

Ischaemic Stroke Following Percutaneous Transluminal Coronary Angioplasty (PTCA): A Rare Complication

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ABSTRACT

Stroke following coronary interventions is a devastating and most dreaded complication with significant morbidity and mortality. Various factors have been ascribed for this complication including the technical errors. We hereby describe such a patient who presented to us with the diagnosis of acute coronary syndrome and underwent percutaneous coronary intervention (PCI) but unfortunately developed left sided hemiparesis due to ischaemic stroke (right middle cerebral artery). She was managed as per the standard treatment protocols for acute coronary syndrome and later on for ischaemic stroke which she nicely responded to and was discharged in a haemodynamically stable condition. On follow-up after 15 days, she was totally symptom-free. We will discuss all the possible preventive and treatment measures for this rare complication of (PCI).

Keywords: Ischaemic stroke, Acute coronary syndrome, Percutaneous coronary intervention, Cardiac catheterisation, Right middle cerebral artery

CASE HISTORY

A 75-year-old female got admitted to our hospital with chief complaints of left sided chest pain- squeezing type, continuous, radiating to left shoulder along with breathlessness on exertion, all since a day before admission. She had undergone coronary artery bypass grafting 10 years back and percutaneous transcatheter coronary angioplasty with drug-eluting stent insertion five years back. On admission, her pulse was 80 bpm, BP-140/80 mmHg. Jugular venous pressure was not raised. Rest of general examination was normal. Systemic examination was normal. Her laboratory investigations were as follows:

Haemoglobin-11.7G%; total leukocyte count-13,000, serum potassium-3.49 mEq/L; blood urea-26 mg/dL; serum creatinine-0.76 mg/dL; CPK MB-94 ; troponin T- 0.4.

Chest X-Ray→ no obvious abnormality.

Electrocardiogram→lateral wall myocardial ischaemia.

2D-Echocardiogram→ regional motion wall abnormality in basal wall. She was managed conservatively as per the standard protocol for management of acute coronary syndrome initially. She was taken for coronary angiography the next day where they found patent grafts of previous CABG but the OM was 70% stenosed (tubular fibrotic lesion) in mid-segment. Immediately, a drug eluting stent of 2.5 mm x 15 mm was inserted in it via a right femoral arterial approach under all aseptic precautions with no intraprocedural complications. Four hours after the procedure, patient started developing tingling in fingers of left upper limb and after one hour she developed left sided hemiparesis with grade 4 power in upper and lower limbs. She immediately underwent computed tomography of brain which showed lacunar infarct in posterior limb of the left internal capsule. She was immediately started on dopamine infusion to maintain a mean arterial pressure of 110-120 mmHg for 72 hours. She was already on aspirin, clopidogrel and atorvastatin along with supportive care. After that, a computed tomography with angiogram of brain was done which revealed acute infarct in the posterior limb of the left internal capsule. Power of left upper and lower limb initially reduced for next two days to grade 1 but then eventually it improved to grade 4+ over a period of five days when the patient was discharged with the advice to continue ramipril, aspirin, clopidogrel, atorvastatin,

physiotherapy and other supportive care. On follow-up after 15 days, her power of left upper and lower limb was normal.

DISCUSSION

PCI is increasingly used to treat patients with diffuse atherosclerosis, acute coronary syndromes and even high-risk patients such as low ejection fraction. Still, the rates of overall mortality and major cardiac adverse events have decreased [1]. The overall rate of ischemic strokes during or after cardiac catheterization ranges from 0.18% to 0.40%, with higher morbidity and mortality rates [2-4]. Blumer was amongst the first to extensively discuss the importance of embolism as a complication of cardiac infarction. He stated that mural thrombi are common following cardiac infarction, and that fragments may detach and produce embolic phenomena (Blumer 1937). Strokes among patients with acute coronary syndromes enrolled in the Organization to Assess Strategies for Ischemic Syndromes (OASIS) I and II studies were associated with six-month mortality rates of 27% [5].

Routinely used thrombolytic agents and anticoagulants are associated with the cholesterol embolization syndrome [6]. Dukkupati et al., found that cerebrovascular events were more common in patients with pre-existing hypertension, diabetes, and renal insufficiency [3]. Approximately one-third of all strokes occur within 24 hours following admission, whereas about two-thirds occur in the first week after the myocardial infarction (Behar et al., 1991; Sloan et al., 1997). Dukkupati et al., studied 20,679 patients who underwent PCI and found that cerebral infarction after angioplasty could be attributed to the following artery distributions: middle cerebral in 56%, anterior cerebral in 2%, posterior cerebral in 37%, superior cerebellar in 5%, posterior inferior cerebellar in 5%, and basilar in 7% [3]. Our patient had middle cerebral artery involvement which correlates to the study done by Dukkupati et al.

Keeley and Grines observed plaque dislodgment off the aortic arch with catheter advancement in more than 50% of 1,000 PCI procedures studied [7]. Use of large-bore catheters or intra-aortic balloons may dislodge atheromatous material resulting in the embolization to the cerebral circulation thus causing stroke and such plaques may not be amenable to the lytic therapies. This may be a reason for stroke in our patient. Also, any haemodynamic

instability in emergent situations and low cardiac output would further compromise cerebral perfusion and worsen ischemic events. In situ thrombus formation over the catheter tips is another possible source of embolism [8].

Some technical problems should be avoided to prevent stroke. Small amount of back-bleeding should be allowed when a guide catheter is advanced around the aortic arch. If the catheter is connected to a Tuohy-Borst Y-adapter during advancement, the valve should be left open, followed by strict double flushing, to discard any atherosclerotic debris that may be entrained by the guide catheter [7]. Incidence of stroke due to coronary intervention can be reduced by proper preprocedural evaluation and treatment of co-morbidities, flushing the catheters thoroughly, minimizing catheter manipulation, using minimal contrast, not panicking even when there is evidence of shock, arrhythmias and even complex anatomy in emergency cases. If at all the ischaemic stroke occurs, the thrombolytic agents should be used only if the benefit outweighs the complications. In our case, although this elective procedure was performed following the standard protocol by an experienced interventional cardiologist and his team, acute ischemic stroke was still the unfortunate occurrence.

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