International Journal of Research in Medical Sciences
Dutta B et al. Int J Res Med Sci. 2025 Sep;13(9):3812-3816
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20252798

Case Report

Simultaneous coronary artery and bilateral carotid artery stenting in the same setting: first ever experience in Bangladesh

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Received: 09 July 2025
Accepted: 12 August 2025

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ABSTRACT

The coexistence of coronary artery disease (CAD) and carotid artery stenosis (CS) is relatively common, particularly among elderly patients. However, the optimal management of patients with simultaneous severe CAD and bilateral CS remains a subject of clinical debate, as multiple treatment strategies exist. We present the case of a 66-year-old male who was admitted to the National Institute of Cardiovascular Diseases (NICVD), Bangladesh, with recurrent syncopal episodes and exertional chest pain. Diagnostic evaluation with Digital Subtraction Angiography (DSA) and Coronary Angiography (CAG) revealed bilateral severe internal carotid artery stenosis along with significant stenosis of the right coronary artery (RCA). The patient was successfully treated with a one-stage percutaneous intervention involving right coronary artery stenting followed by bilateral internal carotid artery stenting. To the best of our knowledge, this is the first documented case of such a simultaneous triple-vessel intervention in Bangladesh.

Keywords: Coronary artery disease, Carotid artery stenosis, Coronary angiography, Digital subtraction angiography, Percutaneous coronary intervention

INTRODUCTION

The coexistence of carotid artery stenosis (CS) and coronary artery disease (CAD) poses a significant therapeutic challenge, particularly in patients requiring revascularization procedures. Patients with both conditions have a higher risk of perioperative stroke during coronary artery bypass grafting (CABG), making the choice of treatment strategy crucial for optimizing outcomes.[1-3] Currently, there is no universally accepted protocol for managing patients with concurrent severe carotid and coronary disease. The options include.

Combined (synchronous) surgery

Performing CABG and carotid endarterectomy (CEA) under the same anesthetic session.

Staged procedures

Performing CEA before or after CABG.

Hybrid approaches

Combining CABG with carotid artery stenting (CAS) or percutaneous coronary intervention (PCI) with CEA.

Fully percutaneous strategies

Performing PCI and CAS during the same or staged catheter-based procedure 3,43,43,4. In this case report, we describe a rare and technically challenging case of simultaneous right coronary artery PCI and bilateral carotid artery stenting performed in a single procedural setting.

CASE REPORT

Mr. Md Abdus Samad, a 66-years-old hypertensive, non-diabetic male from Monirampur, Jessore, presented to the National Institute of Cardiovascular Diseases (NICVD), Dhaka, with complaints of recurrent syncopal episodes for the past three months and exertional chest pain for the preceding two months.

Clinical examination

On general physical examination, there was no evidence of anemia, jaundice, cyanosis, clubbing, peripheral edema, xanthelasma or lymphadenopathy. The pulse rate was 76 beats per minute with occasional dropped beats, of normal volume and without any radio-radial or radio-femoral delay. Blood pressure was recorded at 160/90 mmHg and jugular venous pressure was within normal limits. Cardiovascular examination revealed the apex beat located in the left 5th intercostal space, medial to the mid-clavicular line and heaving in nature. The first heart sound (S1) was normal, while the second heart sound (S2) was soft. A grade 4/6 ejection systolic murmur was audible in the aortic area and radiated to the right side of the neck. Bilateral carotid bruits were also present. Auscultation of the lung bases revealed no abnormal breath sounds. Neurological and other systemic examinations were unremarkable.

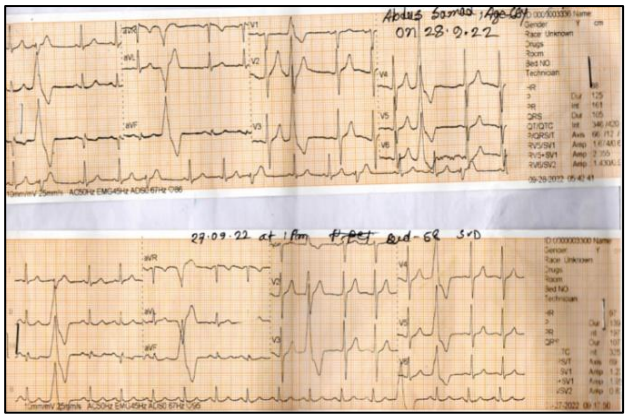

Figure 1: ECG shows multiple PVC.

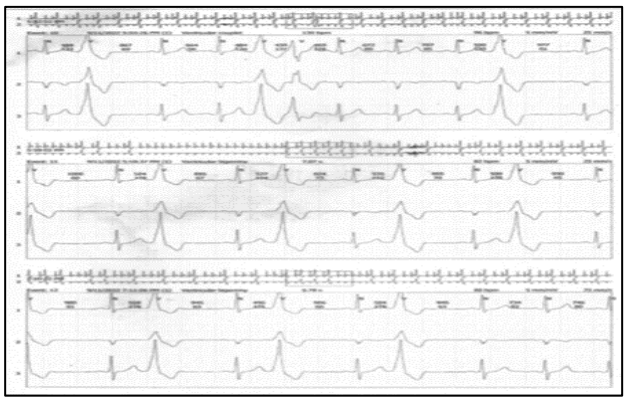

Figure 2: Ventricular bigeminy and trigeminy.

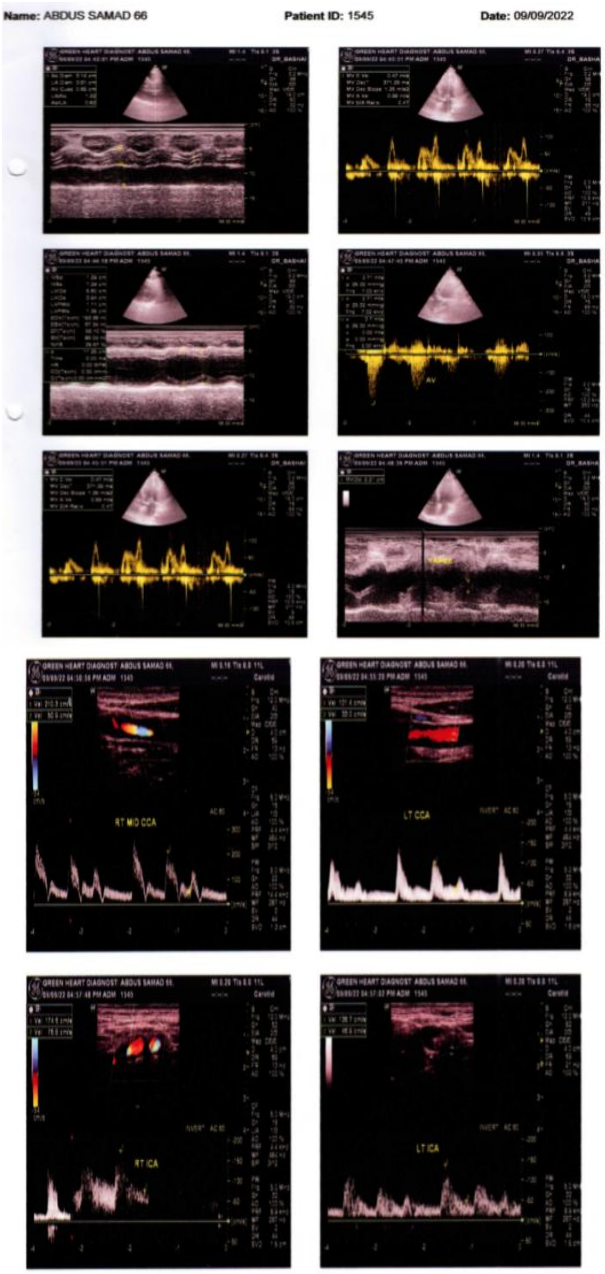

Figure 3: Echocardiography shows mild Aortic stenosis with EF 56%.

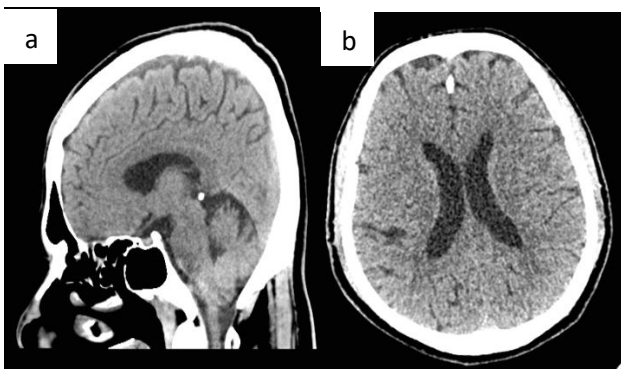

Figure 4: CT Brain shows mild generalized cerebral atrophy (a, b).

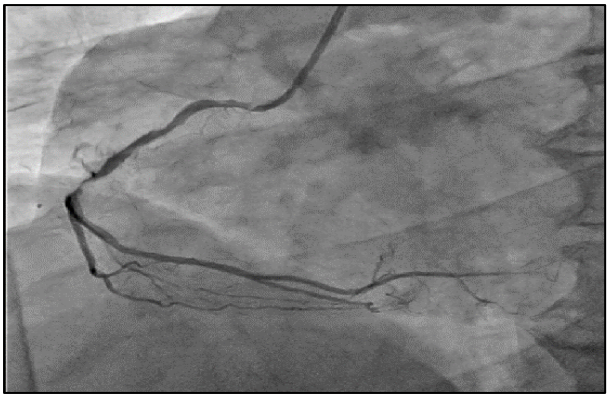

Figure 5: CAG shows significant RCA stenosis in proximal and mid part.

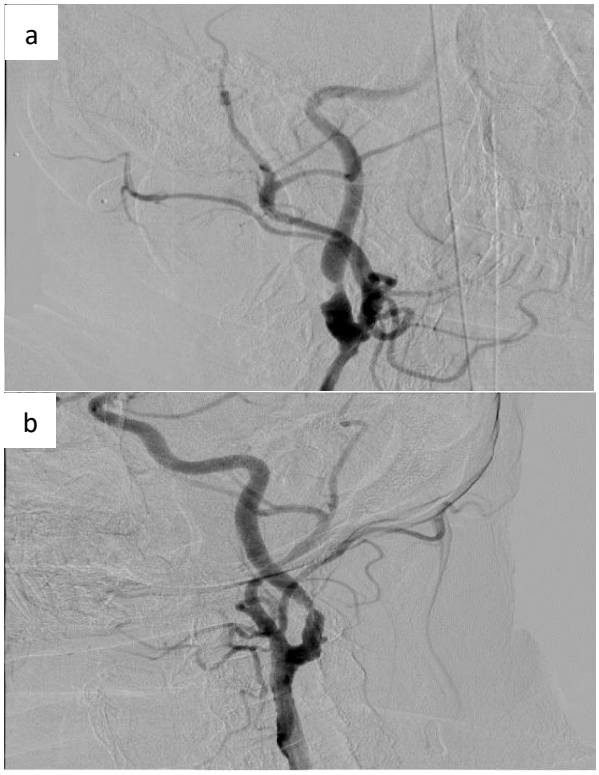

Figure 6: (a) DSA shows 80-90% stenosis in RICA. (b) ECG shows multiple PVC.

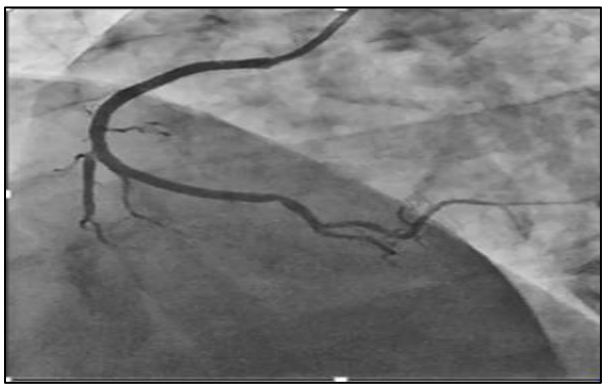

Figure 7: RCA after stenting.

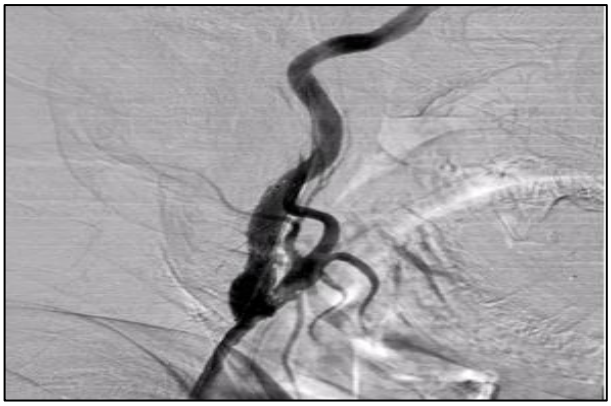

Figure 8: RICA after stenting.

Figure 9: LICA after stenting.

Investigations

An initial electrocardiogram (ECG) demonstrated frequent ventricular ectopic (Figure 1). A 24-hour Holter monitor revealed multiple ventricular ectopics manifesting as ventricular bigeminy and trigeminy (Figure 2). Transthoracic echocardiography showed mild aortic stenosis with a preserved ejection fraction (EF) of 56% (Figure 3). A non-contrast CT scan of the brain revealed mild generalized cerebral atrophy (Figure 4). A duplex ultrasonography of the neck vessels revealed moderate to severe atherosclerotic changes in both carotid arteries, with an unstable-appearing soft plaque located at the proximal segment of the right internal carotid artery (RICA). Further evaluation with coronary angiography (CAG) and digital subtraction angiography (DSA) demonstrated a significant long-segment stenosis involving the proximal to mid-portion of the right coronary artery (RCA) (Figure 5), along with 80–90% stenosis in both proximal internal carotid arteries just above the common carotid artery (CCA) bifurcation (Figures 6 (a) and 6 (b)).

Intervention

Given the findings and symptomatology, a decision was made to proceed with percutaneous coronary intervention

(PCI) of the RCA and stenting of the RICA during the same procedural setting, followed by left internal carotid artery (LICA) stenting if the patient remained hemodynamically stable. After appropriate pre-dilatation using a 2.5×15 mm semi-compliant (SC) balloon, two drug-eluting stents (DES) were deployed in the RCA: a 2.75×40 mm DES (Alex Plus) distally, overlapped proximally by a 3.0×34 mm DES (Alex Plus). Post-dilatation was performed using a 3.5×15 mm non-compliant (NC) balloon (Figure 7). Subsequently, RICA stenting was conducted using a self-expanding MER 6×8×40 mm stent, followed by post-dilatation with a 5×10 mm NC coronary balloon (Figure 8). After a 30-minute observation period in the catheterization lab, during which the patient remained stable, a decision was made to proceed with LICA stenting in the same session. A similar MER 6×8×40 mm self-expanding stent was successfully deployed in the LICA with post-dilatation (Figure 9).

Post-procedural outcome and follow-up

Vital signs and neurological status were closely monitored post-intervention, with particular attention to signs of hyper perfusion syndrome. The patient remained hemodynamically stable and asymptomatic for three consecutive days post-procedure and was subsequently discharged on dual antiplatelet therapy and other secondary prevention medications.

He was followed up at 2 months, 8 months, 1 year and 2 years post-procedure. At each visit, the patient reported no recurrence of symptoms and clinical and imaging evaluations revealed satisfactory outcomes with patent stents and no signs of restenosis or neurological complications.

DISCUSSION

The coexistence of CS and CAD is a well-recognized clinical scenario, particularly in elderly populations with diffuse atherosclerotic disease. Approximately 20% of patients with significant CAD also present with severe CS and the prevalence of CAD increases to nearly 80% among patients referred for carotid revascularization procedures.[4] The optimal treatment strategy in such cases is often complex, requiring careful planning to minimize the risk of adverse cerebrovascular and cardiovascular outcomes. Simultaneous percutaneous coronary intervention (PCI) and bilateral carotid artery stenting in a single procedural setting remains a challenging approach. The primary concern in such combined interventions is the heightened risk of distal embolization leading to cerebral ischemia, as well as the possibility of cerebral hyperperfusion syndrome (CHS) following sudden restoration of blood flow.[5]

In our case, bilateral internal carotid artery stenting was performed alongside right coronary artery (RCA) stenting in a single setting, without the use of distal protection devices (DPDs). While DPDs are traditionally used to prevent cerebral embolization during carotid stenting, several studies and case reports have questioned their routine application, especially in low-resource settings. It has been argued that DPDs do not consistently offer significant benefits in reducing periprocedural stroke risk, particularly when used in experienced hands.[5] Furthermore, these devices require crossing the lesion prior to activation, which itself may precipitate embolization.[6] In resource-limited settings such as ours, cost-effectiveness is a critical factor. Omitting DPDs may reduce procedural costs and hospital stays without compromising safety if patients are carefully selected and monitored.

In this case supports this perspective, as the patient remained hemodynamically and neurologically stable throughout the intervention and recovery period. Timing and sequencing of revascularization are crucial. Carotid revascularization before coronary revascularization is often preferred to mitigate the risk of stroke, which remains the most frequent non-cardiac complication after CABG or PCI.[7] Reports suggest that successful carotid revascularization reduces the subsequent stroke risk to approximately 2.2%, which is equivalent to the baseline risk in patients without cerebrovascular disease undergoing coronary revascularization.[8]

However, this strategy must be tailored to individual cases. In patients with significant coronary lesions, particularly involving the RCA, stenting of the coronary artery may be prioritized to avoid peri-procedural hypotension or bradycardia during carotid interventions. These hemodynamic fluctuations can exacerbate myocardial ischemia if left unaddressed.[9] Thus, when coronary revascularization is performed first, meticulous intraoperative monitoring of blood pressure and heart rate is essential to avoid cerebral hypoperfusion and reduce the risk of peri-procedural stroke.[10] While literature on simultaneous carotid and coronary interventions remains limited, available evidence suggests that this approach can be technically feasible, relatively safe and cost-effective in selected patients.[11]

In our case, we first performed RCA stenting using two drug-eluting stents (DESs), followed by deployment of a self-expanding stent in the RICA. After ensuring clinical stability over a 30-minute observation period, we proceeded with stenting of the LICA in the same session. The patient remained neurologically and hemodynamically stable post-procedure. Continuous monitoring for 72 hours revealed no signs of hyperperfusion syndrome, bradycardia or hypotension. He was discharged in stable condition and demonstrated normal neurological function on follow-up visits at 2 months, 8 months, 1 year and 2 years.

This case illustrates the viability of a simultaneous, multi-vessel endovascular approach in selected patients with combined severe CAD and bilateral CS, even in low-resource environments.

CONCLUSION

Symptomatic severe carotid artery stenosis and significant obstructive coronary artery disease frequently co-exist. Among the different treatment strategies, simultaneous percutaneous interventions including coronary artery stenting and carotid artery stenting in the same setting is feasible, relatively safe and cost-effective.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Dutta B, Karmoker KK, Rashid MB, Siddika KA, Kashyapi B, Rahman MW, et al. Simultaneous coronary artery and bilateral carotid artery stenting in the same setting: first ever experience in Bangladesh. Int J Res Med Sci 2025;13:3812-6.