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(CASE REPORT)

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SUCCESSFUL CAROTID ENDARTERECTOMY FOLLOWING ISCHEMIC STROKE IN A PATIENT WITH SEVERE CAROTID SUBOCCLUSION AND MULTIVESSEL CORONARY ARTERY DISEASE

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ABSTRACT

Introduction: Systemic atherosclerosis frequently affects multiple vascular territories simultaneously—cerebral, coronary, and peripheral. Managing patients with concurrent severe carotid and coronary artery disease remains a clinical challenge.

Case presentation: We report a female patient (born August 1949), a long-term smoker with hypertension and type 2 diabetes mellitus, who suffered an ischaemic stroke in February 2025 at the age of 75. MSCT angiography revealed subocclusion of the right internal carotid artery (ICA) (>95%) and stenosis of the left ICA (45%). Echocardiography demonstrated moderate aortic regurgitation and left ventricular hypertrophy. Coronary angiography confirmed multivessel coronary artery disease, including a critical 80% right coronary artery (RCA) stenosis, successfully stented in May 2025. Carotid endarterectomy (CEA) of the right ICA was performed in September 2025 at age 76. She was the oldest patient to undergo carotid endarterectomy at the Department of Vascular Surgery, Cantonal Hospital Zenica. Follow-up Doppler ultrasound in November 2025 showed no stenosis in the operated right ICA, stable left ICA stenosis at 55%, and complete neurological recovery.

Additional follow-up: In August 2026, repeat echocardiography demonstrated unchanged findings (moderate aortic regurgitation, left ventricular hypertrophy, grade I diastolic dysfunction). In October 2026, colour Doppler of the carotid arteries confirmed stable status—right ICA patent without stenosis, left ICA unchanged at approximately 55%.

Conclusion: A staged approach—percutaneous coronary intervention (PCI) followed by CEA—proved safe and effective in this elderly patient with systemic atherosclerosis. Long-term follow-up (to October 2026) confirmed durable carotid patency, stable cardiovascular status, and absence of recurrent cerebrovascular events.

Keywords: Carotid endarterectomy; Carotid subocclusion; Ischaemic stroke; Multivessel coronary artery disease; Percutaneous coronary intervention; Systemic atherosclerosis

1 INTRODUCTION

Systemic atherosclerosis is a chronic disease that frequently involves multiple arterial territories simultaneously, including the carotid and coronary circulation. The coexistence of carotid artery stenosis and coronary artery disease reflects the panvascular nature of atherosclerosis and is associated with common risk factors such as hypertension, diabetes mellitus, smoking, dyslipidaemia, and advanced age [1,2].

Carotid artery stenosis represents an important cause of ischaemic stroke and is associated with a substantial risk of recurrent cerebrovascular events. Large randomized trials have demonstrated that carotid endarterectomy significantly reduces the risk of recurrent stroke in appropriately selected patients with symptomatic high-grade carotid stenosis [3].

The management of patients with concomitant severe carotid and coronary artery disease remains challenging because both cerebrovascular and cardiovascular risks must be considered during treatment planning. Contemporary evidence supports a multidisciplinary and individualized approach, particularly in patients requiring revascularization of more than one vascular territory [4,5].

2 CASE PRESENTATION

2.1 Initial presentation

A 75-year-old woman (born August 1949), a long-term smoker with a history of arterial hypertension and type 2 diabetes mellitus, was admitted in February 2025 because of left-sided weakness and speech difficulties. Brain computed tomography confirmed acute ischaemic stroke, and the patient was hospitalized for further diagnostic evaluation and treatment.

2.2 Vascular and cardiac evaluation

MSCT angiography performed on 6 February 2025 revealed subocclusion of the right internal carotid artery (ICA) exceeding 95% at its origin, with an additional distal stenosis of approximately 40%. The left ICA demonstrated a calcified plaque causing approximately 45% stenosis. Additional findings included bilateral external carotid artery disease, moderate stenosis of the proximal right vertebral artery, a gracile left vertebral artery, and moderate intracranial atherosclerotic changes. The Circle of Willis was preserved, and no aneurysms or arteriovenous malformations were detected. An incidental hypodense thyroid nodule was also noted. Vascular surgery consultation was recommended.

Transthoracic echocardiography performed on 22 February 2025 showed preserved left ventricular systolic function (ejection fraction 59%), left ventricular hypertrophy, grade I diastolic dysfunction, moderate aortic regurgitation, mild-to-moderate mitral regurgitation, moderate tricuspid regurgitation, and mildly elevated pulmonary artery pressure. These findings were attributed mainly to long-standing arterial hypertension and chronic pulmonary disease associated with smoking.

2.3 Coronary angiography and percutaneous coronary intervention

Given the patient's extensive atherosclerotic burden and planned carotid surgery, coronary angiography was performed on 22 May 2025. It demonstrated three-vessel coronary artery disease, including 50% stenoses of the left anterior descending artery and a critical 80% stenosis of the dominant right coronary artery (RCA). Percutaneous coronary intervention was successfully performed with implantation of a drug-eluting stent in the RCA without complications. The patient was discharged the following day in stable condition with recommendation for carotid endarterectomy.

2.4 Carotid endarterectomy

Following vascular surgery assessment, carotid endarterectomy of the right ICA was performed on 22 September 2025. At the time of surgery, the patient was 76 years old and was the oldest patient to undergo carotid endarterectomy at the Department of Vascular Surgery, Cantonal Hospital Zenica. Owing to her advanced age, recent ischaemic stroke, and concomitant multivessel coronary artery disease, the case posed a considerable clinical and surgical challenge. Nevertheless, the operation and postoperative course were uneventful. After brief intensive care monitoring, the patient was discharged without neurological deficit and with satisfactory wound healing.

2.5 Follow-up

Colour Doppler ultrasonography performed in November 2025 demonstrated a satisfactory postoperative result, with no residual stenosis of the operated right ICA and stable left ICA stenosis of approximately 55%. Follow-up vascular examination in May 2026 confirmed stable findings and satisfactory clinical status.

Extended follow-up showed continued clinical stability. Repeat echocardiography in August 2026 demonstrated unchanged findings, including moderate aortic regurgitation, left ventricular hypertrophy, and grade I diastolic dysfunction. Colour Doppler ultrasonography in October 2026 confirmed persistent patency of the right ICA without restenosis and stable left ICA stenosis of approximately 55%. Throughout follow-up, the patient remained neurologically asymptomatic with no recurrent cerebrovascular events.



Figure 1: Long-term postoperative appearance following right carotid endarterectomy. Clinical photograph obtained during follow-up demonstrating a well-healed cervical surgical scar without signs of local complications or wound-healing abnormalities.

Table 1: Timeline of Diagnostic Evaluation, Revascularization Procedures, and Follow-up

Date	Clinical event
February 2025	Acute ischaemic stroke with left-sided weakness and speech difficulties
6 February 2025	MSCT angiography: right ICA subocclusion (>95%), left ICA stenosis 45%
22 February 2025	Echocardiography: preserved EF (59%), LVH, moderate aortic regurgitation
22 May 2025	Coronary angiography: three-vessel coronary artery disease; critical RCA stenosis (80%)
22 May 2025	Successful PCI with drug-eluting stent implantation in the RCA
22 September 2025	Right carotid endarterectomy performed
November 2025	Doppler ultrasound: patent right ICA, stable left ICA stenosis (~55%)
May 2026	Vascular surgery follow-up: stable findings
August 2026	Repeat echocardiography: unchanged cardiac findings
October 2026	Long-term Doppler follow-up: no restenosis of the right ICA, stable left ICA stenosis
October 2026	No recurrent cerebrovascular events; sustained neurological recovery

3 DISCUSSION

3.1 Systemic atherosclerosis and carotid subocclusion

This case illustrates the systemic nature of atherosclerosis, which frequently involves multiple arterial territories simultaneously, including the carotid and coronary circulation [1,2]. Following an ischaemic stroke, comprehensive vascular evaluation revealed severe right internal carotid artery (ICA) subocclusion, contralateral carotid stenosis, multivessel coronary artery disease, vertebral artery involvement, and additional cardiovascular abnormalities. These findings support the concept of panvascular atherosclerosis and emphasize the importance of investigating other vascular beds when significant atherosclerotic disease is identified in one territory [1,2,4].

The patient's neurological presentation was most likely related to the severe right ICA subocclusion (>95%). Unlike complete carotid occlusion, carotid subocclusion preserves a residual lumen through which thrombotic material and unstable plaque components may embolize distally, contributing to recurrent cerebrovascular events [6-8]. Previous studies have shown that carotid subocclusion constitutes a distinct clinical entity whose management remains challenging because of the associated risk of recurrent cerebral ischaemia [6-8]. In the present case, severe carotid subocclusion most likely represented the principal mechanism underlying the ischaemic stroke.

Furthermore, this case highlights the importance of comprehensive vascular assessment in patients presenting with ischaemic stroke, as clinically significant lesions affecting multiple arterial territories may coexist and substantially influence therapeutic decision-making.

3.2 Coronary artery disease and staged revascularization

In addition to severe carotid disease, coronary angiography revealed multivessel coronary artery disease with a critical 80% stenosis of the dominant right coronary artery. Percutaneous coronary intervention (PCI) with implantation of a drug-eluting stent was successfully performed without complications. Moderate stenoses of the left anterior descending artery were managed conservatively because no indication for additional revascularization was present at that time [9-11].

The optimal management of patients with concomitant severe carotid and coronary artery disease remains controversial and requires individualized treatment planning [5]. Current guidelines support prioritization of the vascular territory associated with the highest immediate clinical risk while taking into account the overall cardiovascular status of the patient [9,11]. In the present case, coronary revascularization was performed before carotid surgery because of the critical RCA lesion and the need to reduce perioperative cardiac risk.

The favourable outcome observed in this patient supports the effectiveness of a staged treatment strategy. Similar approaches have been associated with good outcomes and acceptable perioperative risk in patients presenting with simultaneous carotid and coronary artery disease [5,17].

3.3 Carotid endarterectomy and clinical outcome

Carotid endarterectomy remains the standard surgical treatment for appropriately selected patients with symptomatic severe carotid stenosis. Large randomized trials have demonstrated a significant reduction in recurrent stroke risk following carotid endarterectomy in symptomatic patients with high-grade stenosis [3,16].

In the present case, carotid endarterectomy was performed after successful coronary revascularization and resulted in excellent clinical and radiological outcomes. At the time of surgery, the patient was 76 years old and represented the oldest patient to undergo carotid endarterectomy at the Department of Vascular Surgery, Cantonal Hospital Zenica. Advanced age, recent ischaemic stroke, concomitant multivessel coronary artery disease, and multiple cardiovascular risk factors contributed to the complexity of clinical decision-making and perioperative risk assessment.

Despite these challenges, the procedure and postoperative recovery were uneventful. Follow-up Doppler ultrasonography demonstrated durable patency of the operated carotid artery, without residual stenosis or restenosis, while the contralateral ICA remained stable. Most importantly, no recurrent neurological symptoms, transient ischaemic attacks, or cerebrovascular events occurred during follow-up.

These findings further support the effectiveness of carotid endarterectomy in preventing recurrent stroke in patients with symptomatic severe carotid disease and demonstrate that favourable outcomes can be achieved even in elderly patients when careful patient selection and multidisciplinary perioperative management are applied [3,16].

3.4 Additional cardiovascular findings

Echocardiographic evaluation demonstrated preserved left ventricular systolic function associated with moderate aortic regurgitation, left ventricular hypertrophy, and grade I diastolic dysfunction. These findings are consistent with chronic hypertensive cardiovascular disease and reflect the cumulative impact of long-standing cardiovascular risk factors [12-14].

The presence of left ventricular hypertrophy is of particular importance because it represents an established predictor of adverse cardiovascular outcomes and reflects chronic exposure to elevated blood pressure [14]. Mildly elevated pulmonary artery pressure was likely associated with smoking-related pulmonary disease and concomitant tricuspid regurgitation [15]. Although these abnormalities did not require immediate intervention, their identification contributed to comprehensive cardiovascular risk stratification and long-term follow-up planning.

3.5 Clinical implications and limitations

This case highlights the importance of a multidisciplinary approach in patients with systemic atherosclerosis. Simultaneous evaluation of carotid, coronary, and cardiac pathology enabled comprehensive risk assessment and successful planning of staged revascularization. The case also emphasizes the value of collaboration between neurologists, cardiologists, vascular surgeons, and imaging specialists in the management of complex vascular patients.

An additional message of this report is that advanced age alone should not preclude carotid endarterectomy when clear clinical indications, appropriate perioperative assessment, and careful patient selection are present. The excellent outcome observed in this patient suggests that successful carotid revascularization can be achieved even in elderly individuals with extensive systemic atherosclerotic disease.

The principal limitations of this report include its single-patient design, absence of follow-up coronary imaging, lack of spirometric evaluation for possible chronic obstructive pulmonary disease, absence of dedicated thyroid ultrasound assessment, and the lack of CTA or MRA follow-up imaging. Nevertheless, Doppler ultrasonography demonstrated durable carotid patency throughout follow-up. Despite these limitations, the case provides a clinically relevant example of successful staged coronary and carotid revascularization with favourable long-term neurological and cardiovascular outcomes.

4 CONCLUSION

This case illustrates the complex and systemic nature of atherosclerotic disease, manifesting as ischaemic stroke caused by severe right internal carotid artery subocclusion, concomitant multivessel coronary artery disease, and additional cardiovascular comorbidities. Comprehensive vascular and cardiac assessment enabled timely identification of clinically significant lesions affecting multiple arterial territories and facilitated appropriate treatment planning.

A staged revascularization strategy consisting of percutaneous coronary intervention followed by carotid endarterectomy resulted in an excellent clinical outcome. Carotid endarterectomy provided durable restoration of carotid artery patency, complete neurological recovery, and freedom from recurrent cerebrovascular events during long-term follow-up. Postoperative surveillance confirmed persistent patency of the operated right internal carotid artery without restenosis and stable contralateral carotid disease.

This case highlights the importance of a multidisciplinary approach in patients with systemic atherosclerosis and supports staged coronary and carotid revascularization as a safe and effective treatment strategy. Furthermore, the successful outcome achieved in the oldest patient to undergo carotid endarterectomy at the Department of Vascular Surgery, Cantonal Hospital Zenica, suggests that advanced age alone should not be considered a contraindication to carotid endarterectomy when clear clinical indications, appropriate patient selection, and careful perioperative assessment are present.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare that they have no conflicts of interest.

Statement of ethical approval

This case report was prepared in accordance with the CARE (CASE REPORT) reporting guidelines.

Statement of informed consent

Written informed consent was obtained from the patient for publication of this case report, the accompanying clinical photograph, and the de-identified clinical information contained in the manuscript. Patient confidentiality and anonymity were maintained throughout manuscript preparation.

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