



## Carotid stenting in a nonagenarian patient with symptomatic carotid stenosis

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### CASE REPORT

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### Abstract

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Carotid artery stenosis is a disabling disease in all age groups. Elderly people are more prone to recurrent strokes due to advancing age and multiple co-morbidities. Treatment options for symptomatic carotid stenosis in the very elderly are the same as in younger patients although with a higher operative risk. We describe a successful case of carotid artery stenting in a nonagenarian with symptomatic carotid artery stenosis, a subgroup for whom treatment options are rarely discussed in guidelines.

#### Key Words

Carotid artery stenosis; nonagenarian; carotid artery stenting

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### Implications for Practice

1. Carotid artery stenting is an accepted treatment modality for atherosclerotic carotid artery stenosis.
  2. Carotid artery stenosis is an important cause of stroke in elderly and outcomes after stroke are highly influenced by advancing age.
  3. Very elderly symptomatic patients should be investigated and considered for intervention after careful individual patient and lesion assessment.
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### Background

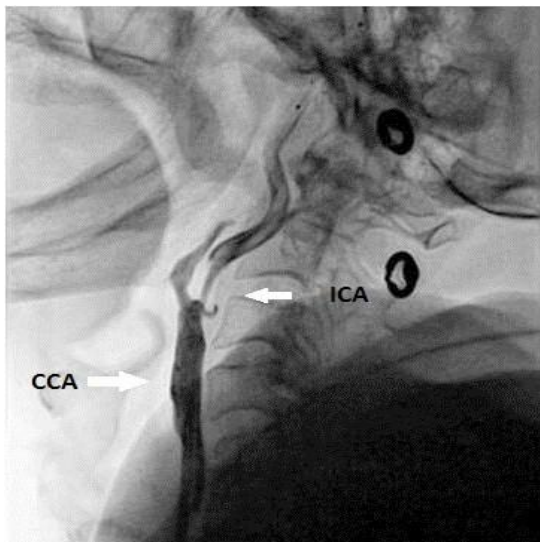
Carotid artery stenosis is an important cause of stroke in the elderly and outcomes after stroke are highly influenced by advancing age. As the average lifespan extends and medical care continues to improve, there is a continuous increase in the number of individuals above the age of 80 years with a high quality of life. Carotid artery stenting (CAS) is a minimally invasive modality for the treatment of carotid artery stenosis which is relatively well tolerated even in high-risk patients including octogenarians. However, there is very little data regarding the procedural outcome in symptomatic nonagenarian patients.

### Case details

A 94-year-old right-handed male with a history of left hemiparesis (three years prior) with complete recovery presented recounting a recent episode of right hemiparesis. The latest episode had occurred three months prior and the patient had fully recovered over the next two days. The patient was a known diabetic and hypertensive on adequate therapy. Over the past three years he had been medicated with dual anti-platelets, statins and oral anticoagulation with an international normalised ratio maintained between two and three. Carotid arterial doppler performed after the second stroke demonstrated a right proximal internal carotid artery (ICA) stenosis of more than 90% by velocity. Computed tomography (CT) of the brain was normal. The patient had no apparent neurological deficit at the time of admission. He had mild cognitive dysfunction which appeared age-related on detailed evaluation. He was in sinus rhythm and transthoracic echocardiography was normal. A coronary angiogram showed insignificant plaques and carotid angiography confirmed a right ICA 90% stenosis. Treatment options of medical therapy, carotid stenting and carotid endarterectomy were discussed with the patient. After providing informed consent the patient underwent right ICA stenting under cover of aspirin, clopidogrel and

unfractionated heparin to achieve a peak activated clotting time between 250-300 seconds; a temporary pacemaker was inserted for back-up support during the procedure to manage reflex bradycardia. A Protege (ev3 Inc., Plymouth, MN, USA) self expanding nitinol stent was successfully deployed with SPIDER distal embolic protection device into the patient's arteries (Figures 1, 2 and 3). The patient tolerated the procedure well with no change in National Institute of Health Stroke Scale (NIHSS).<sup>1</sup> Further hospital stay was uneventful and the patient was discharged on the third day after the procedure. At three months of follow-up, the patient remains asymptomatic.

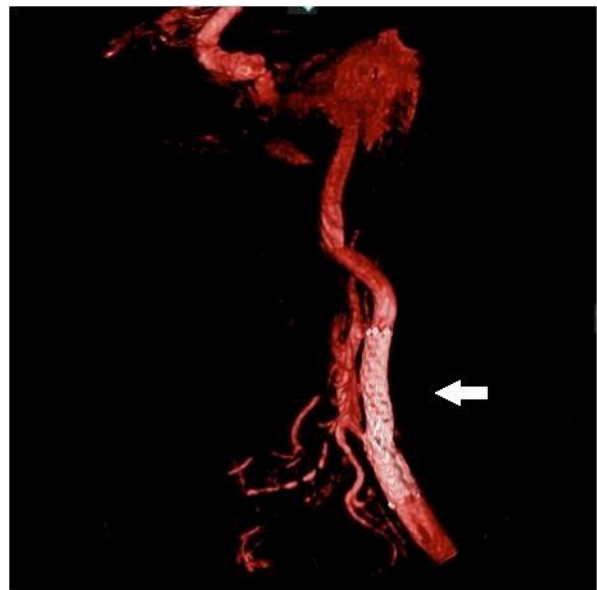
**Figure 1: Right ICA before carotid artery stenting**



**Figure 2: Right ICA post carotid artery stenting, white arrow indicates location of stent. ICA – Internal carotid artery, CCA- Common carotid artery**



**Figure 3: 2D representation of 3D reconstructed image post right carotid artery stenting. White arrow indicates location of stent**



### Discussion

In India stroke is the leading cause of death and disability in an ageing population. Arterial atherosclerotic stenotic or occlusive disease of the carotid arteries is an important cause of cerebral ischemia and/or infarction. Carotid endarterectomy (CEA) has been used extensively for symptomatic carotid artery stenosis as an intervention with up to 20% absolute risk reduction of stroke at two years compared with optimal medical care.<sup>2</sup> This is in contrast to asymptomatic patients >75 years of age who did not enjoy clear benefit in the Asymptomatic Carotid Surgery Trial.<sup>3</sup> On the other hand symptomatic elderly patients have been reported to benefit from CEA more than younger patients.<sup>4</sup> The risks of CEA increase with increasing age; the 30-day mortality in one study was 3.6% in patients over 85 years.<sup>5</sup> Carotid artery stenting (CAS) as a therapeutic modality is a less invasive option for patients considered at high risk for surgery. Results of CAS with the use of an embolic protection device are comparable with CEA in the prevention of stroke and primary end points.<sup>6</sup> However, some clinical trial data suggest that similar to CEA, the rate of adverse outcomes increases when CAS is performed in older patients.<sup>7</sup> Paradoxically, several individual institutional studies specifically examining the role of age in CAS outcomes reported no significant difference in adverse outcome rates between octogenarians and non-octogenarians.<sup>8,9</sup> In a recent study, symptomatic status, lesion characteristics, lesion length, arch anatomic characteristics and embolic protection device dwell time were the clinical predictors of adverse outcomes in octogenarians rather than age.<sup>10</sup>



This case illustrates that CAS is feasible even in symptomatic patients of very elderly group, and that age should not be a primary deterrent for appropriate management of such patients. However the safety, effectiveness and role of CAS in the very elderly patient population require further clarification.

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## PEER REVIEW

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## CONFLICTS OF INTEREST

The authors declare that they have no competing interests

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## PATIENT CONSENT

The authors, Ranjan Shetty K, G Vivek, Manoj K Gupta, Krishananda Nayak, Umesh Pai, Lorraine Dias, Kushal Naha and Raviraj Acharya, declare that:

1. They have obtained written, informed consent for the publication of the details relating to the patient in this report.
2. All possible steps have been taken to safeguard the identity of the patient.
3. This submission is compliant with the requirements of local research ethics committees.