Mini Review

Review: Ophthalmic Surgery as a cause of Pulmonary Emboli

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Abstract

Pulmonary embolism (PE) as a complication of routine modern Ophthalmic surgery is rare and almost never discussed with patients. A review of the literature.

ABBREVIATIONS

PE: Pulmonary Embolus; VR: Vitreo-retinal; CE: Cataract Extraction; VTE: Venous Thrombo-Embolism

INTRODUCTION

Pulmonary embolism (PE), is a rare complication following modern ophthalmic surgery. However, in certain vitreo-retinal (VR) surgeries treating conditions such as macular holes or retinal detachments, patients are required to position prone for weeks post-operatively, to optimise the surgical outcomes. This requirement often renders a patient less mobile and venous thrombo-embolic (VTE) events have been reported post-operatively.

In this review article, we analyse the reported VTE events following ophthalmic surgeries, analyse the pathophysiology and analyse the posturing requirements.

METHODOLOGY

A literature review was conducted via a search of Medline, Embase, PubMed and CINAHL databases updated to Aug 2020.

RESULTS

A paucity of data was collated from the literature review as summarised below in Table 1. Earlier studies from the 1970s looked at mortalities following ophthalmic surgeries [1,2]. Ophthalmic surgeries have undergone extensive refinement since, now, procedures are minimally invasive and often sutureless. This is a dramatic improvement from the 1970s where even routine cataract surgeries required 180 degrees of sutting. The mortality rate from ophthalmic surgeries were estimated at 1:1000 from these reports, attributable to cerebrovascular accidents, acute myocardial infarctions and pulmonary emboli. Factors postulated to be involved include, higher untreated cardiovascular co-morbidities and unknown risk factors, the use of general anaesthesia for the procedures and likely longer post-operative immobility as early mobilisation post-operatively was not yet an important concept then.

The contemporary literature consists of a case series [3], from Turkey and 2 case reports [4,5]. The case series from Turkey reported 6 cases of PE following ophthalmic surgeries. In the case series, 1 patient died following vitrectomy from a massive PE and 2 other cases required invasive treatment measures. The risk factor identified was low mobilisation following the ophthalmic surgeries due to poor vision. However, no further comment on the level of vision in the operated eye or the fellow eye was documented. No information was also further offered about the patients’ co-morbidities or innate risk factors. The other 2 case reports both occurred following routine VR procedures and one of the risk factors identified were the reduced mobilisation due to post-operative posturing requirements of 30-40 minutes prone every hour for 2 weeks. These 2 cases each had further risk factors identified with one identifying factor V leiden deficiency [4], and the other having significant cardiovascular risk factors such as obesity, hypertension and dyslipidemia.

In the review, an additional 3 case reports of significant VTE events in the form of deep vein thromboses were identified following routine ophthalmic procedures [6-8]. 1 of the case reports occurred following routine CE surgery in a gentleman who had factor V leiden deficiency [7], while the other 2 cases occurred following routine VR procedures that required post-operative restrictive posturing [6,8].

DISCUSSION

The modern ophthalmic surgery is minimally invasive and of low morbidity. The complication rate or risk of significant visual loss (e.g. endophthalmitis), of modern ophthalmic surgeries are in the order of 1:1000 and 1:3000 for CE and VR procedures respectively [9,10]. Mortality rates are no longer published alongside complication rates for modern ophthalmic surgeries as it would be an extraordinary event.
VTEs following ophthalmic surgeries are rare, as patients are usually mobilising hours after the procedure and in routine CE, have improved vision as soon as a day following surgery. The immobilisation that occurs following major abdominal or orthopaedic joint surgeries does not occur with ophthalmic surgeries.

The Virchow’s triad of hypercoagulability, stasis and endothelial injury as risk factors of VTE [11], are relevant even on ophthalmic surgeries. Multiple patients identified in the review [4,7], especially young patients who developed post-operative PE, were subsequently found to have Factor V Leiden deficiencies which puts them in a chronic hypercoagulable state.

Routinely, patients would be required to posture prone following VR procedures if they had a gas bubble in the eye. The posture would allow for the gas to tamponade the retina against the other layers of the globe and the apposition is thought to improve the surgical outcomes [12]. The instructions are often 30-50 minutes for 2 weeks following surgery, but as pointed out by authors, patients often put themselves in that position longer than instructed in hope to improve their outcomes [5]. Weeks of reduced mobility would contribute to the venous stasis arm of the Virchow’s triad in the pathogenesis of a VTE.

The argument for VTE prophylaxis routinely for high-risk patients is unlikely to be relevant for such an unlikely risk in routine ophthalmic surgical patients, as is the case with other minor procedures. This could be considered for patients requiring extensive ophthalmic procedures, such as orbital surgeries, or in a prolonged hospital admission.

In terms of the VR post-operative conundrum, there is a growing interest in research and emerging evidence to reduce the need for strict posturing post-operatively [13,14]. The need for post-operative posturing and the ability to comply is usually discussed pre-operatively and should be concerns, the surgeon may opt to use a medium that does not require posturing – e.g. balanced salt solution, silicone oil, heavy liquid. It may be relevant, too, to consider a medium alternative to gas for patients with likely prolonged immobilisation post-operatively due to co-morbid state or pre-existing risk factors such as coagulopathies.

**CONCLUSION**

PE following modern ophthalmic surgery is a rare complication but should not be dismissed given its potential for fatality. Routine prophylaxis would not be justifiable or necessary. The consideration of that could be given to at-risk groups and alternative mediums not requiring posturing to be considered. Future research into this topic may even preclude the need for specific posturing that greatly limits mobility.

**REFERENCES**


