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Valsalva Retinopathy: A Rare Complication After General Anesthesia

Christian Hönemann, MD, PhD,* and Ludwig Brandt, MD, PhD†

Sudden visual loss after general anesthesia is a rare and serious complication. Unilateral visual loss can be caused by an increase in pressure in the preretinal veins with subsequent rupture and hematoma formation. Our patient most likely experienced an increase in venous pressure as a consequence of temporarily increased intrapulmonary pressures during a sustained Valsalva maneuver shortly after tracheal intubation. Although surgical correction is available, in almost all cases, no specific therapy is required because the problem completely regresses spontaneously. (A&A Case Reports. 2015;5:231–3.)

Sudden visual loss after general anesthesia is a rare and serious complication. The etiology of sudden visual loss includes external ocular injury, corneal abrasion or sclera injury, cortical blindness, retinal ischemia in prone position, and glaucoma.^{1,2} In this case report, we discuss Valsalva retinopathy. The patient gave his approval for publication of this report.

CASE REPORT

A 45-year-old male patient underwent general anesthesia. Endotracheal intubation was performed in preparation for surgical correction of a Bankart shoulder injury. Partial open reduction of the dislocation and a screw osteosynthesis were performed. Anesthesia was induced with alfentanil and propofol and maintained with isoflurane, and muscular relaxation was facilitated by atracurium. Immediately after the uncomplicated endotracheal intubation, his oxygen saturation decreased to 93%. To reduce the intrapulmonary shunt, manual ventilation was initiated achieving significantly increased inflating pressures (peak pressure, 35 cm H₂O; positive end-expiratory pressure, 15 cm H₂O). His oxygen saturation was restored to 97%, and positive end-expiratory pressure of 8 cm H₂O was maintained. The remainder of the anesthetic including emergence from anesthesia was otherwise uneventful.

Three hours after the surgery and anesthetic, the patient complained of problems with his eyes. He explained that on awakening, he perceived a dark, heart-shaped spot with a slightly reddish rim in the right eye. An ophthalmologist

was consulted who diagnosed Valsalva retinopathy (Figs. 1 and 2).

Four days later, the patient stated, "...the condition of my eye is still the same, although the shape of the blood spot is continually changing. Maybe there is some improvement..." Forty-one days after surgery, the patient stated "...the spot has gotten smaller and smaller and...you cannot see anything of what was there on the day of surgery. I have kept my vision and I have not had any further problems" (Fig. 3).

DISCUSSION

Valsalva retinopathy is a suddenly occurring event. The cause is assumed to be an increase in intraocular venous pressure, triggered by a sudden increase in intrathoracic pressure, corresponding to a Valsalva maneuver.

The increase in intraocular pressure results in (1) a rupture of perifoveal capillaries followed by preretinal hemorrhage and (2) disruption of small capillary vessels creating a pooling of blood between the vitreous humor and the retina called "preretinal hemorrhage." This hemorrhage occurs in the otherwise healthy eye typically in the area of the macula lutea (Fig. 2). It is unilocular, well defined, and, in most cases, unilateral. The hemorrhage regresses over time, and in most cases, there is no permanent loss of vision once the resolution is complete. The healing time has been reported to be between 1 week and 6 months.³

The Valsalva maneuver is a forceful expiration against a closed airway increasing intrathoracic (and/or intraabdominal) pressure. Valsalva retinopathy is described in connection with coughing, sneezing, vomiting, strenuous bowel movements, and sexual intercourse.⁴ Other activities can also cause this hemorrhage in the retina: weight lifting,³ aerobics,⁵ motorcycling,⁶ pushing contractions at birth,⁷ blowing up a balloon,⁸ singing, or screaming. Chandra et al.² have described the occurrence of Valsalva retinopathy after thoracic trauma.

Pollack et al. describe the various cases of suprachoroidal hemorrhage in patients during pars plana vitrectomy. Six of 7 patients received general anesthesia, during which a Valsalva maneuver occurred associated with biting on the endotracheal tube. One patient, whose surgery was performed under local anesthesia, experienced severe coughing during surgery.^{9,10} Bolder and Norton¹ reported

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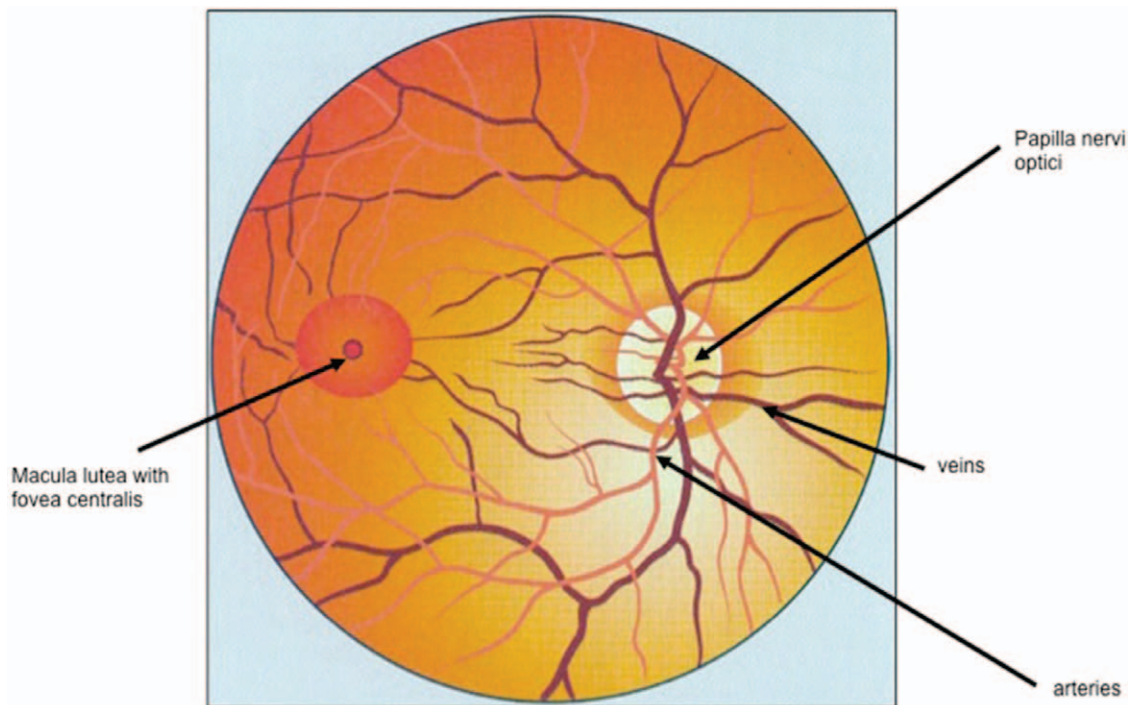


Figure 1. Normal ocular fundus.

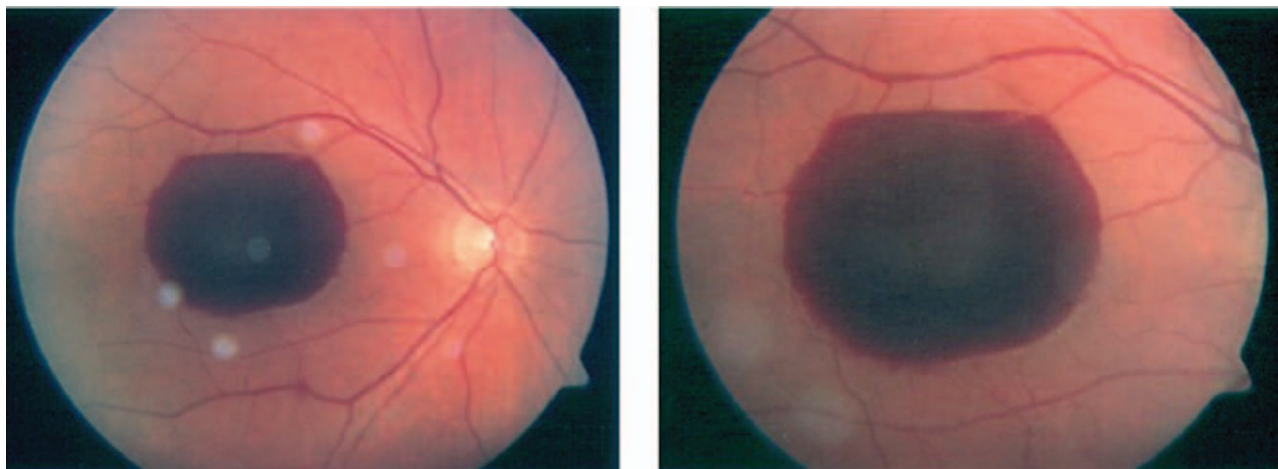


Figure 2. Ocular fundus, day 1 after surgery. Diagnosis: Classical Valsalva retinopathy. Unilateral hemorrhage occurs in the otherwise healthy eye typically in the area of the macula lutea (left: overview; right: 1.5-fold enlargement).

retinal hemorrhage occurring in a young woman whose trachea was intubated during laparoscopy, with intraoperative Trendelenburg positioning. They discussed another possible cause for the occurrence of retinal hemorrhage: obstructed retinal microcirculation as a reaction to hypoxia, hypercapnia, and increased intracranial pressure with resulting increased retinal venous pressure.¹ Victory et al.¹¹ reported a case of a 43-year-old woman who, after receiving an epidural combined with general anesthesia, developed a retinal hemorrhage. Although surgical correction is available, most authors note that full recovery from the retinopathy occurs without any specific intervention.

In cases where a speedier resolution is desired or in cases of a persistent defect, the use of a Nd:YAG laser can be considered. In this process, a membranotomy at the posterior boundary of the vitreous humor is performed to enable diffusion of the hemorrhage into the vitreous humor with subsequent resorption. This approach enables improvement in vision within 1 to 2 months. Specific risks of this therapy include macular damage or retinal detachment.

CONCLUSIONS

Sudden visual loss after general anesthesia is a very rare and serious complication. Valsalva retinopathy, described in this

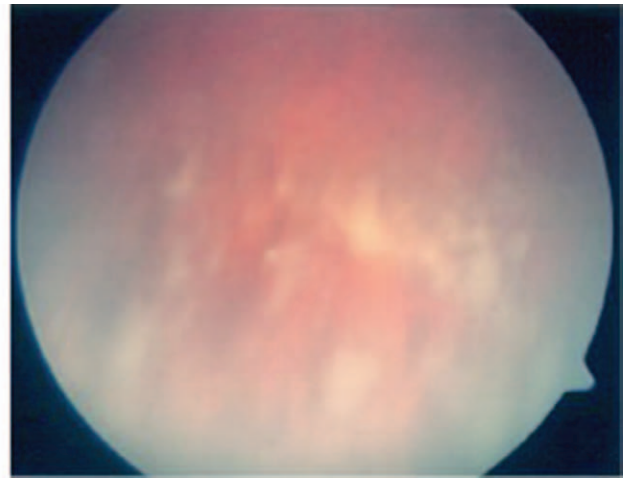
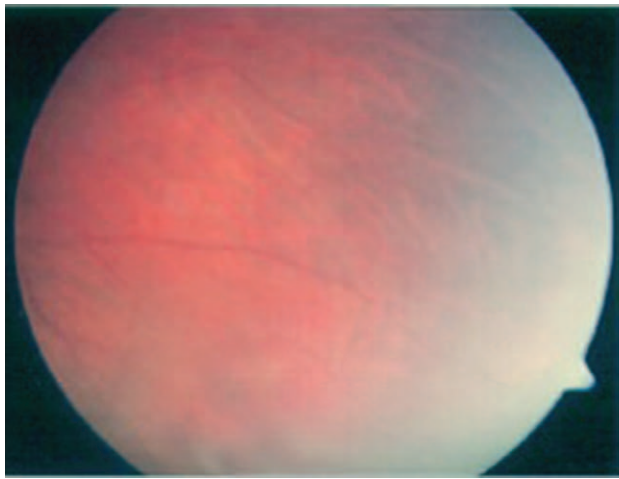


Figure 3. Ocular fundus, day 54 after surgery. Valsalva retinopathy: Ophthalmologic examination showed only remnants of the blood clot in the eye, which also dissolved over time (left: overview; right: 1.5-fold enlargement).

case report, is among the rarer causes. Once a reliable diagnosis is made, no specific therapy is needed, because there is almost always spontaneous and complete regression. ■

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