

# Transient Cortical Blindness After Coronary Artery Bypass Surgery: A Case Report

Masood Soltanipur <sup>1,2</sup>, Hossein Yarmohamamdi <sup>1,2</sup>, Mahdi Rezaei <sup>1,2</sup>, Amir Rostami<sup>2</sup>, Seyed Mohsen Mirhosseini <sup>1,\*</sup>

<sup>1</sup> Cardiovascular Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>2</sup> Medical Students Research Committee, Shahed University, Tehran, Iran

\*Corresponding Author: Cardiovascular Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: mohsenmirhosseini@sbmu.ac.ir

Received: 14 August, 2024; Accepted: 5 October, 2024

## Abstract

Transient cortical blindness (TCB) is an unusual postoperative complication following cardiac surgery. In this report, we present the case of a 54-year-old female who developed TCB after undergoing coronary artery bypass grafting (CABG) surgery. Her vision gradually improved over the course of two months post-operation. No causative ocular damage was found upon ophthalmologic examination, and assessments of related arteries (carotid, vertebral, and ophthalmic) were entirely normal. Following the onset of blindness, a non-contrast computed tomography scan showed bilateral subarachnoid hyperdensities in the occipital and parietal lobes. Magnetic resonance imaging was performed to confirm the presence of cerebral hemorrhage, but no pathology was detected. While the exact mechanism of TCB remains unclear, recognizing this potential complication after CABG is crucial.

**Keywords:** Coronary Artery Bypass Graft (CABG), Transient Cortical Blindness (TCB), Heart Surgery, Case Report

## 1. Introduction

Transient cortical blindness (TCB) is an infrequent yet intriguing postoperative complication following cardiac surgery. It is marked by the sudden, temporary loss of vision in both eyes, typically resolving within hours (1). This report of a rare occurrence of TCB following coronary artery bypass grafting (CABG) surgery aims to raise awareness among clinicians and researchers regarding this potential complication.

## 2. Case Presentation

A 54-year-old non-diabetic woman with a history of myocardial infarction (MI) and percutaneous coronary intervention approximately 13 years ago presented with complaints of chest pain. Her medications included nitroglycerin, atorvastatin, and aspirin. Preoperative evaluation showed an ejection fraction of 40%, with carotid Doppler revealing no abnormalities. Coronary angiography indicated 80%, 90%, and 60% stenosis in the left anterior descending (LAD), diagonal artery, and right coronary artery, respectively. Bypass grafts were placed, utilizing the left internal mammary artery to the LAD artery and a saphenous vein to the obtuse marginal and ramus arteries; however, bypass grafting for the right coronary artery was unsuccessful. During surgery,

blood flow through the grafts was satisfactory. An iodinated contrast agent was used, with an operative time of 128 minutes and an aortic clamp duration of 70 minutes.

The patient remained asymptomatic immediately postoperatively but began experiencing bilateral blurred vision three days after surgery. Her vision progressively worsened over the following two weeks until she could only perceive light in both eyes. Her vision then gradually improved over the next two months. Postoperatively, her vital signs were stable, there were no changes in her electrocardiogram or cardiac enzymes, and her cardiac status remained stable.

Ophthalmologic examination revealed no causative ocular abnormalities aside from bilateral papilledema and reduced visual acuity to light perception. As an initial treatment, intravenous hydrocortisone was administered (100 mg twice daily for three days). A non-contrast computed tomography (CT) scan showed bilateral subarachnoid hyperdensities in the occipital and parietal lobes. Subsequently, magnetic resonance imaging (MRI) was performed to confirm the presence of cerebral hemorrhage, but no evidence of hemorrhage was detected. Evaluation of the carotid, vertebral, and ophthalmic arteries was normal. The patient was kept under close observation without further intervention,

and her vision fully recovered after two months. No additional complications were noted during follow-up.

### 3. Discussion

Transient cortical blindness is an uncommon but potentially severe and stressful complication that has been primarily associated with cerebral and vertebral angiography (2, 3). Reports on TCB following CABG have also appeared in the literature since the 1990s (4, 5). The pathophysiology of TCB remains incompletely understood, but several proposed mechanisms may help explain its occurrence. Hyperosmolar iodinated contrast agents have been linked to TCB cases (1). These contrast agents may disrupt the blood-brain barrier, leading to the infiltration of contrast into the brain parenchyma. This localized infiltration, particularly in the occipital lobes, may induce an inflammatory response, which could contribute to the sudden onset of cortical blindness (6).

It is worth noting that not all TCB cases involve hyperosmolar iodinated contrast agents. Reports indicate that non-ionic contrast agents, considered less osmotically active, have also been associated with TCB occurrences (7). Although using non-ionic and hypoosmolar contrast agents was expected to reduce the risk of TCB, it is evident that this precaution does not provide complete prevention (7). This discrepancy suggests that factors beyond contrast agent osmolarity may contribute to TCB.

In the present case, bilateral subarachnoid hyperdensities in the occipital and parietal lobes were observed on a non-contrast CT scan. However, subsequent MRI findings showed no pathological abnormalities. This inconsistency raises questions about the nature of the observed hyperdensities and their relationship to TCB. A similar case reported by Lee and Arjan Singh also demonstrated acute subarachnoid bleeding in both occipital lobes on CT, with a normal MRI, further underscoring the transient nature of these changes and the absence of lasting damage associated with TCB (8). This highlights the importance of MRI in the evaluation of these patients, though the diagnosis of TCB remains largely based on clinical presentation. The prognosis for TCB is generally favorable, with most cases resolving within hours, as observed in this patient (9). In conclusion, clinicians should remain vigilant about the possibility of TCB following coronary angiography and CABG procedures. Additionally, patients undergoing these procedures should be informed of the potential risk of TCB, and close monitoring for signs and symptoms of this condition is advised.

### Footnotes

**Authors' Contribution:** S. M. M.: Contributed to conceptualizing the study and finalized the manuscript; A. R., M. R., and H. Y.: Gathered data and contributed to writing the initial draft; M. S.: Contributed to writing the initial draft and its editing. All authors reviewed the manuscript.

**Conflict of Interests Statement:** The authors confirm that no known conflicts of interest are associated with this publication.

**Data Availability:** Data are available based on the request from the corresponding author.

**Funding/Support:** There has been no financial support for this work.

**Informed Consent:** Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

### References

- Gellen B, Remp T, Mayer T, Milz P, Franz WM. Cortical blindness: a rare but dramatic complication following coronary angiography. *Cardiol.* 2003;**99**(1):57-9. [PubMed ID: 12589125]. <https://doi.org/10.1159/000068443>.
- Tong X, Hu P, Hong T, Li M, Zhang P, Li G, et al. Transient Cortical Blindness Associated with Endovascular Procedures for Intracranial Aneurysms. *World Neurosurg.* 2018;**119**:123-31. [PubMed ID: 30077753]. <https://doi.org/10.1016/j.wneu.2018.07.234>.
- Li M, Liang H, Liu C, Liu H, Zheng Y, Shi W, et al. Risk Factors of Transient Cortical Blindness After Cerebral Angiography: A Multicenter Study. *Front Neurol.* 2019;**10**:1005. [PubMed ID: 31620076]. [PubMed Central ID: PMC6759592]. <https://doi.org/10.3389/fneur.2019.01005>.
- Kamata J, Fukami K, Yoshida H, Mizunuma Y, Moriai N, Takino T, et al. Transient cortical blindness following bypass graft angiography. A case report. *Angiol.* 1995;**46**(10):937-46. [PubMed ID: 7486215]. <https://doi.org/10.1177/000331979504601009>.
- Sticherling C, Berkefeld J, Auch-Schwelk W, Lanfermann H. Transient bilateral cortical blindness after coronary angiography. *Lancet.* 1998;**351**(9102):570. [PubMed ID: 9492782]. [https://doi.org/10.1016/S0140-6736\(05\)78557-3](https://doi.org/10.1016/S0140-6736(05)78557-3).
- Alp BN, Bozbuga N, Tuncer MA, Yakut C. Transient cortical blindness after coronary angiography. *J Int Med Res.* 2009;**37**(4):1246-51. [PubMed ID: 19761711]. <https://doi.org/10.1177/147323000903700433>.
- Yazici M, Ozhan H, Kinay O, Kilicaslan B, Karaca M, Cece H, et al. Transient cortical blindness after cardiac catheterization with iobitridol. *Tex Heart Inst J.* 2007;**34**(3):373-5. [PubMed ID: 17948092]. [PubMed Central ID: PMC1995067].
- Lee Z, Arjan Singh RS. Transient Cortical Blindness After Coronary Angiography, Bypass Graft Angiography, and Coronary Angioplasty. *Cureus.* 2021;**13**(1). <https://doi.org/10.7759/cureus.12542>.
- Akhtar N, Khatri IA, Naseer A, Ikram J, Ahmed W. Transient cortical blindness after coronary angiography: a case report and literature review. *J Pak Med Assoc.* 2011;**61**(3):295-7. [PubMed ID: 21465952].