Case Report

Diplopia due to Selective lateral rectus palsy as a complication after coronary angioplasty – A case report

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Abstract The overall incidence of stroke after percutaneous coronary intervention (PCI) ranges from 0.2 to 0.4 %. Periprocedural strokes associated with these invasive procedures are frequently attributed to embolic material that lodges in distal cerebral arteries. Selective involvement of single ocular muscle (Lateral Rectus) leading to diplopia is a rare complication.we are presenting such a case.

Keywords: Percutaneous Coronary Intervention (PCI), Periprocedural Stroke, Intraarterial Thrombolysis.

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CASE REPORT

A 45-year-old diabetic male underwent coronary angioplasty to LAD via trans-radial route. The procedure was uneventful, but within a short time of being shifted out of the cath lab, the patient started complaining of diplopia. It was found that the patient had binocular diplopia in all fields of vision and partial ptosis of the right eyelid. Neurology and ophthalmology evaluation confirmed acute onset right Lateral Rectus Palsy .MR imaging revealed no abnormality. The patient recovered completely in the next 15 days with conservative management.

DISCUSSION

The overall rate of stroke after percutaneous coronary intervention (PCI) ranges from 0.2% to 0.4%, but, it is the most debilitating complication from the patient's perspective and is associated with a high rate of morbidity and mortality. In 20,679 consecutive patients who underwent PCI in a large-volume center, stroke occurred in 0.44%. The occurrence of stroke was more frequently associated with diabetes mellitus, hypertension, prior stroke, or renal failure and was independently associated with in-hospital death. Factors associated with greater risk of development of stroke were: longer cardiac catheterization procedures, usage of more contrast, intraaortic balloon counter pulsation, a procedure that is itself known to increase the risk of stroke. Possible explanations for this latter characteristic include the greater propensity for hemodynamic compromise in these patients, which may increase the risk of ischemic stroke, and less meticulous care in advancing the catheter through the aorta during urgent PCI, which increases the risk of embolization by scraping of aortic plaques with subsequent embolization of debris to the brain. Scraping of aortic plaques occurs in >50% of PCI cases and is related to the size of the catheters used during the procedure. Larger catheters can cause greater dislodgement of aortic plaques and are therefore more likely to cause cerebral infarcts. Cerebral microembolism is thought to be the main mechanism of periprocedural ischemic stroke occurring with PCI. This finding is supported by transcranial Doppler studies performed during cardiac catheterization, which show the systematic

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occurrence of cerebral microemboli. Air embolism, thrombus formation in the catheter or on its surface, or dislocation of aortic atheroma during manipulation and passage of catheters within the aorta are the main sources of embolic material causing ischemic stroke during cardiac catheterization or PCI. Patients with coronary artery disease more frequently have severe atheroma in the descending aorta and aortic arch than patients without coronary artery disease. The aortic arch is recognized as a source of embolic material, and atheroma in the aortic arch is an independent risk factor for recurrent stroke. Retrograde progression of atheroma from the descending aorta to the aortic arch and the ascending aorta appears to be related to advancing age and presence of atherosclerotic risk factors. The risk of cerebral embolism and peripheral embolism is associated with this atheroma burden, especially during invasive procedures. Given these anatomic considerations in atheroma distribution, the choice of arterial access site may have some relevance in the determination of embolic risk, as previously suggested, with the potential advantage of an upper-limb approach in high-risk patients. Therefore, particularly in patients with several risk factors (eg, older age, previous stroke, diabetes mellitus, and hypertension) or during emergency procedures, prevention of ischemic stroke requires a meticulous technique including adequate anticoagulation, frequent catheter flushing with heparinized saline, and over-the-wire exchange catheters. Traditionally, ischemic stroke was thought to be related to solid particle embolization mobilized from atheroma protruding within the aorta, which would limit the effectiveness of thrombolysis in this setting. However, data on the composition of these cerebral emboli are lacking, and recent reports of successful neurovascular rescue, including the use of thrombolysis, might inform the established paradigm. Presumptions about the composition of cerebral embolism, whether calcified or fibrin-dense atheroma poorly amenable to lysis, might prove incorrect. Fresh thrombus formed at the tip of a catheter or on its surface or superimposed fresh thrombus on solid atheroma debris might make these emboli at least partially responsive to thrombolysis. Periprocedural strokes associated with these invasive procedures are frequently attributable to embolic material that lodges in distal cerebral arteries. However, given the increasingly aggressive antithrombotic environment used in PCI, especially in acute coronary syndromes, cerebral hemorrhages are also encountered. This implies that the ischemic or hemorrhagic mechanism has to be documented before any treatment can be initiated. Two possible clinical scenarios exist for patients with periprocedural stroke in cardiac catheterization or PCI. The first is where stroke occurs during the procedure. The second is where the stroke occurs a few hours later, after the patient has left the catheterization laboratory. It is unclear whether these 2 situations refer to different or similar underlying mechanisms, and no specific guidelines exist for either situation. The first aim is to confirm that the sudden-onset neurological deficit is due to a stroke rather than to another process (eg, seizure, migraine, or encephalopathy) or other medical disorder such as hypoglycemia, a common stroke mimic that can resolve completely after prompt correction. Most patients with ischemic stroke are alert, which can help distinguish ischemic stroke from metabolic disorders and intracerebral hemorrhage but nonetheless requires neurologist involvement with careful neurological examination and National Institutes of Health Stroke Scale (NIHSS) rating, a powerful predictor of prognosis. Also important to consider is the potential sedation that the patient received during the intervention, with subsequent hypoventilation or altered mental status requiring oxygenation or sedation reversal, respectively. As an aid to decision making, we propose an algorithm (Figure 2) based on recommended strategies for spontaneous stroke management19 and consensus opinion. This algorithm is therefore subject to change as further data become available.

STROKE OCCURRING DURING THE PROCEDURE

De Marco *et al* reported 6 cases of periprocedural ischemic stroke complicating cardiac catheterizations in which immediate cerebral angiography was the key factor in their successful management.20 This makes sense, in that embolism might be the most frequent cause of stroke during PCI, and cerebral angiography is becoming more widely used in spontaneous stroke because it allows identification of the occluded vessel and offers the opportunity for reperfusion by mechanical means or local thrombolysis with a greater chance of recanalization than with intravenous thrombolysis.21–25 In the case of intraprocedural stroke, the major advantages of performing a cerebral angiogram is that the diagnosis of embolic stroke will be confirmed and treatment can be given immediately. Furthermore, selective intra-arterial treatment is the preferred strategy over intravenous thrombolysis in this setting because most of these patients have recently received antiplatelet agents and full-dose anticoagulation, factors that increase the risk of hemorrhagic complications. Limited data exist on the effectiveness and safety of intra-arterial thrombolysis complicating cardiac catheterization in patients with ischemic stroke already treated by heparin (Table 3). However, even if confidence intervals are wide, complete success may be expected in about 50% of cases with an acceptable rate of intracranial hemorrhage, as shown in Table 3. Implementing this strategy requires specific skills in selective cerebral angiography22 or the involvement of an interventional neuroradiologist, which would invariably delay treatment. If an ischemic cause cannot be diagnosed immediately, brain imaging such as plain computed tomography (CT) or magnetic resonance imaging is mandatory before any potential thrombolysis can be contemplated. If intravenous thrombolysis is considered (for patients who have not received heparin or with normal activated coagulation time), special attention to the arterial access site will be required, with the potential risk of major bleeding if the sheath has been already retrieved. In this setting, radial access is certainly an advantage but femoral access is not contraindicated.

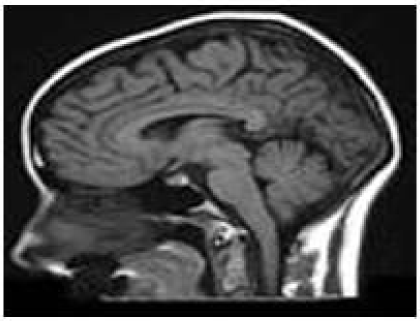

Figure 1

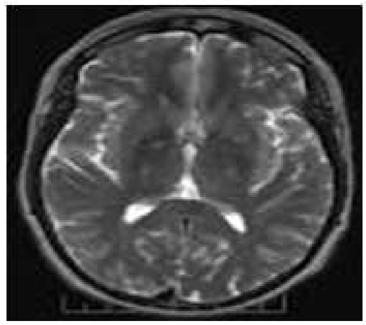

Figure 2

Figure 3

POSTPROCEDURAL STROKE

The occurrence of postprocedural stroke requires urgent cerebral imaging (well before 3 hours have elapsed) to confirm an ischemic cause and to plan subsequent treatment. The use of anticoagulation and several antiplatelet drugs, including glycoprotein IIb/IIIa inhibitors in PCI, precludes systematic use of thrombolytic treatment without a firm diagnosis. Indeed, although less frequent, hemorrhagic stroke remains a possibility. As depicted in the algorithm (Figure 2), we recommend assessment with magnetic resonance imaging or, depending on local facilities and time, a plain CT with CT perfusion if possible. On the basis of the results of this imaging, a conventional therapeutic strategy including selective or intravenous thrombolysis22–24 can be used depending on whether or not a significant area of tissue at risk of infarction is observed (eg, magnetic resonance perfusion-diffusion mismatch). The important new message suggested by recent literature is that stroke occurring during cardiac catheterization is the most treatable of neurological conditions whether it occurs in the catheterization laboratory or otherwise. Expeditious management including a multidisciplinary response team (cardiologist, neurologist, radiologist, and potentially a neurointerventionalist) is required to facilitate immediate imaging and institution of therapy akin to standard acute stroke management

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