



# Endovascular Treatment of Basilar Artery Stenosis with Drug-Eluting Balloon

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## Abstract

Cerebral arterial stenosis is a leading cause of stroke and insufficient blood supply. Percutaneous Transluminal Cerebral Angioplasty and Stenting (PTCAS) have been identified as an efficient therapy to treat vertebrobasilar stenosis. Angioplasty with drug-eluting balloon is one of the endovascular treatments to obtain a good vessel patency and to improve patency in the long term follow-up. However, the feasibility to treat the basilar artery stenosis by Drug-Eluting Balloon has not been reported previously. We report a case of a 74-year-old woman with a severe stenosis of basilar artery stenosis that was treated successfully using Drug-Eluting Balloon procedure. The favorable outcomes observed in this patient suggests that drug-eluting balloon may be a promising treatment option for basilar artery stenosis.

**Keywords:** Endovascular; Basilar Arterystenosis; Drug-Eluting Balloon

## Introduction

The symptomatic basilar artery stenosis is a fatal disease and the promising therapeutical strategy has not been well identified [1]. These patients at high risk of mortality and morbidity suffer from ischemic stroke and sudden death [2]. Stenting provides an ideal approach for basilar artery angioplasty and improved long-term prognosis of patients [3]. However, stenting still has several complications such as technical difficulty, post-interventional symptoms, and in-stent restenosis [4]. In the study, we report a case of symptomatic basilar artery stenosis that was successfully treated using drug-eluting balloon.

## Case Presentation

A 74-year-old woman with a history of hypertension presented with episodic vertigo for 4 years. Antihypertensive agent was used for 1 year. Due to the risk of cerebrovascular disease, she started on aspirin 100 mg/day, atorvastatin 20 mg/day for 1 year. She had 3 min to 5 min-lasting intermittent vertigo. On physical examination, she had no neurologic deficits. After the patient was admitted to our hospital, she was given aspirin 100 mg/day, clopidogrel 75 mg/day, and atorvastatin 20 mg/day.

Digital subtraction angiography clearly showed 5 mm long tight stenosis involving the mid portion of the basilar artery and 70% to 80% luminal stenosis of the basilar artery (Figure 1A). Based on severe clinical symptoms, we decided to perform an angiography to treat the basilar artery stenosis. A written consent was therefore expressed by the patient. We opted to perform a percutaneous transluminal angioplasty with a 3 mm × 20 mm Ultra-soft monorail balloon (Boston Scientific, Natick, US) and afterwards with a 3 mm × 20 mm Elutax drug-eluting balloon (Aachen Resonance GhMB; Vilnius, Lithuania) inflated for 60 sec and slowly deflated in order to reduce artery dissection risk (Figure 1B). No complications were observed.

## Discussion

Acute basilar artery occlusion is a fatal disease associated with poor survival and mortality rates approaching 90% without treatment [5]. Recanalization is the promising strategy for BAO therapy [6]. Atherosclerosis plaques are the most common lesion found in the basilar artery system, causing vascular stenosis or occlusion [7].

Percutaneous transluminal angioplasty is a well-established method for the treatment of artery atherosclerotic lesions [8]. Stenting has been identified to improve the safety and durability of angioplasty in every circulatory bed [9]. Despite accumulating experience in patient enrollment,

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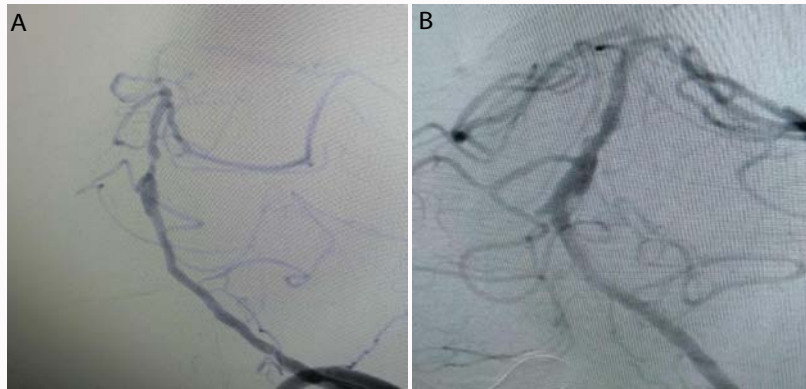
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**Figure 1:** Digital subtraction angiography confirmed the presence of basilar artery stenosis. (A). The mid portion of the basilar artery was supplied by 5 mm long tight stenosis and 70% to 80% luminal stenosis of the basilar artery. (B). Angioplasty with 5 mm drug-eluting balloon was performed with excellent angiographic result.

procedural feasibility, safety of revascularization, high rates of recurrent stenosis is a still shortcoming of intracranial stenting. Recently, balloon angioplasty has been shown to be safe alternative with low ratio of distal embolization, dissection, or vessel rupture, though the risk of restenosis remains to be an issue [10]. The application of sirolimus or paclitaxel eluting balloon has recently been regarded as a safe, feasible and efficient treatment of intracranial stenotic lesions.

In this case, we obtained an ideal vessel lumen with a predilation using a monorail balloon and after a prolonged angioplasty with a drug-eluting balloon. Our aim was to restore an optimal vessel patency and attenuate the clinical symptoms. In addition, we used a drug-eluting balloon of 3 mm of diameter to spread a conspicuous amount of paclitaxel in the intimal and media layers after barotraumas and intimal microfissurings to inhibit the muscular cell proliferation and improve clinical therapeutical effects.

According to our knowledge, this is the first report that using drug-eluting balloon in the basilar artery stenosis. Although angioplasty with a drug-eluting balloon needs special technical challenges, the favorable outcomes observed in this patient suggests that drug-eluting balloon may be a promising treatment option for basilar artery stenosis.

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