

# Transradial approach for carotid artery stenting in a patient with severe peripheral arterial disease

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## Abstract

We present a case of a 73-year-old man with critical bilateral internal carotid artery stenosis, recent right-hemisphere stroke and severe peripheral artery disease in whom right internal carotid artery stenting (RICA-CAS) was performed successfully via a right transradial approach.

**Key words:** carotid artery stenting, radial approach, peripheral artery disease, stroke, embolic protection device.

## Introduction

Stroke remains a major cause of morbidity and mortality. It is also a main cause of severe disability in adults [1]. Every year 75 000 people in Poland suffer from stroke and it has been demonstrated that atherosclerotic carotid artery disease accounts for about 20% of all ischemic strokes [2].

The aim of modern treatment of carotid artery atherosclerosis is to inhibit the progression of the disease and, more importantly, to prevent stroke. With increasing operator experience, ongoing technical improvement in embolic protection devices (EPD) and stent design, carotid artery stenting (CAS) has emerged as an effective treatment associated with high efficacy and a low complication rate [3]. The transfemoral approach is commonly used for CAS; however, in cases of severe peripheral artery disease (PAD), the transradial access remains a viable alternative.

## Case report

A 73-year-old man with a 9-day history of right hemisphere ischemic minor stroke was admitted to our institution due to a bilateral stenosis of the internal carotid artery revealed in duplex ultrasonography

(DUS) for further evaluation and treatment. Additional comorbidities included stable coronary artery disease, paroxysmal atrial fibrillation treated with oral anticoagulants, hypertension, hypercholesterolemia and severe PAD with occlusion of the right common iliac artery treated with suprapubic femoro-femoral bypass in 2005 (Figure 1). Admission DUS confirmed tight bilateral internal carotid artery stenosis with peak systolic velocity of 3.2 m/s and end diastolic velocity of 1.1 m/s on the right side. After consultation in the multidisciplinary team including a neurologist, vascular surgeon and interventional cardiologist, the patient was scheduled for transradial right internal carotid artery stenting (RICA-CAS) due to concomitant PAD. On the procedure day, a 7 Fr arterial sheath was placed in the right radial artery. Catheterization of the right common carotid artery with a 5 Fr SIM1 diagnostic catheter (Boston Scientific) was unsuccessful; thus it was exchanged for a 5 Fr SIM2. A tapered steerable Jindo 0.035" guidewire (Cordis) was positioned at a distal segment of the right external carotid artery and the diagnostic catheter was exchanged for the 7 Fr Guider Softip XF Guiding Catheter (Boston Scientific) (Figure 2). The selective angiogram showed eccentric 80% stenosis of the right internal ca-

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**Figure 1.** Suprapubic femoro-femoral bypass (arrows)



**Figure 2.** Successful cannulation of the right common carotid artery with 7 Fr Guider Softip Guiding Catheter via the right radial artery

rotid artery (Figure 3). Over a SionBlue J 0.014" guide-wire (Asahi), a 6 Fr Spider FX distal embolic protection device (ev3) was introduced and opened distally to the target lesion. A closed-cell design, self-expanding Carotid Wallstent 7 mm × 30 mm (Boston Scientific) was implanted using the direct stenting technique. In the next step an Ultra-Soft 5 mm × 20 mm dilatation catheter (Boston Scientific) was used for post-dilatation (2 × 10 atm/10 s; Figure 4) with an optimal angiographic result (< 20% residual stenosis without dissection, Figure 5). The peri-

and postprocedural period was uneventful and the patient was discharged from hospital the next day. Neither new cerebral events nor restenosis were revealed during 6-month follow-up.



**Figure 3.** Selective angiography confirming critical ostial stenosis of the right internal carotid artery



**Figure 4.** Self-expanding Carotid Wallstent 7 mm × 30 mm post-dilatation with 5.0 mm × 20 mm balloon

## Discussion

It was shown that CAS may be a fair alternative to the carotid endarterectomy and it is considered safe and effective when performed by well-trained operators in high-volume centers [4, 5]. Transfemoral access is the most common access for the CAS procedure; however, in severe aorto-iliac disease it can be unfeasible or may pose an increased risk of cerebral embolic complications. Thus, in this particular situation we use right radial artery access as it was shown to be very effective and safe in coronary interventions [6, 7].

A transradial approach for carotid artery stenting may be a viable alternative for a standard transfemoral technique, although it has some limitations [8]. First, it requires lower profile systems (up to 7 Fr). Most carotid stents are 5–6 Fr compatible, but only distal EPD for 6–7 Fr access is available at the moment. Second, the radial approach is much more technically demanding in CAS procedures. The unfavorable anatomy can make the passage of a guiding catheter from the radial to the common carotid artery through the aortic arch difficult or even impossible. Thus, prior transradial coronary intervention experience and the use of dedicated devices may increase the chance for success in the carotid territory. Recent data suggest that radial artery access is associated with fewer major bleeding events compared with femoral vascular access, in particular in cases of combined antithrombotic therapy [9]. Moreover, it was recently shown that the overall complication rate of carotid stenting via the radial artery is low, including catheter-induced cerebral embolization [8, 10]. Early mobilization is another key advantage of the transradial approach especially in older patients undergoing endovascular interventions.

There are similar cases described in the literature [11, 12], but to our knowledge, this is the first description of CAS performed via the transradial approach in Poland.

## Conclusions

Transradial CAS may be a viable alternative to femoral access, especially in patients with severe PAD. However, it is more technically demanding and requires prior transradial coronary intervention experience and the use of dedicated devices.

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**Figure 5.** Final angiography showing optimal effect of RICA-CAS