

## Visual Loss after Lateral Position

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### Abstract

Perioperative visual loss (POVL) is an infrequent, devastating complication. Increased recognition and discussion of this complication is reported in recent literature, most notably following spinal and cardiac surgery. The most common causes are ischemic optic neuropathy, central retinal artery occlusion, and cortical blindness. Here, we present a case of a 54 y old female who developed acute visual loss in her eyes after lateral position total hip arthroplasty that might explain this complication.

**Keywords:** Postoperative visual loss; Nonocular surgery; Total hip arthroplasty

### Introduction

Although rare, a change in visual acuity after surgery for nonocular procedures has devastating long-term consequences [1]. Most of reports for POVL have been linked to ischemic optic neuropathy, and patients undergoing spinal and cardiac surgery seem to be at the highest risk [2]. The most commonly diagnosed causes of POVL associated with nonocular surgery are ischemic optic neuropathy (ION), central retinal artery occlusion (CRAO), and cortical blindness [3]. These different ophthalmologic injuries have different signs and symptoms and are associated with different surgical procedures. Numerous factors have been proposed that contribute to the development of POVL including anemia, emboli, hypotension, globe compression, prone positioning, volume or type of fluid administered, and preexisting diseases [4].

We here report a patient who experienced POVL following a total hip arthroplasty performed in the lateral position throughout the surgery. Many reasons might be speculated to be associated with this disease.

### Case Report

A 52 y old female patient presented with bilateral hip pain and gradually serious in 1 year, and the symptom is given priority to with the right side. Combined with radiological examination, the diagnosis is bilateral femoral head ischemic

necrosis and hip osteoarthritis with significantly more serious on the right side. We had decided to perform a total hip arthroplasty on her right under general anesthesia. The results of the blood tests taken prior to surgery are listed in **Table 1**.

**Table 1.** Blood tests prior to surgery.

| Examination indexes | T test value | N normal range | Units              |
|---------------------|--------------|----------------|--------------------|
| WBC                 | 6.96         | 04-10          | $\times 10^9/L$    |
| RBC                 | 2.69         | 3.5-5.5        | $\times 10^{12}/L$ |
| Platelets           | 225          | 100-300        | $\times 10^9/L$    |
| Hematocrit          | 27.8         | 37-45          | %                  |
| Hemoglobin          | 9            | 11-15          | g/dL               |
| Glucose             | 4.96         | 3.9-6.1        | mmol/L             |
| Creatinine          | 290.1        | 155-375        | $\mu\text{mol}/L$  |
| Total protein       | 54.15        | 60-83          | g/L                |
| Albumin             | 33.52        | 34-48          | g/L                |
| CRP                 | 23           | 0-8            | mg/L               |
| ESR                 | 45           | 0-20           | mm/h               |

The surgery was performed in the lateral position, and the total duration of the operation was 90 min. Orotracheal intubation was with no complications. The following intravenous fluids were administered: Saline 0.9% 500 cc, Glucose electrolyte 500 cc, hydroxyethyl starch 500 cc. Total blood loss was 300 cc and Intraoperative autologous blood transfusion 200 cc. Mean arterial blood pressure was 80 mmHg, mean cardiac frequency was 65 bpm, and no surgical complications were found.

On the third day postoperatively, the patient felt blurred vision with her eyes, and gradually serious to completely invisible. Mydriasis and pupillary reaction to light was absent with binoculars by examination. Ophthalmology consultation recommended fundus examination and head MRI examination. The fundus examination showed that papilledema and retinal vein dilation with binoculars. Head MRI examination displayed Multiple focal ischemia in bilateral cerebral hemisphere white matter. The blood test results showed a severe anemia (hemoglobin 4.8 g/dL) that listed in **Table 2**. Mean arterial blood

pressure was 65 mmHg. After transfusion of 4 units of red blood cells suspension immediately, the hemoglobin was recovered to preoperative levels (9.5 g/dl) over the next 2 days. The blood pressure also returned to normal by fluid infusion. We had performed a short-term implosive therapy with dexamethasone by on the advice of ophthalmologists. Unfortunately, the symptoms of patients with postoperative visual loss had no obvious recovery, and no further improvement was achieved in the vision in 2 yrs of follow-up.

**Table 2.** Blood tests on the third day after the operation.

| Examination indexes | T test value | N normal range | Units                 |
|---------------------|--------------|----------------|-----------------------|
| WBC                 | 5.38         | 04-10          | × 10 <sup>9</sup> /L  |
| RBC                 | 1.45         | 3.5-5.5        | × 10 <sup>12</sup> /L |
| Platelets           | 282          | 100-300        | × 10 <sup>9</sup> /L  |
| Hematocrit          | 15.4         | 37-45          | %                     |
| Hemoglobin          | 4.8          | 11-15          | g/dL                  |
| Total protein       | 55.2         | 60-83          | g/L                   |
| Aalbumin            | 34.03        | 34-48          | g/L                   |

## Discussion

In 1948, the first case reports and case series involving POVL started appearing in the literature which described a patient in the prone position during spinal surgery [5]. Over the past few decades, more and more cases of POVL of nonocular surgery had been gradually reported that were mainly concentrated in the spine and cardiac surgery [6,7]. We present this patient who experienced POVL following total hip arthroplasty performed in the lateral position, and we have many assumptions for etiology and diagnosis of this patient.

Various pathologic processes have been identified that may be responsible for direct injury to the visual apparatus, ischemic optic neuropathy (ION), central retinal artery occlusion (CRAO) and cortical blindness [8].

Direct damage to the ocular apparatus is the most common cause of POVL and most of them are treatable and reversible [9]. Cortical blindness is the least common cause of POVL in adults that results from a stroke in the parietal occipital areas of the cortex responsible for reception and integration of visual input [10]. Anyway, both of the two kinds of pathological pattern seems to be less likely related to our case.

ION and CRAO are the most often associated with nonocular operations. ION can be divided into two types: anterior ION (AION) and posterior ION (PION). Visual field deficits and pupillary light reflexes in patients with ION may present as scotoma, altitudinal field cuts, or complete loss of vision with no light perception. PION is associated with procedures with prolonged periods of increased venous pressure in the head that usually presents as painless loss of vision upon awakening from anesthesia and does not typically progress. By contrast, Patients with AION may present with a sudden painless visual

disturbance which progresses over a few days [11]. Both surgery and factors are thought to be potential risks for ION. Surgical-related risk factors include positionduration of operation (6 h), fluid overload, amount of blood lost, use of vasopressors, transfusion [12]. Patient-related risk factors include anemia, hypotension and those conditions that predispose to atherosclerotic disease [13].

CRAO is caused by decreased blood supply to the entire retina.

This process results most commonly from increased intraocular pressure (IOP) IOP due to external pressure during positioning. The most common cause perioperatively is improper head positioning which leads to external pressure on the eye [10]. It leads to increases in IOP which can also increase from processes within the globe, including retrobulbar hemorrhage. Other causes can include thrombotic or embolic processes of the retinal vasculature due to a hypercoagulable state that may result in occlusive disease [14].

There are a variety of causes may be related to our case: The patient hospitalized with mild anaemia, and progressed after surgery for a severe anemia and hypotension. Those might be the potential factors lead to ION that we ignored previously. In addition, patient underwent surgery in the lateral position, unnoticed position (such as head-down position) or external pressure during the surgery might cause increased venous pressure in the head ultimately lead to ION or CRAO. Moreover, underlying thrombosis of retinal vascular might cause CRAO. All of these are potential risk factors, we still not sure what is the specific reason for the result in this case.

Although there is no definitive treatment for POVL, aggressive therapy is necessary. The treatment options including intravenous or retrobulbar corticosteroids, antiplatelet therapy, acetazolamide, mannitol, furosemide and hyperbaric oxygen [15]. Whenever a patient complains of visual disturbances after operation, an ophthalmologic consultation needs to be obtained at the earliest convenience. Besides, given continuous reports of POVL, it should be attracted to our attention, and the related possibility should be explain to patients in preoperative.

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