

VISUAL HALLUCINATION POST CORONARY ARTERY BYPASS GRAFTING : A CASE REPORT

IGB Adi Dharmawan^{1*}, Pontisomaya Parami², Cynthia Dewi Sinardja³

Anesthesiology and Intensive Care Department, Prof. Dr. dr. IGNG Ngoerah General Hospital, Denpasar, Bali, Indonesia¹, Anesthesiology and Intensive Care Department, Udayana University General Hospital, Denpasar, Bali, Indonesia^{2,3}

*Corresponding Author: gadbius2022@gmail.com

ABSTRAK

Halusinasi visual merupakan komplikasi neuropsikiatri yang jarang namun penting setelah tindakan Coronary Artery Bypass Grafting (CABG). Halusinasi ini sering dikaitkan dengan delirium, namun beberapa pasien mengalaminya secara mandiri, sehingga menimbulkan tantangan dalam diagnosis dan penanganan. Kami melaporkan kasus seorang pria berusia 63 tahun dengan penyakit arteri koroner multipembuluh dan syok kardiogenik yang menjalani CABG mendesak tanpa penggunaan mesin jantung-paru (off-pump). Setelah operasi, dalam kondisi hemodinamik stabil dan tanpa gangguan metabolik, pasien mengalami halusinasi visual kompleks yang muncul hanya saat mata tertutup. Halusinasi yang dialaminya berupa bayangan seekor anjing, bayangan hitam besar, dan pemandangan kampung halaman yang familiar. Tidak ditemukan tanda-tanda delirium berdasarkan penilaian menggunakan Delirium Symptom Interview (DSI) dan Confusion Assessment Method (CAM). Penanganan suportif serta pemberian haloperidol dosis rendah berhasil meredakan gejala dalam waktu 24 jam tanpa kekambuhan. Kasus ini menyoroti bentuk halusinasi visual yang jarang, yakni halusinasi saat mata tertutup, setelah CABG off-pump, yang berbeda dari halusinasi dengan mata terbuka yang lebih umum dilaporkan. Tinjauan literatur menunjukkan bahwa insiden halusinasi visual pascaoperasi jantung berkisar antara 11% hingga 58%, dengan sirkulasi ekstrakorporeal (penggunaan mesin jantung-paru) diduga sebagai faktor risiko. Namun, kasus ini menantang anggapan tersebut. Fenomena ini memiliki kemiripan dengan Charles Bonnet Syndrome, yaitu kondisi di mana deprivasi visual memicu munculnya halusinasi spontan di korteks asosiasi visual. Halusinasi visual ternyata dapat terjadi bahkan pada pasien CABG off-pump tanpa delirium atau defisit neurologis. Mengenali fenomena ini sangat penting untuk mencegah misdiagnosis dan intervensi yang tidak perlu. Penelitian lebih lanjut diperlukan untuk memahami patofisiologi dan faktor risiko yang mendasarinya.

Kata kunci : coronary artery bypass grafting, delirium, halusinasi visual

ABSTRACT

Visual hallucinations are rare but notable neuropsychiatric complications following coronary artery bypass grafting (CABG). We report a 63-year-old male with multivessel coronary artery disease and cardiogenic shock who underwent urgent off-pump CABG. Postoperatively, while hemodynamically stable and free from metabolic disturbances, the patient experienced vivid, complex visual hallucinations exclusively upon eye closure. The hallucinations consisted of recurring images of a dog, a large black shadow, and a familiar hometown landscape. There were no signs of delirium as assessed by the Delirium Symptom Interview (DSI) and Confusion Assessment Method (CAM). Supportive care and low-dose haloperidol led to resolution of symptoms within 24 hours without recurrence. This case highlights a rare presentation of closed-eye visual hallucinations after off-pump CABG, distinct from the more commonly reported open-eye hallucinations. Literature review reveals incidences of visual hallucinations post-cardiac surgery ranging from 11% to 58%, with extracorporeal circulation being a suspected risk factor. However, this case challenges that notion. The phenomenon resembles Charles Bonnet Syndrome, where visual deprivation leads to spontaneous hallucinations in the visual association cortex. Visual hallucinations can occur even in off-pump CABG patients without delirium or neurological deficits. Recognizing this phenomenon is essential to prevent misdiagnosis and unnecessary interventions. Further research is needed to understand the pathophysiology and risk factors.

Keywords : coronary artery bypass grafting, delirium, visual hallucination

INTRODUCTION

Coronary Artery Bypass Grafting (CABG) is a major cardiac surgery that can improve patients' quality of life, but it can be complicated by hallucinations as a cerebral complication.⁸ There's a very few data about the prevalence, risk factors and pathophysiology of postoperative hallucinations following cardiac surgery. We find two clinical studies about hallucinations in cardiac surgery, one prospective observational study that included 52 patients and one case series of three patients (Eissa, et al., 2025) (Eriksson, et al., 2002). ICD-11 define hallucinations (MB27.2) as "Sensory perceptions of any modality occurring in the absence of the appropriate (external) stimulus. The person may or may not have insight into the unreal nature of the perception." Hallucinations are differentiated from illusions (MB27.4), which are described as "A misinterpretation of a true sensation (e.g., hearing voices in the sound of running water, the perception of figures in shadows)" (Arciniegas, 2015). Hallucinations are seen in a variety of diseases, such as schizophrenia, blindness, Parkinson's disease, and in up to 50% of patients with delirium. Hallucinations can be frightening and may cause emotional distress and thus prolonged the length of hospital stay (Ottens, et al., 2010).

Patients who report visual hallucinations of images of animate or inanimate objects after major cardiac surgery may need an assessment from neurologist and psychiatrist (Tshernatsch, et al., 2022). Some cases shows that the hallucinations are not related to postoperative delirium and the patients clearly are aware of the unreality of this sensory experience (Eissa, et al., 2025) (Kastaun et al., 2016). Recent development of the Questionnaire for Psychotic Experiences (QPE), a validated instrument for the detection of hallucinations across all diagnostic groups, has enabled clinicians and researchers to screen for perioperative hallucinations in a structured fashion (Ottens, et al., 2020). Current literature provides information on hallucinations following cardiac surgery mainly in the form of case reports, previous case series by Kastaun et al. shows that this clinically relevant phenomenon can occur in up to 11% of patients after coronary artery bypass grafting (CABG), while investigation of a mixed cardiac surgery sample found an approximately 15% incidence of visual hallucinations in the first four postoperative days (Eriksson, et al., 2002). Other study by Eriksson et al. reported 58% of patients after CABG using extracorporeal circulation (ECC) have hallucinations regardless of the presence of delirium (Laloux & Osseman, 1992). It is unclear whether the phenomenon is the direct result of cardiac surgery.

We report a case of postoperative visual hallucinations in a patient undergoing urgent coronary artery bypass grafting (CABG) for critical multivessel coronary artery disease and cardiogenic shock. The case emphasizes the importance of neuropsychiatric monitoring in high-risk cardiac patients. Early recognition and multidisciplinary management are crucial to minimize adverse outcomes.

CASE REPORT

A 63-year-old male with a history of hypertension and dyslipidemia presented with acute decompensated heart failure and cardiogenic shock. ECG revealed sinus rhythm with extensive infero-anterior ischemia. Coronary angiography showed critical left main (LM) stenosis (90%), proximal left anterior descending (LAD) artery stenosis, and chronic total occlusion of the left circumflex (LCx) artery. Ejection fraction (EF) was severely reduced at 32%. The patient was supported preoperatively with intra-aortic balloon pump (IABP) therapy. There was no history of cerebrovascular disease, and neurologic and neuropsychological examinations were normal preoperatively.

An urgent three-vessel off-pump CABG was performed with the following grafts: the graft to the lateral circumflex and right coronary artery was performed by using the saphenous vein

and then the left internal mammary artery was anastomosed onto the left anterior descending. The patient received a standard midazolam 0.5 mg/kg and sufentanyl 0.8 mcg/kg as premedication. Induction was done using sufentanyl 0.5 mcg/kg as analgetic and O₂: Sevoflurane as agent for induction. To facilitate intubation rocuronium 0.6 mg/kg was given as muscle relaxant. Anaesthesia maintenance was done using O₂: Compressed air: Sevoflurane; Sufentanyl 0.1-0.2 mcg/kg every 45 minutes; Rocuronium 0.15 mg/kg every 45 minutes. Off pump CABG was performed within 5 hours duration with stable haemodynamic. There was no evidence of stroke on physical examination, and metabolic parameters were within acceptable limits. Patient was extubated in the operating room. Postoperatively, the patient was managed in the ICU under sedation with dexmedetomidine and morphine infusion. On second postoperative day, the patient exhibited an episode of visual hallucination while remaining hemodynamically stable. There was no sign of hypoxia, hypercapnia, or electrolyte imbalance.

The patient experienced visual hallucinations, solely on eye closure. The images appeared a few seconds after eye closure and lasted continuously until both eyes were opened, at which time they instantaneously disappeared. The hallucinations were limited to 3 types of recurring images: a dog and a big black shadow resembling a giant, and a view from his hometown. That vision was vivid, complex, and of normal size and shape. The images of dog, big black shadow resembling a giant, and a view from his hometown occurred simultaneously and were spread out in a repetitive, orderly manner throughout the patient's entire visual field. The dog appeared in white, the giant shadow appeared in black. No coloured flashes (photopsia) were observed. Auditory or tactile hallucination did not accompany the visual hallucinations. The images remained stationary, and there was no light-headedness or vertigo associated with the hallucinatory episodes. All the hallucinations were related to the patient's prior daily life as a farmer except the big black shadow.

The visions of dog resembled his own dog, whereas he remembered the view of his hometown as the same one he had seen on numerous occasions while he was there. He only can't describe the big black shadow in the vision. Notably, the hallucinations appeared at various times throughout the day but never at night when the patient was lying down to sleep. He did not have dreams of the same or related visions. The patient denied feeling frightened or anxious about closing his eyes at any time. He was able to voluntarily close and open his eyes and never felt forced to keep his eyes closed. Using The Delirium Symptom Interview (DSI) and the Confusion Assessment Method (CAM), which allows for the testing of the domains of functioning associated with the Diagnostic and Statistical Manual of Mental Disorders IV criteria, no delirium diagnosis was made. Supportive care was provided, and haloperidol 0.5 mg PO was administered. The hallucination resolved within 24 hours without recurrence.

RESULT AND DISCUSSION

This case presents a unique instance of transient, closed-eye visual hallucinations following off-pump coronary artery bypass grafting (CABG), occurring in a 63-year-old male without pre-existing neurological or psychiatric conditions. The patient's vivid, complex visual experiences—manifesting exclusively upon eye closure and resolving upon eye opening—are particularly noteworthy, as they differ from the more commonly reported open-eye hallucinations in postoperative cardiac patients. Visual hallucinations after cardiac surgery are an underrecognized phenomenon, with varying reported incidences. Tschernatsch et al. conducted a prospective study involving 184 patients undergoing elective CABG, finding that 16.1% of those who underwent on-pump surgery experienced transient visual hallucinations, whereas none in the off-pump group did (Tschernatsch, et al., 2022).

These hallucinations were not associated with delirium, psychosis, or significant visual impairment and were characterized by patients' awareness of their unreality, aligning with the concept of pseudohallucinations. Similarly, Ottens et al. reported a 21.9% incidence of hallucinations in a mixed cardiac surgery cohort, including CABG and valve surgeries. These hallucinations occurred predominantly within the first four postoperative days and were not necessarily linked to delirium (Ottens, et al., 2020). Eriksson et al. observed an even higher incidence, with 58% of patients experiencing hallucinations post-CABG using extracorporeal circulation, regardless of delirium presence. These studies suggest a potential association between the use of extracorporeal circulation and the occurrence of postoperative hallucinations (Laloux & Osseman, 1992).

Contrary to the aforementioned studies, our patient underwent off-pump CABG yet still experienced visual hallucinations. This challenges the notion that extracorporeal circulation is a primary contributor to postoperative hallucinations. Moreover, the hallucinations in our case were exclusively present upon eye closure, a feature not commonly reported in the literature. Previous case reports, such as those by Eissa et al. and Laloux and Osseman, have documented closed-eye visual hallucinations post-cardiac surgery, but these are exceedingly rare (Eissa, et al., 2025) (Rojas & Gurnani, 2023). The patient's ability to recognize the hallucinations as unreal, absence of delirium (as assessed by the Delirium Symptom Interview and Confusion Assessment Method), and the transient nature of the episodes suggest a benign course. Nonetheless, such experiences can be distressing and may lead to unnecessary interventions if misinterpreted (Tshernatsch, et al., 2022). Awareness of this phenomenon is crucial for clinicians to provide appropriate reassurance and avoid unwarranted treatments.

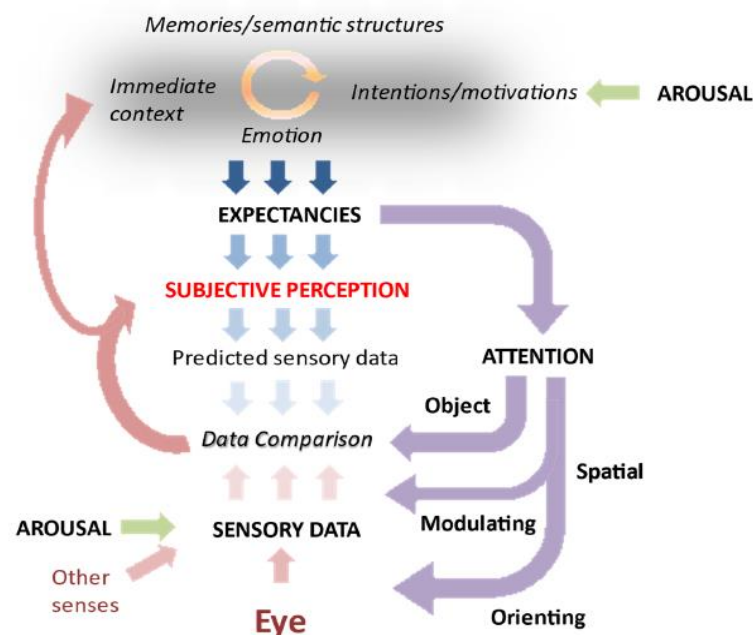


Figure 1. Generative Model of Visual Perception

The main distinguishing feature of the patient's visual hallucinations was their prompt onset on eye closure and immediate disappearance on eye opening. The pathogenesis theory of closed-eye visual hallucinations stems from that concerning ophthalmopathic hallucinations, also known as Charles Bonnet syndrome, which is a phenomenon characterized by complex visual hallucinations in visually challenged patients but otherwise psychologically normal (Collerton, et al., 2023). Collerton et al propose a harmonised framework for aspects of visual perception relevant to hallucinations (Caplan, 2007). The perception is driven by expectations

which are created by a complex interaction of higher-level cognitive functions. Predictions of incoming sensory data drawn from that perception are then compared with actual sensory data, with the perception then being modified to minimize any mismatch. Expectations also drive attention and action to focus the gathering of sensory data on areas that are most relevant to testing predictions as shown in figure 1.

The hallucinations are thought to be a “release phenomena” caused by input disruption of afferent visual to the visual association areas of the cerebral cortex, which causes the release of hallucinations that are normally inhibited by visual input to the association areas. Eye closure may generate hallucinations through the exclusion of light and loss of visual input to the cerebral association areas. Our patient experienced hallucinations when light and visual input were gone during eye closure, which directly supports the theory that hallucinations are released when normal afferent input fails to reach the visual association cortex. Conversely, the hallucinations ceased instantaneously when light and visual input were admitted on opening of the eyes, indirectly supporting the theory by providing evidence that hallucinations are prevented from being released when afferent input reaches the association areas (Caplan, 2007) (Collerton, et al., 2023 (Eissa, et al., 2025).

The main treatment of choice for visual hallucinations due to primary psychotic illness are neuroleptic medications eg. dopamine antagonists. These medications are also beneficial for the management of hallucinations, that are due to endogenous dopamine release, with haloperidol having the most evidence for safety and efficacy (Valencia & Franco, 2008). A case report in one patient by Valencia C and Franco JG shows a clinical improvement with haloperidol in a 94 year-old woman with Charles Bonnet Syndrome (Sommer, et al., 2012). A review study by Sommer et al. investigated the differences in the efficacy of the 5 antipsychotic which shows no significant difference in efficacy between haloperidol, olanzapine, ziprasidone, quetiapine, and amisulpride in their potential to treat hallucinations ($\chi^2(4) = 7.90, P = .095$).¹⁰ Those studies support the findings in our patient, in which his hallucination resolved within 24 hours without recurrence while received supportive care and haloperidol 0.5 mg PO was administered.

Early identification and appropriate management including reduction or adjustment of sedation, environmental orientation, and supportive therapy are key to recovery. Low-dose haloperidol was used in this case, which has shown efficacy in managing hallucination. Routine use of ICU delirium screening tools such as the Confusion Assessment Method for the ICU (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC) should be emphasized. Proactive strategies such as early mobilization, minimization of sedatives, and sleep hygiene also play a crucial role in prevention (Kastaun, et al., 2016) (Tschernatsch, et al., 2022).

CONCLUSION

This case underscores that visual hallucinations can occur even after off-pump CABG and may present uniquely upon eye closure. It highlights the need for heightened awareness among clinicians regarding postoperative hallucinations, their varied presentations, and the importance of distinguishing them from more serious neuropsychiatric conditions. Further research is warranted to elucidate the underlying mechanisms and risk factors associated with this phenomenon.

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