

Case Report

Carotid Angioplasty in a patient with Coronary Artery Bypass Surgery with Occluded Grafts, severe Aortic Stenosis, moderate Systolic Dysfunction and 100% contralateral Carotid occlusion: lessons to be learned

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Abstract

Carotid artery stenting (CAS) has emerged as an attractive alternative to carotid endarterectomy (CEA). However, CAS in a high risk patient carries significant morbidity/mortality. We report a successful CAS procedure in an extremely high risk case with a unique underlying comorbid combination not previously reported in the literature.

Introduction

Atherosclerosis is a generalized disease not just limited to the coronary circulation. The prevalence of coexistent carotid artery disease may be as high as 12 % in patients undergoing coronary artery bypass grafting (CABG).^{1,2} Though traditionally, carotid endarterectomy (CEA) has been used as the treatment of choice for patients with high grade asymptomatic as well as moderate to high grade symptomatic

carotid artery disease, carotid artery stenting (CAS) is increasingly being used as an alternate to CEA primarily because it is less invasive.³⁻⁵ We report a case of successful CAS in patient with an extremely high risk profile. Such a case has not been reported before.

Case Report

A 62-year-old male underwent coronary artery bypass grafting (CABG) fifteen years ago for severe triple vessel coronary artery disease (CAD). He presented with intermittent dyspnoea on exertion (NYHA class II/III) for the past six months. On examination, patient had a low volume carotid pulse, an ejection-systolic murmur in addition to left carotid bruit. Transthoracic echocardiography showed globally dilated left ventricle with ejection fraction (EF) of 40% as well as severe aortic stenosis with valve area of 0.61 cm² and a mean transvalvular gradient of 42.7 mm Hg. Carotid duplex study showed completely occluded right internal carotid artery (ICA) and 50-70% complex stenosis of left ICA. Patient underwent coronary and carotid angiography through right femoral approach which revealed severe triple vessel CAD with

occluded saphenous vein grafts (SVG) and only patent left internal mammary artery (LIMA) graft to left anterior descending artery (LAD). Carotid angiogram showed 100% occlusion of right ICA with extensive collaterals from the external carotid artery and a 70% ulcerated plaque at the origin of left ICA (Figure-1).

After detailed discussion with the patient, neurology and cardiac surgery, it was decided to proceed with angioplasty to the left ICA followed by Re-Do CABG (in view of good targets) and aortic valve replacement after 4-6 weeks. In anticipation of haemodynamic instability, patient was started on IV dopamine 5 µg/kg/min twelve hours before the procedure. Left ICA was stented with a 6-8/40 mm Acculink self-expanding nitinol stent (Abbot Medical) after placement of a distal embolus protection device (Rx-Accunet 6.5-19mm, Abbot Medical) (Figure-2 and 3). Procedure had no immediate adverse sequelae. However, after transfer to the coronary care unit (CCU) patient had frequent episodes of hypotension requiring high doses (10-20 µg/kg/min) of dopamine infusion for four days followed by phenylephrine infusion at 5µg/kg/min for additional three days. He remained in the CCU



Figure-1: Initial selective left carotid angiogram.



Figure-2: Post stenting carotid angiogram.

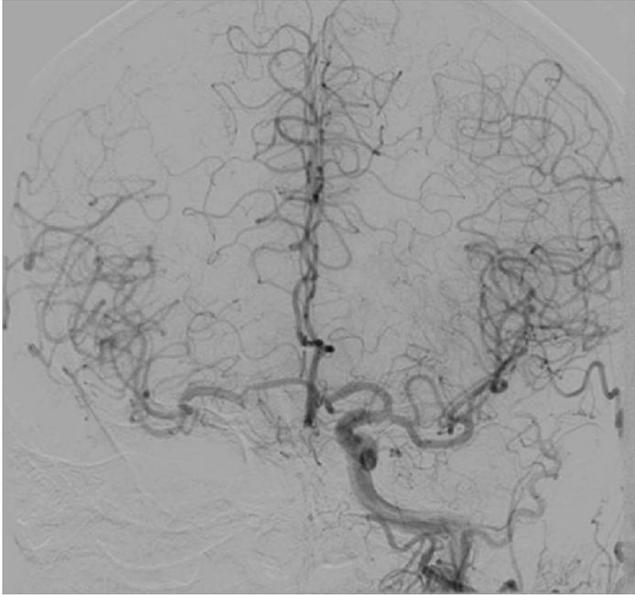


Figure-3: Post stenting intracerebral angiogram showing collateral flow to right hemisphere as well.

for seven days under close observation, during which he was mobilized out of bed on 5th day. At the end of the week, patient had stable blood pressure without any IV pressors, neurologic or renal complications. He was discharged in excellent condition. At two weeks follow-up, patient was in good health with no heart failure or angina. He is scheduled to undergo Re-Do CABG and AVR as planned earlier.

Discussion

CEA has been shown to be superior to medical therapy in patients with significant carotid stenosis.^{3,4} The combined risk of postoperative stroke or death in patients undergoing CEA has been reported to be 5-6% in those with symptomatic stenosis.⁶ The first randomized prospective trial of CEA vs. CAS in high risk patients using a distal protection device showed that CAS was not inferior to CEA in terms of primary end point of stroke, death or myocardial infarction and less need for repeat revascularization.⁵ The benefits of CAS lie in its non-invasive nature and the ability to reach complex anatomic lesions, however, the results so far have not been uniformly favourable.⁷ The major cardiac complication associated with CEA is perioperative myocardial infarction particularly in patients who have significant underlying coronary artery disease.

Randomized trials of CAS vs. CEA have shown a median hospital stay of 1.84 ± 1.75 days and there were no reports of hypotension requiring prolonged hospitalization.⁵ Other studies have also not shown any prolonged hypotension episodes in patients undergoing CAS.⁸ Even though randomized trials of CAS included high-risk patients, but none

had such high-risk profile as our patient. Our case presents a unique and extremely high risk profile i.e. previous CABG with occluded grafts, moderately depressed systolic function, severe aortic stenosis and 100% occluded contralateral carotid artery. This combination has not been previously reported, neither has the extremely prolonged post-procedure hypotension requiring many days of intravenous pressors like dopamine and phenylephrine. Based on anecdotal experience in another case, we had anticipated post procedure hypotension but the extremely prolonged hypotension (5-7 days) was completely unexpected as it had never been previously reported. The etiology of this remains unclear though it's likely that in most patients, the vagal stimulation that occurs as a result of stenting in the area of the carotid bulb is overcome due to counter reflex measures like increased cardiac output. However in our case, the moderately depressed systolic function and even more importantly, the severe aortic stenosis severely limited his ability to compensate the vasodilation/hypotension as a result of the procedure. We believe that had we not anticipated post procedure hypotension and started dopamine pre-procedure, the procedure could have been catastrophic. In this case the choice of intravenous pressor was also difficult. Dobutamine would have worsened angina, therefore we chose dopamine and later phenylephrine to provide peripheral vasoconstriction which proved to be the right choice.

Conclusion

This case illustrates that even though CAS carries very high morbidity in patients with multiple high-risk features, careful planning before the procedure and anticipation of unexpected complication can lead to excellent outcome.

References

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