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Transient Cortical Blindness Following Coronary Artery Bypass Graft: A Case Report

Namvar Movahedi,[1] Shapour Shirani,[2] Saeed Soltanzadeh,[3] Parin Yazdanifard[1]

Departments of [1]Cardiovascular Research and [2]Radiology, Tehran Heart Center, Medical Sciences, University of Tehran; [3]Neurology Department, Shariatee Hospital, Medical Sciences, University of Tehran, Iran

ABSTRACT

We present our first encounter with transient cortical blindness as a neurological adverse complication in a 68-year-old woman five days following coronary artery bypass grafting. This transient neurological complication may have been a result of microembolization following coronary angiography, cardiopulmonary bypass or setting of hypertension, diabetes mellitus and renal disease that affect on vertebrobasilar vascular system. This was our first experience of this complication in over 18,000 cardiac surgeries.

INTRODUCTION

Cortical blindness is an infrequent, albeit disastrous, neurological complication after a number of operations including cardiac surgeries with the reported incidence of 0.003% and 0.0008% [Meyendorf 1982; Henzlova 1988; Grocott 2004; Murthy 2006a, 2006b]. Post-cardiac surgery visual disturbances, comprising color vision loss, metamorphosias, visual gnostic disorders, and cortical blindness, are rare phenomena caused by microembolic or ischemic hypoxic changes of the basal ganglia and the occipital lobe [Grocott 2004; El Gatit 2008]. The impairment of the posterior cerebral circulation, which supplies the occipital lobe, seems to be a major contributing factor to cortical blindness in cardiac arrests, surgeries, and angiographic procedures [Wunderlich 2000; Lim 2002; El Gatit 2008]. Diagnosis, especially at the acute stage, is difficult because magnetic resonance imaging (MRI) and funduscopy may appear normal [Suzuki 2001]. According to prognosis, it has been reported as a reversible transient complication with the favorable prognosis and spontaneous return of sight within few days of cardiac procedures [Schowengerdt 1993; Borghi 2008]. However, it is affected by some deteriorating factors such as older age, male gender, and associated disease [Aldrich 1987]. We herein describe our first encounter with post-coronary artery bypass grafting (CABG) transient cortical blindness and disorientation on the fifth postoperative day in a 68-year-old woman.

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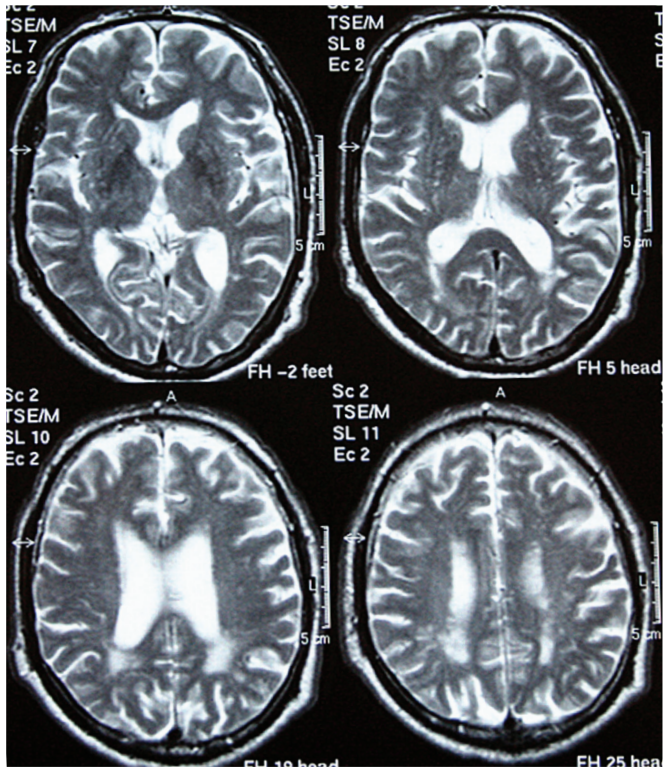
Correspondence: Namvar Movahedi, MD, Assistant professor of cardiovascular surgery, Tehran Heart Center, Tehran University of Medical Sciences. North Kargar Street, Tehran, Iran 1411713138; +98-2188029256; fax: +98-2188029256 (e-mail: namvarmovahedi2007@yaboo.com).

CASE REPORT

A 68-year-old woman with a documented three-vessel coronary artery disease and a history of hypertension, chronic renal failure, hyperlipidemia, 80% stenosis in the left renal artery, and non-insulin controlled diabetes mellitus (DM) underwent CABG using the left internal mammary artery and three venous conduit grafts. The perioperative echocardiography showed normal valves, good right ventricle size, ejection fraction of 55%, and concentric left ventricular hypertrophy with diastolic dysfunction. The first 4 postoperative days saw her recovering satisfactorily with no complications. On the 5th postoperative day, however, she complained of a sudden loss of vision in both eyes. Her pupils were equal and reactive to light. The ophthalmological examination revealed no light perception (NLP) of both eyes in visual acuity as well as a cotton-wool spot at funduscopy probably due to DM.



Brain Magnetic Resonance Imaging (MRI): Axial T2WI. There are high signal in perventricular white matter due to myelin pallor.

Other paraclinical and clinical examinations, including neurological tests, were normal. Additionally, the brain MRI study revealed increased signal foci in T2WI in periventricular region in favor of myelin pallor without any finding of acute cerebral infarction, which is normal for patients' age study (Figure). The color Doppler sonography of the carotid arteries revealed no significant stenosis. Our neurological and ophthalmological consultations led to a diagnosis of bilateral cortical blindness due to microembolization, and on the basis of which a proper course of treatment was commenced. She fully regained her vision 4 days later, and her ophthalmological examination was normal. At three months' follow-up, the ophthalmological examination demonstrated that the patient had normal visual activity, but she did not consent to a follow-up MRI because she was on a dialysis program for her chronic renal failure.

DISCUSSION

It is believed that the impairment of the posterior cerebral circulation, which supplies the occipital lobe and basal ganglia, begotten by microembolism or ischemic hypoxic changes is a major contributing factor to cortical blindness in cardiac arrests, surgeries, angiographic procedures, hypertensive encephalopathy and pseudotumor cerebry [Meyendorf 1982;El Gatit; Schowengerdt 1993; Wunderlich 2000; Lim 2002]. The contrast agents used in angiographic procedures can disrupt the blood-brain barrier, and the resultant increase in vascular permeability could potentially lead to cortical blindness with an incidence of 0.3% to 4% [Kamata 1995; Lim 2002]. On the other hand and as Borghi stated in 2008 [Borghi 2008], the vertebrobasilar system seems to be more fragile in the setting of chronic hypertension, renal insufficiency and immunosuppressive therapy [Schwartz 1992; Lim 2002; Merchut 2002]. In our case, in addition to coronary angiography, the patient underwent CABG via cardiopulmonary bypass (CPB), and a known complication of CPB is gaseous microembolization with adverse cerebral outcomes [Lynch 2008]. However, the late onset of cortical blindness in our patient seems contradicts our hypothesis of microembolization due to CPB or angiography regarding previous reports [Aldrich 1987; Borghi 2008; Bagheri 2008]. In this case, the history of hypertension, renal insufficiency and diabetes mellitus in association with progressed atherosclerosis seems to have played a role in damaging of the vertebrobasilar vascular system and posterior cerebral circulation and her experiencing transient bilateral cortical blindness.

After all, it is worthy of note, that the patient's MRI remained normal.

It could be concluded that this transient cortical blindness occurred as a result of microembolization in the wake of setting of patient's diseases that could affect on vertebrobasilar vascular system. Nonetheless, the fact that all the clinical and paraclinical tests of the patients were normal precluded proper documentation to our hypothesis. Approximately 18,000 patients have undergone cardiac surgery via CPB in our center over the past 6 years; and this was the first time that we had faced post-cardiac surgery cortical blindness.

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