischemic attack (TIA) and acute ischemic stroke (AIS), accounting for only 1.43% of cases.<sup>3</sup> The condition presents with a range of symptoms and rapidly progresses in severity. Multiple TIAs preceded infarction in certain patients with BAS, and in 60% of those cases, a posterior circulation stroke occurred two weeks after the initial TIA.<sup>4</sup> Further evidence of the need for appropriate management is that neurologic state after the onset of symptoms with BAS has the potential to significantly impact the long-term prognosis of patients.<sup>9</sup> First-line medical management of symptomatic BAS is typically medical therapy, as outlined in the Warfarin–Aspirin Symptomatic Intracranial Disease (WASID) trial and the Stenting versus Aggressive Medical Therapy for Intracranial Arterial Stenosis (SAMMPRIS) trial.<sup>1,2</sup> Although studies have detailed the management of BAS, it has mainly been described in the context of diffuse intracranial atherosclerosis.<sup>5,6,7,8,9</sup> Management of BAS in an isolated scenario without the risk factors posed by the presence of atherosclerotic disease elsewhere has not been widely reported to our knowledge. We present the case of a male in his 60s with isolated BAS who

failed maximal medical treatment but experienced a decrease in TIA and AIS occurrences after angioplasty and stenting.

### CASE REPORT

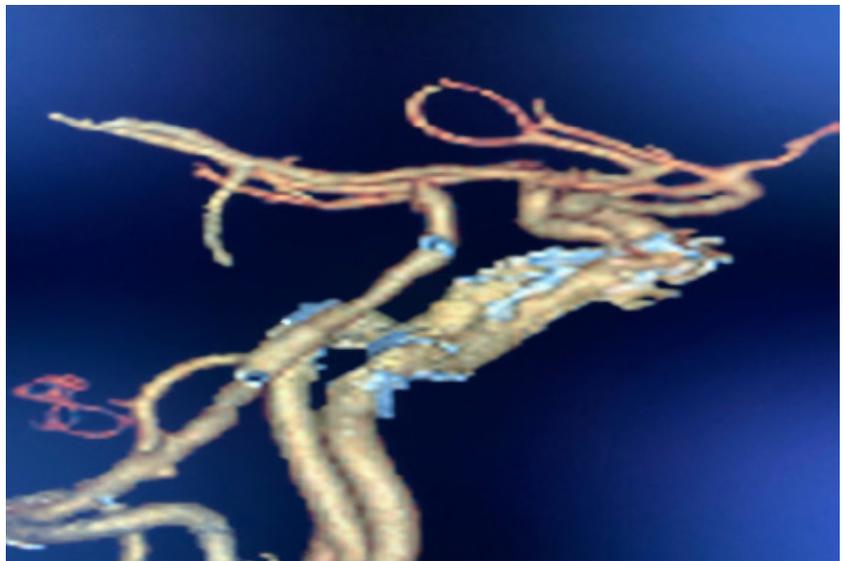
Our patient is a male in his 60s who presented with complaints of two episodes of left-sided hemiparesis. Symptoms resolved spontaneously after 10 minutes, and the patient was stable upon admission. The patient had no pertinent past medical history or prior ischemic events. He denied tobacco use. Computed tomography angiography (CTA) showed the anterior cerebral, anterior communicating, middle cerebral, posterior cerebral, and right communicating arteries patent with minimal atherosclerosis. The left communicating artery was not visualized. CTA also showed patent dural sinuses and internal carotid arteries. High-grade basilar artery stenosis within its proximal mid-course was visualized on an angiogram (Figure 1). The patient was admitted on suspicion of a transient ischemic attack related to basilar artery stenosis. He was started on a loading dose of Plavix 300 mg followed by Plavix 75 mg, Atorvastatin 80 mg, and Aspirin 325 mg daily per SAMMPRIS protocol. National Institutes of Health (NIH) stroke scale score was





**FIGURE 1.** Angiogram showing >90% BAS.

determined to be 0. The patient had no acute events overnight, and he was discharged on a regimen of Aspirin 325 mg daily, Plavix 75 mg daily, and Atorvastatin 80 mg daily. 24 days later the patient presented with right upper extremity weakness. He denied medication nonadherence. CTA indicated >90% basilar artery stenosis. Magnetic resonance imaging (MRI) visualized an acute left cerebellar hemisphere infarct. Treatment teams determined that an eventual cerebral angiogram with angioplasty of the basilar artery would be beneficial. Soon after, the patient developed left-sided numbness and dizziness. MRI demonstrated a stroke in the inferior basilar artery territory. Interventional radiology (IR) decided to proceed with angioplasty. Post-procedure, cerebral angiogram showed a 50% short segment dissection in the region of the stenosis. IR then proceeded with angioplasty and neuroform atlas stent placement. Repeat cerebral angiogram demonstrated minimal residual BAS. The patient remained stable post-procedure. All cerebral arteries were visualized as patent on CTA (Figure 2) when the patient came in once more for concern over forearm tingling. It was determined his symptoms



**FIGURE 2.** CTA demonstrating improvement in basilar artery patency.

could not be explained in the setting of normal CTA of the head and neck. After this initial post-operative visit, the patient did not return for any neurological issues.

## DISCUSSION

Many studies discussing the management of BAS are in the context of coexisting cerebral or vertebral



artery atherosclerosis.<sup>5,6,7,8,9</sup> Our patient's case draws attention to the management of isolated BAS. The patient experienced an infarction while remaining adherent to the first-line medical treatment of BAS outlined in the SAMMPRIS protocol. Due to the failure of medical management, angioplasty of the basilar artery was the initial next step. Post-procedure, however, dissection in the region of the stenosis visualized on angiogram lead IR to proceed with basilar artery angioplasty and stent placement. The patient has remained stable with no incidents of TIA or AIS since then. Despite its efficacy in our patient, stent placement is not considered to be a first-line treatment option of BAS. In the SAMMPRIS trial, it was found that medical management is more effective than stent implantation in treating intracranial arterial stenosis.<sup>2</sup> This was concluded due to the increased risk of stroke post-stent placement and the efficacy of maximal medical therapy in decreasing stroke risk.<sup>2</sup> It was discussed how the presence of high-grade stenosis and acute symptoms could indicate the presence of unstable plaque.<sup>2</sup> This unstable plaque could then predispose patients to periprocedural embolism in the distal arterial circulation.<sup>2</sup> This is of concern as embolism arising from arterial circulation is the most prevalent cause of stroke in patients with isolated BAS.<sup>3</sup> In our patient, there was no incidence of periprocedural embolism or arterially derived embolism post-stent placement. This favorable outcome may be associated with the fact that CTA consistently visualized patent cerebral and vertebral circulation. Minimal atherosclerosis visualized in the vasculature, excluding the basilar artery, may have decreased the risk of arterially derived embolism associated with stent placement. Furthermore, the presence of collateral arterial circulation is strongly associated with a better prognosis in general for patients with symptomatic isolated basilar artery stenosis.<sup>3</sup> Another factor that may have contributed to the positive outcome in our patient is the location of the BAS. Stenosis of the basilar artery mid area is typically associated with poor prognosis in isolated BAS in comparison to other locations.<sup>3</sup> Our patient's stenosis of the basilar artery was located in the proximal mid-course.

## CONCLUSION

In the absence of diffuse atherosclerosis and no pertinent past medical history, our patient had a positive

response to angioplasty and stenting after failing maximal medical treatment. While the current literature is in favor of medical management, our patient's case suggests that stenting can have a positive outcome in decreasing ischemic occurrences associated with isolated BAS.

## AUTHOR AFFILIATIONS

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