



Case report

Bilateral pulmonary emboli following macular hole surgery with postoperative prone positioning



Daniel A. Brill*, Taylor S. Fields, Anjali U. Badami, Alexander J. Kuley, Nitin Kumar, Uday R. Desai

Henry Ford Hospital, Department of Ophthalmology, Detroit, MI, USA

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ABSTRACT

Purpose: To report a rare case of bilateral pulmonary emboli following pars plana vitrectomy with postoperative prone positioning.

Observations: A 60 year-old female presented with a fourmonth history of unilateral distorted vision. Ocular coherence tomography revealed a full thickness macular hole. Two weeks later, the patient underwent a 23-gauge pars plana vitrectomy with internal limiting membrane peeling and 12% perfluoropropane gas tamponade. Postoperatively, she completed two weeks of prone positioning. Five days later, she presented with a two day history of abdominal pain and shortness of breath. Computed tomography angiography revealed bilateral pulmonary emboli. The patient received six months of anticoagulation to prevent further thromboembolic events.

Conclusions: Life threatening blood clots can form due to prolonged immobilization from prone positioning. Patients should be educated to perform light exercise postoperatively to prevent complications of blood stasis.

1. Background

Prone positioning is advocated after retinal surgery involving gas. For a vitrectomy to repair retinal pathology such as retinal detachments and macular holes, a gas bubble can be placed to tamponade the retina for adequate reapproximation and closure. Days to weeks of postoperative prone positioning can aid the apposition of the gas bubble tamponade to the retina. The duration of prone positioning varies with retinal pathology, type of gas, and surgeon preference. Sulfur hexafluoride (SF6) remains in the eye for approximately one month, and perfluoropropane (C3F8) remains in the eye for approximately two months, depending on gas concentration and wound integrity.

Prolonged immobility is a significant risk factor for blood clot formation. In particular, lower extremity deep vein thromboses can develop and result in life threatening pulmonary emboli. In two large retrospective case series, pulmonary embolism was the leading cause of ophthalmic surgical mortality.^{1,2} While blood clots can occur after all ocular surgery,¹⁻⁴ prone positioning after retina surgery in particular has been associated with the formation of blood clots.⁴⁻⁷

Here we report a rare case of bilateral pulmonary emboli less than three weeks after pars plana vitrectomy for macular hole surgery with postoperative prone positioning.

2. Case report

A 60 year-old female presented to the retina clinic with a four-month history of distorted vision in her right eye. Her past medical history was notable for hypertension, hyperlipidemia, hip replacement surgery, morbid obesity, and peripheral vascular disease. At baseline, she ambulated well without mechanical assistance. She did not have a history of thromboembolic events.

On dilated fundus exam, an epiretinal membrane with macular striae was noted. Optical Coherence Tomography (OCT) confirmed an epiretinal membrane with a full thickness macular hole. Two weeks later, the patient underwent a 23-gauge pars plana vitrectomy (PPV) with internal limiting membrane (ILM) peeling and 12% C3F8 (perfluoropropane) gas tamponade. The surgery proceeded without intraoperative complications. The patient was discharged home the same day of surgery.

The patient was advised to perform prone positioning over the next two weeks. For the first week, she was advised to keep her head positioned downwards for 40 minutes of every hour. For the second week, she was advised to keep her head positioned downwards for 30 minutes of every hour. She came to all of her postoperative appointments, and followed the postoperative drops and positioning as recommended. In

* Corresponding author. Henry Ford Health System, Department of Ophthalmology, 2799 West Grand Boulevard, Detroit, Michigan, 48202, USA.
E-mail address: dbrill1@hfhs.org (D.A. Brill).

fact, she may have remained in a prone position even longer than advised with a belief that increased duration may increase her chance for success. Nineteen days after surgery, she presented to the emergency department with a two day history of worsening right upper quadrant abdominal pain and shortness of breath. D-dimer was elevated at 1.28 µg/mL (normal < 0.5 µg/mL). Computed tomographic angiography showed multiple bilateral lower lobe pulmonary emboli. She was immediately started on an unfractionated heparin intravenous infusion. During her three day hospital stay, she developed epistaxis. Ultimately, she was discharged with hydrocodone for pain, oxymetazoline nasal spray for epistaxis, and apixaban for six months of anticoagulation therapy for bilateral provoked pulmonary emboli.

3. Discussion

Patient morbidity from prone positioning is readily recognized, but patient mortality can easily be overlooked. Our patient's pulmonary emboli represent a rare example of a life-threatening complication from prolonged prone positioning. Our patient's life was saved due to her decision to seek medical help, and our emergency department's quick diagnosis and treatment.

While we acknowledge that prone positioning is necessary for certain surgical cases, there is not clear published evidence that prone positioning results in better patient outcomes after macular hole surgery.^{8,9} Vitreoretinal surgeons are divided as to the necessity of prone positioning after macular hole surgery. Anatomical full thickness macular hole closure has been demonstrated to occur in the majority of patients on first postoperative day OCT studies.¹⁰ For small macular holes (< 400 µm), minimal or no prone positioning may be acceptable to achieve excellent results.¹¹ However, for larger holes, longer prone positioning appears to have a role to achieve maximal hole closure.^{11,12} The Foundation of the American Society of Retina Specialists "Macular Hole" webpage agrees that prone positioning may be required in some cases up to two weeks.¹³

Our case highlights the potential for a rare, but significant complication that may occur with prone positioning. As such, the trend toward shorter durations of prone positioning after macular hole surgery should mitigate this risk. However, our case is very instructive in that she had no history of thromboembolic events. While her systemic history does increase her risk for thromboembolic events, there was nothing in her history that allowed us to predict this complication.

As such, the potential for thromboembolic events should be considered in all patients undergoing macular hole surgery with prone positioning. In patients with a previous thromboembolism history, the bias should be toward shorter duration of prone positioning. But in all patients, regardless of the duration, prone positioning should not be done continuously. Even shorter periods of complete immobility would increase the risk of thromboembolism in low risk patients. Therefore, all patients who are advised go undergo prone positioning after macular hole surgery should be counseled on the importance of intermittent ambulation to lessen the likelihood of this life threatening complication.

Patient consent

Consent to publish case a detail was not obtained from our patient, as our case report does not contain any personal identifiers.

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Conflicts of interest

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Authorship

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Summary statement

Prolonged immobility after postoperative prone positioning is a risk factor for potentially life-threatening thromboembolic events. We report a case of bilateral pulmonary emboli following macular hole surgery with two weeks of postoperative prone positioning.

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