



## Monocular blindness following elective hip arthroplasty

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Visual loss is a devastating complication of non-ophthalmic surgery. It is documented following cardiac, spinal, and transplant surgery. Patients with carotid artery occlusion are at increased risk for ocular ischaemia. Pre-operative assessment as well as early diagnosis and treatment is essential in cases of high-risk patients. We discuss the case of an 82-year-old man who underwent an elective total hip replacement and was left with monocular hemispherical blindness as a result of branch retinal artery occlusion.

**Keywords :** elective hip arthroplasty ; monocular blindness ; carotid artery occlusion ; retinal artery occlusion.

### INTRODUCTION

Visual loss is a very rare and alarming complication of non-ophthalmic surgery. It can occur following cardiac, spinal, and transplant surgery. It has never been documented as a complication of elective hip replacement surgery. The presence of carotid artery occlusion is a significant risk factor for ocular ischaemia independent of surgery. However, when a patient with pre-existing arterial disease is subjected to the stresses of surgery, the consequences can be devastating. We discuss the case of an 82-year-old man who underwent an elective total hip replacement and was left with monocular hemispherical blindness as a result of branch retinal artery occlusion.

### CASE REPORT

An 82-year-old man was admitted for an elective total hip replacement. His co morbidities included hypertension, renal impairment, and essential thrombocytosis for which he had a full medical and haematological work up pre-operatively. His thrombocytosis was treated with hydroxyurea and, following normalisation of platelet levels, he was commenced on regular aspirin 75 mg. He also had a significant background history of laryngeal carcinoma and laryngectomy more than 20 years previously.

On admission, the patient's regular aspirin was held and replaced with tinzaparin 4500 IU daily. A left cemented Exeter total hip replacement was performed via a posterior approach with the patient in the right lateral position. He had an uneventful

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intraoperative course. His pre-operative haemoglobin was 10.5 g/dL and estimated blood loss during the procedure was 350 ml with another ~200 ml from the drain. Post-operatively, low molecular weight heparin (LMWH) was continued and both TEDS and AV foot pumps were employed. On day one post op, symptomatic anaemia (Hb 5.8 g/dL and dyspnoea) was treated with transfusion of 3 units of cross-matched red cells, but as there was no significant oozing from the wound, the LMWH was continued.

On day 3 post op, the patient experienced a new complaint of pain and blurred vision in his right eye. He urgently attended the hospital's eye clinic that same day. Despite a history of bilateral cataract surgery 25 years previously, no other ocular abnormality was detected. Visual acuity was 6/9 with glasses in the right eye and 6/12 with glasses in the left eye. The patient was prescribed viscous eye drops. There was no clinical improvement over the next 72 hours and so a brain CT was performed to rule out any acute intracranial event. Besides age-related findings of cerebral atrophy and a small area of ischaemia in the parietal lobe (thought to be of no clinical significance), there were no acute changes.

A medical and ophthalmological review was carried out and risk factors for a thrombotic event were reviewed. Both fasting lipids and glucose were within normal limits. Despite a history of thrombocytosis, platelets on admission were 257 000/mL and remained less than 400 000 throughout the inpatient stay. Aspirin was recommenced. Of note, an echocardiogram performed pre-operatively did not show any valvular abnormalities or a patent foramen ovale.

At ophthalmology follow-up one week after the onset of symptoms, an inferior altitudinal defect was appreciated on confrontational fields. Visual acuity could not be measured in the right eye but perception of light was positive. On fundoscopy, the retina was markedly ischaemic with cotton wool spots and splinter haemorrhages around the optic disc. A diagnosis of retinal artery occlusion was made.

The patient was discharged day 10 post op on aspirin. Further medical investigations were carried out on an outpatient basis to determine potential

causes for this event. A repeat echocardiogram was satisfactory. Carotid duplex scanning revealed that the left internal carotid artery was totally occluded and a heterogenous plaque in the right internal carotid artery was causing an 80-89% stenosis. Both vertebral arteries were normal. At his three month ophthalmology review, there was no improvement in vision.

## DISCUSSION

Visual impairment is an understandable risk with ophthalmic surgery. It can also be a devastating complication of non-ocular surgery. The incidence of permanent visual loss after non-ophthalmic surgery is in the region of 0.0008% (1). It occurs more frequently after cardiac and spinal surgery at a rate of almost 0.2% (2). Pre-existing arteriosclerosis is a risk factor for thromboembolic disease and so it is not surprising that cardiac surgery (most often carried out in the context of significant arterial disease) is associated with a higher risk of visual loss. Visual disturbances following transplant surgery have also been reported (3,4) with the aetiology thought to include immune reactions and opportunistic infections.

Visual loss following spinal surgery is well documented (5,6). With an overall incidence of approximately 0.1%, spinal surgery for scoliosis correction carries the greatest risk of 0.28% (5). Putative explanations of why spinal surgery imparts such a high risk of visual loss include increased pressure to the periorbital region, when the patient is in the prone position, increasing intraocular pressure with the risk directly related to the duration of the procedure (6). A pre-operative history of hypertension (5) as well as intra-operative hypotension (1,2,6) are also risk factors. Peri-operative blood transfusion can also confer an increased chance of visual loss (5).

Post-traumatic central retinal artery occlusion had been reported in hip fractures (7). There are no previous reports of visual loss following elective arthroplasty. The most likely aetiological factor in this patient's visual loss is the presence of significant carotid stenosis, which was only diagnosed post-operatively. The association between carotid

artery disease and monocular vision loss is documented (8). The presence of atherosclerotic lesions of the carotid arteries produces haemodynamic changes in the central retinal artery, with a direct relation between the degree of ICA stenosis and reduced retrobulbar blood flow (9).

Symptomatic internal carotid artery occlusion can be induced by position (10). Pressure on the periorbital area when in a prone position conveys an increased risk of visual loss in spinal surgery (5). The patient was placed in a right lateral position and his visual loss was only in the right eye. It is possible that the pressure during the operation on both the right periorbital and right carotid regions may have been a contributing factor to his visual loss.

Though carotid artery stenosis is the most significant aetiological factor, there are also several other elements which may have contributed to this patient's risk. Pre-operative risk factors include hypertension, history of malignancy, and essential thrombocytosis. However, blood pressure was controlled with appropriate medication, thrombocytosis was treated, and his laryngeal cancer occurred more than 20 years previously. Peri-operatively, the patient was exposed to permissive hypotension (80/50) as is standard procedure for arthroplasty. Another strong risk factor was his anaemia but this was treated aggressively. Paradoxically, receiving the blood transfusion also put the patient at risk. A fat embolus, as a result of raised intraosseous pressure during broaching of the femoral canal, may have occluded the retinal artery. Post operatively, the patient was anticoagulated with LMWH, mobilised day one, and was well hydrated.

Visual loss may be reversible in early stages by the use of newer treatments such as intra-arterial thrombolysis (11). However, conventional management of occlusion of the central retinal artery (CRAO) is supportive and does not alter the course of the disease (12). Therefore, prompt management is essential. The prognosis regarding recovery of sight following CRAO is very poor.

This case highlights the issue regarding routine carotid duplex screening. Almost 30% of those aged 50 or older have carotid artery disease whether symptomatic or not (8). The Asymptomatic Carotid Atherosclerosis Study (ACAS) has shown the

benefit from carotid endarterectomy for asymptomatic patients with >60% stenosis (13). Studies have examined the cost-effectiveness of screening asymptomatic carotid stenosis and subsequent surgical intervention in those with significant stenosis in comparing expenditure for screening and treatment per incremental quality-adjusted life-year (QALY) saved (14,15). A one-time screening program for a population with a high prevalence of carotid stenosis may be cost-effective but annual screening is detrimental. However, the benefit of pre-operative screening for high risk patients should be considered.

## CONCLUSION

Blindness following elective hip arthroplasty is a dramatic yet rare complication. Early diagnosis is critical in order to have any chance of saving vision. Involvement of medical specialists and ophthalmologists is essential. However, prognosis remains poor. Therefore, both surgeons and anaesthetists should be aware of the importance of pre-operative carotid duplex scanning particularly for high risk patients. Prevention, when possible, is the only effective measure.

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