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LETTER TO THE EDITOR

Fatal air embolism and ocular shrinkage during vitrectomy

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To the Editor:

Intraoperative vascular air embolism (VAE) is a rare but potentially lethal complication during ophthalmic surgeries. Morris et al. [1] simulated suprachoroidal air infusion to create torn vortex vein stumps on four donors' eyes, and entrained air flew through the veins during ocular air/fluid exchange (OAFE). We present a lethal case of VAE confirmed by transesophageal echocardiography (TEE) and extracorporeal membrane oxygenation (ECMO) during vitrectomy for total choroidal detachment.

A 32-year-old woman with cerebral palsy and systemic lupus erythematosus, and post-cataract surgery in bilateral eyes, was anesthetized for vitrectomy due to choroidal detachment in bilateral eyes. General anesthesia was induced with fentanyl, lidocaine, propofol, and succinylcholine, and maintained with cisatracurium and desflurane. The surgeon set the infusion pressure at 80 mmHg to keep the eyeball in the correct shape and clear the surgical field. Two hours later, the pressure was elevated to 100 mmHg for 5 min because of ocular shrinkage. Pulseless electrical activity and then asystole developed 1 min later. OAFE was stopped and cardiopulmonary resuscitation was started. Emergent TEE revealed air bubbles in cardiac chambers (see Fig. S1 of the Electronic supplementary material, ESM). Our cardiovascular surgeons set up ECMO after 50 min of CPR including 200-J biphasic defibrillation delivered twice. Significant volumes of air were noted inside the arterial and venous cannulas (Fig. S2 of the ESM), and about 500 ml of air were separated by the membrane oxygenator.

In our case, a sudden onset of ocular shrinkage during OAFE was noted by the surgeon just before asystole. This may have occurred due to air leaking through vortex veins. Thomas et al. calculated the air flow through a catheter 0.93 mm in diameter using the Hagen–Poiseuille equation, and found that the air flow reached 1.6 L/min. As is well known, 200–300 ml of intravenous air can be lethal. To prevent VAE during eye surgery, reconfirmation of the position of the infusion cannula before OAFE and the cessation of air infusion upon detecting eyeball shrinkage should be emphasized. We anesthesiologists should pay attention to the air infusion pressure setting requested by the surgeon.

Conflict of interest None.

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