CASE REPORT

Case Report: Transient complete blindness after coronary angiography [version 1; peer review: awaiting peer review]

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Abstract
Transient cortical blindness is a rare complication that can occur after coronary angiography. We report a case of a 53-year-old Caucasian male with a history of multiple cardiovascular risk factors who presented to the emergency room with chest pressure and shortness of breath. He underwent cardiac catheterization and subsequently developed transient bilateral blindness. His vision gradually improved over the next 72 hours without any intervention. This case highlights the importance of considering transient cortical blindness as a potential complication of coronary angiography and the favorable outcome of this condition.

Keywords
Transient cortical blindness, coronary angiography, complications, case report

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Background
Coronary angiography is a well-established and widely used diagnostic procedure for evaluating the patency of coronary arteries. While the procedure is generally considered safe, there are potential risks associated with it, including bleeding, infection, allergic reactions to the contrast dye, and damage to the artery where the catheter was inserted. One rare but potentially serious complication of coronary angiography is transient cortical blindness, which occurs due to the contrast dye used during the procedure. As a result, patients may experience a temporary loss of vision that can last from a few minutes to several days. This can be a source of significant stress and anxiety for both patients and healthcare providers. By recognizing and managing this condition, providers can help alleviate patient anxiety and ensure appropriate follow-up care.

Case report
A 53-year-old Caucasian male teacher presented to the emergency room with complaints of chest pressure that started two hours after dinner and was associated with shortness of breath. He had a past medical history of hyperlipidemia, diabetes mellitus type 2, hypertension, ventricular tachycardia, ventricular fibrillation which had led to defibrillator placement, and of coronary artery disease for which he underwent coronary artery bypass surgery. The patient reported that his mother suffered from a myocardial infarction at age 50 years and his brother died suddenly at age 35 years. Upon arrival at the ER, he was given aspirin, nitroglycerin paste, and enoxaparin. His chest discomfort resolved. The patient underwent cardiac catheterization due to suspicion of acute coronary syndrome.

Iopamidol 76% (a nonionic, iso-osmolar iodinated contrast material) was used during the cardiac catheterization. The procedure revealed evidence of three-vessel disease with two of three bypass grafts patent. The left ventricular function was mildly impaired. During the procedure, the patient developed chest pain and significant inferior ST elevation prompting immediate intervention with percutaneous coronary intervention (PCI)/drug-eluting stent of the ostial right coronary artery and PCI/percutaneous transluminal coronary angioplasty (PTCA) of the mid-right posterior descending coronary artery. After recovering from the anesthesia, the patient developed marked bilateral vision loss. MRI of the brain could not be obtained due to the incompatibility of the patient’s pacemaker device. A CT scan of the brain without contrast (Figure 1) and a CT angiogram of the head and neck showed no acute intracranial abnormality, aneurysms, or significant stenosis. Ophthalmology evaluation showed significantly reduced visual acuity in the eyes bilaterally of 20/400. The ocular motility was intact. Pupils were 3 mm, equal, and reactive without an afferent pupillary defect. Intraocular pressure with Tono-Pen was 12 mmHg on the right and 15 mmHg on the left. The anterior segment exam was essentially normal. Dilated fundal examination revealed a normal cup/disc ratio of 0.3 in each eye, flat optic nerve and retina, and patent vessels without any hemorrhages or edema. Otherwise, the neurological examination was unremarkable.

![CT scan of the brain without contrast.](image)
The patient's vision gradually improved without any intervention over 72 hours. His visual acuity returned to normal and he did not experience any further episodes of vision loss.

Discussion
Transient cortical blindness is a rare occurrence following coronary angiography, with an estimated incidence of only 0.05%. The differential diagnosis for this condition includes central retinal artery occlusion, amaurosis fugax, or cerebrovascular accident (CVA); however, these are less likely given the normal funduscopic exam of the retina during the episode and lack of ischemic changes on imaging. Transient cortical blindness has been more commonly reported in cases of vertebral artery angiography, likely because the occipital cortex receives blood supply from the posterior cerebral artery through the vertebrobasilar system. In the case presented, the patient experienced transient cortical blindness after undergoing coronary angiography, despite having undergone the procedure without complications before undergoing bypass surgery. Reports have suggested that transient cortical blindness after coronary angiography is more prevalent in patients who have undergone coronary artery bypass grafting (CABG). It is plausible that direct injection of contrast during angiography may reach the vertebral artery through the internal mammary artery used during CABG. The exact mechanism underlying transient cortical blindness is not yet fully understood, but it has been hypothesized to be related to allergic or immune mediated contrast medium-induced neurotoxicity. Corticosteroids have been used for the management of some cases, although our patient made a complete recovery without any corticosteroids. The use of hyperosmolar contrast solutions during angiography may increase the permeability of the blood-brain barrier in the occipital cortex, facilitating the entry of contrast agents into the visual cortex area during the procedure. This is particularly common in patients with chronic hypertension. Unfortunately, using iso-osmolar contrast does not mitigate the risk, as is demonstrated in our case. Re-exposure to contrast material has been reported to be safe. Further research is warranted to better understand the underlying mechanisms and develop strategies for prevention in high-risk patients.

Strength and limitations
This case report highlights a rare complication of coronary angiography and is potential occurrence even in patients who underwent the procedure in the past without issues. This serves as a reminder to clinicians to be vigilant and consider the possibility of transient cortical blindness when evaluating patients who develop visual disturbance after coronary angiography. While the case report provides valuable insights, it is important to note that it has limitations. An MRI of the brain which could have provided additional information about potential structural abnormalities or ischemic changes in the brain, could not be obtained due to the patient's pacemaker device which was incompatible with MRI. It is important to note that this represents an individual experience and may not be generalized move to the broader population.

Patient perspective
The patient reported that suddenly losing his vision had caused a feeling confusion, helplessness and fear. During the 72-hour period when his vision gradually improved, he experienced a mix of emotions ranging from hope to uncertainty. The gradual improvement was a relief but he also felt anxious about whether there are vision with fully recovered.

Ethical considerations
The patient provided a written informed consent for the publication of this case report, including the use of de-identified clinical data and imaging results. The patient understood that their identity will remain confidential and their participation is voluntary.

Data availability
Underlying data
All data underlying the results are available as part of the article and no additional source data are required.

References


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