

Perioperative Visual Loss Following Transanal Endoscopic Microsurgery in Prone Position: Medico Legal Consideration

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Abstract

A 67-yr-old man developed Perioperative Vision Loss (POVL) after Transanal Endoscopic Microsurgery (TEM) under general anesthesia in prone position with head-down and turned to one side. After surgery, he complained of ocular pain and no light perception in the left eye. The examination revealed lid edema, ptosis, exotropia, proptosis, chemosis and fixed pupil not reactive to direct light. At funduscopy examination a pathognomonic cherry-red spot in the macula and retinal and disk ischemic pallor were appreciable. The right eye was normal. A diagnosis of left central retinal artery occlusion (CRAO) due to intraoperative extrinsic pressure on the eye was suspected. He never regained vision. POVL is frequently involved in malpractice claims. We discuss the legal implication for anesthesia practitioners.

Background

Transanal Endoscopic Microsurgery (TEM) is a safe and effective procedure in the treatment of large sessile benign rectal lesions. This technique is usually performed under general anaesthesia and with the patient placed either in prone or supine position in order to keep the lesion closer to the 6-o'clock position. In prone head-down position, the patient achieved some degree of upper-body downward tilt. It is associated with intraoperative physiologic changes (e.g. venous congestion) and also with a number of complications [1]. Particularly when the patient is positioned prone, the eye should be protected from compression injuries during anesthesia. Some advocate eye protector devices and periodic check. The most serious adverse event reported is Perioperative Vision Loss (POVL). This often exposes anesthesiologists to the risk of malpractice claims. We report a case of perioperative blindness in a patient who underwent TEM and discuss the legal implication for anesthesia practitioners.

Case Presentation

A 67-yr-old man, BMI 29, underwent TEM for the treatment of a large sessile benign rectal lesion. He was positioned prone with head-down and turned to one side. He had a history of glaucoma and smoke (12 aa.). No other risk factor (e.g. diabetes mellitus, hypertension, atherosclerotic vascular disease, low hematocrit, anemia) were reported. The preoperative blood investigations

were normal. The blood pressure recorded on admission was 145/80. During anesthesia systolic blood pressure was maintained at approximately 80-90 mmHg. The estimated blood loss was not significant. His preoperative vision was normal. The anesthetic duration was 10h and the prone position duration was 61/2h. From chart review no eye protector was used, the patient's head did not change position and no eye control was recorded. The procedure was completed uneventfully, but at the end of the surgery, when the patient was turned into the supine position, edema and ecchymosis were evident in left periorbital tissues, in the contact point with the patient's face.

When the patient awoke after surgery, he complained of ocular pain and no light perception in the left eye. The surgeons promptly requested telephone ophthalmology advice, but the specialist postponed the visit on the following day. The next morning, the ophthalmologist described lid edema, ptosis, exotropia, proptosis, chemosis and fixed pupil not reactive to direct light. Extraocular movements were lost. At funduscopy examination a pathognomonic cherry-red spot in the macula and retinal and disk ischemic pallor were appreciable. The digitally intraocular pressure (IOP) was on the high side in the left eye. The right eye was normal. Based on these findings a diagnosis of left CRAO was strongly suspected.

Early computed tomography (figure 1) scan and MRI of the orbit

show proptosis and extraocular muscle swelling, optic nerve deviation, enlargement e perineural enhancement suggestive of edema.



Figure 1: CT scan shows proptosis, extraocular muscle swelling and optic nerve deviation

The patient never regained vision on the left eye. The informed consent forms related to surgery and anesthesia were generic and did not include this adverse event among the risks. The case was reported to the hospital's risk manager.

Discussion

Perioperative eye injuries are rare (<1% during general anaesthesia); they account for 2% of claims against anaesthesiologists [2]. Visual loss after anaesthesia and surgery is a rare, unexpected and devastating complication. The estimated incidence varying from 0.001 to 1% depending on the type of surgery. POVL is frequently involved in malpractice claims. In response to this problem, the American Society of Anaesthesiologists (ASA) Committee on Professional Liability established the ASA POVL Registry in 1999 to collect detailed information on cases of POVL occurring after non ocular surgery [3-5]. There are numerous literature reports of POVL in patients who have undergone surgery in the prone position, particularly in spine surgery [6-8]. This case is followed by a TEM for the treatment of a large sessile benign rectal lesion.

The etiology of postoperative blindness is incompletely understood and multifactorial [9-12]. The causes are primarily ischemic optic neuropathy (ION) and CRAO. The CRAO is most commonly attributed to improper patient positioning and inadvertent pressure on the eye exerted by the weight of the head compressing against the headrest or, as in this case, against operating table without the protective device (i.e. opti-gard, ophthalmic shield). External compression increased IOP which, by reducing perfusion pressure

to the eye, may produce retinal ischemia. IOP can be attributed also to the increase in central venous pressure (CVP) by reduced venous return in the head-down position and for obstruction to venous outflow if the head is turned to one side end if there is direct pressure on the abdomen on operating table hampering venous return to the heart. Increased orbital venous pressure and extravasation of intracellular fluid into orbital space might be responsible for periorbital edema and chemosis [6, 12].

Nearly all reports of CRAO have involved unilateral injury. A compression induced injury to the eye with trauma to the anterior structures and ischemia in the retina is the main harmful mechanism. Duration of surgery, hypotension, blood loss or haemodilution, more relevant in ION, seems to be only other possible pathogenetic contributory factors.

Prognosis is poor and treatment is generally poorly effective. When there is some degree of recovery of vision, the improvement is often clinically insignificant (e.g. light/dark perception to hand motion only). With respect to perioperative retinal artery occlusion, although vision rarely returns after ischemic injury and the literature is insufficient to support the use of any form of treatment, some treatment strategies can be attempted: e.g. vasodilators, ocular massage and thrombolytic agents. Ocular massage can lower IOP, I.V. Acetazolamide can be administered to increase retinal blood flow and Fibrinolysis within 6-8h after spontaneous CRAO seems to be associated with improved visual outcome. Steroid use must be considered carefully because of questionable efficacy [9, 10, 13].

In this case several factors could have contributed to POVL (CRAO). First of all, intraoperative extrinsic pressure on the eye and failure to adopt protection devices and periodic checks. The direct pressure on the globe cause IOP that reduced perfusion pressure to the eye. This can also be determined by reduced venous return and increased central venous pressure (CVP) due to head-down and turned to one side position and direct pressure on the abdomen on the operating table. Moreover, even moderate hypotension (or significant percent below baseline blood pressure) during surgery may have reduced perfusion pressure to the eye. Finally, despite literature is insufficient to evaluate whether or not is a risk factor for POVL, it should not be prudently overlooked that the patient was suffering from glaucoma.

In patients in prone position for surgery, an eye protection devise should be used. It must be ensured that eye is properly positioned and checked intermittently by palpation or visualization. It is important that the eye checks are documented in the medical record demonstrating the diligent adherence to the procedure of the anesthesiologist. Although there are no data to establish the exact frequency of eye checks when the patient is prone, it is advisable to examine eyes for position change and absence of external compression at least every 20 min [10].

Although ASA Practice Advisory for POVL does not include non-spine surgical procedures, it can however represent a useful reference by analogy. According to ASA Practice Advisory for POVL 2019, it is recommended to "avoid direct pressure on the eye to prevent retinal artery occlusion; check the position of the eye periodically during surgery to ensure the head has not moved and there is no eye compression". This Advisory also suggests to avoiding head level higher than heart and significant neck flexion,

extension, lateral flexion or rotation whenever possible [14].

In intraoperative management, the unexpected discovery of relevant injuries suggesting eye compression (e.g. periorbital, eyelid) is an acute ophthalmological emergency, requiring prompt decompression to release the incremented IOP. In postoperative management, “if there is concern regarding potential visual loss, obtain an urgent ophthalmologic consultation to determine its cause; for the high-risk patient, conduct an ophthalmologic assessment when the patients became alert (e.g. in the recovery room, intensive care unit, or nursing floor) [10, 14]. It is also recommended to “continually monitor systemic pressure in high-risk patients; assess the patient’s baseline pressure on case-by-case basis; treat prolonged significant decrease in blood pressure; determine on case-by-case whether deliberate hypotension should be used in high-risk patients” [15].

Despite the rarity and unpredictability of this adverse event, the informed consent process must advise patients on the occurrence of POVL, risk factors and prevention strategies adopted without the possibility of completely eliminating the risk. According to ASA Practice Advisory for POVL, prior to surgery, it is recommended to “inform patient in whom prolonged procedures, substantial blood loss, or both are anticipated that there may be an increased risk of POVL”. Because anesthesiologists visit patients shortly before surgery, it is preferable that the surgeon discuss the possible complication early at the time of the proposed surgical procedure [10].

Conclusion

Most of post-operative CRAO cases occur in prone-positioned patients. CRAO occurring after surgery is typically observed following external ocular compression, in fact periocular trauma was documented in the majority of cases. Extensive pressure on the globe may raise IOP leading to retinal ischemia. There is no effective treatment for CRAO, so the consequent blindness is often permanent. Avoid direct pressure, use of eye protection device, periodic eye check, change of head position, continuous monitoring of blood pressure, risk recognition like glaucoma and urgent ophthalmologic consultation may prevent postoperative CRAO development and deter malpractice claims. Although the rarity of this adverse event, it is a duty to inform the patients of the risk on occurrence of POVL. Obviously everything must be documented in the medical record. The anesthesiologists and surgeons should be aware of the proper head position to avoid ocular compression, the patients with high preoperative risk factors,

the appropriate intraoperatively management end the early review by the ophthalmologist in the postoperative period to prevent this visual complication and consequent legal issues [6, 10].

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