Valsalva retinopathy following esophagogastroduodenoscopy under propofol sedation: A case report

Ju-Hong Park, Min Sagong, Woohyok Chang

Abstract
We report a case of Valsalva retinopathy associated with esophagogastroduodenoscopy (EGD) under propofol sedation. A 43-year-old woman who had no previous history of systemic or ocular disease presented with a complaint of decreased vision in her left eye, which developed one day after EGD under propofol sedation. According to the referring physician, the patient had experienced multiple sustained Valsalva maneuvers during EGD. The fundus examination of the left eye showed a large preretinal hemorrhage surrounded by multiple small retinal hemorrhages in the posterior pole. One month later, fundus examination revealed a floating organized vitreous hemorrhage. The pars plana vitrectomy was performed to treat persistent vitreous hemorrhage. One month after vitrectomy, fundus examination showed normal retina and the patient’s vision recovered to 20/20. Valsalva maneuver can occur during EGD under sedation, and Valsalva retinopathy should be considered as a possible cause. Valsalva retinopathy should be included in the differential diagnosis when a patient complains of blurred vision following EGD.

INTRODUCTION
Valsalva retinopathy was first described in 1972 as a superficial macular hemorrhage that is caused by a forcible exhalation against a closed glottis, resulting in a sudden rise in intrathoracic or intra-abdominal pressure[1]. The true incidence of such cases remains unknown because hemorrhages sparing the macula may be asymptomatic and only severe cases are reported[2]. Valsalva retinopathy is usually identified in healthy adults and has been associated with aerobic exercise[3], vigorous sexual activity[4], inflating balloons[5], prostate biopsy[6], dental surgery[7], episodes of constipation, vomiting and lifting in pregnant women[8], paroxysmal coughing[9], oratorical contest[10], colonoscopy[11], and esophagogastroduodenoscopy (EGD) without sedation[12]. The visual prognosis is favorable and the hemorrhage usually resolves spontaneously within several weeks to months.
Valsalva retinopathy is characterized by the presence of preretinal hemorrhage following a Valsalva maneuver. Valsalva maneuver, including coughing, could be induced by a forcible exhalation against a closed glottis, thereby creating a sudden increase in intrathoracic and intra-abdominal pressures. The increased pressure results in the spontaneous rupture of perifoveal capillaries. Valsalva retinopathy can cause a sudden loss of vision when it involves the macula. Therapeutic options for Valsalva retinopathy include conservative management, vitrectomy, and laser membranotomy. Most cases resolve spontaneously with favorable visual outcomes.

Routine endoscopy can be performed successfully with either moderate or deep sedation. Moderate sedation provides adequate anxiolysis, analgesia, and amnesia for most patients and is safer than deep sedation. Moderate sedation is usually recommended for most patients, although many patients may move into lighter or deeper sedation levels. Generally, for upper endoscopy, adequate sedation preventing any gagging or coughing during esophageal intubation can be achieved with moderate sedation. Propofol sedation is expected to eliminate the gagging reflex and fear during EGD. The mean dose of administered propofol in EGD is 161 mg, but low-dose propofol sedation is commonly used due to its narrow therapeutic range (1.5-5 μg/mL). In the present case, 50 mg of propofol (1 mg/kg) was administered. In a case of low-dose propofol sedation, awakening can occur during EGD, which could retrigger the cough reflex. Also, in EGD, the endoscopic field should be optimized by the use of gas insufflation in EGD. Gas insufflation can cause gastric distention, leading to an increase in intra-abdominal pressure, which can transmit the pressure directly to the eye. Therefore, coughing and gastric distention may not be inhibited completely with propofol sedation, and the rise in intra-abdominal pressure can cause spontaneous rupture of perifoveal capillary bed.

Valsalva retinopathy associated with vitreous hemorrhage is uncommon, and this is the first reported case of Valsalva retinopathy following EGD under propofol sedation. Only one other reported case of Valsalva retinopathy occurring during EGD exists in the publicly available literature, but it occurred without sedation.

In summary, the Valsalva maneuver could be caused in patients under propofol sedation during EGD because...
of incomplete control of the depth of sedation. Valsalva retinopathy should be considered on the differential diagnosis when observing a patient complaining of blurred vision following EGD under sedation.

**REFERENCES**

1. Duane TD. Valsalva hemorrhagic retinopathy. Trans Am Ophthalmol Soc 1972; 70: 298-313 [PMID: 4663671]
2. Geddes JE. Talbott DG. Paroxysmal coughing, subdural and retinal bleeding: a computer modelling approach. Neuroophthalmol Appl Neurobiol 2006; 32: 625-634 [PMID: 17083477 DOI: 10.1111/j.1365-2990.2006.00771.x]
3. Suede H. Valsalva retinopathy induced by vigorous night-club dancing. Med J Aust 2009; 190: 333 [PMID: 19296817]
4. Markovits AS. Sudden visual loss associated with sexual activity. Arch Ophthalmol 1996; 114: 106 [PMID: 8540841 DOI: 10.1001/archophthalm.1996.01100310012027]
5. Georgiou T, Pearce IA, Taylor RH. Valsalva retinopathy associated with blowing balloons. Eye (Lond) 1999; 13 (Pt 5): 686-687 [PMID: 10696536 DOI: 10.1038/eye.1999.195]
6. Fanin LA, Thrasher JB, Mader TH, Truxal AR. Valsalva retinopathy associated with transrectal prostate biopsy. Br J Urol 1994; 74: 391-392 [PMID: 7953282 DOI: 10.1111/j.1446-4110.1994.tb16641.x]
7. Krepler K, Wedrich A, Schranz R. Intraocular hemorrhage associated with dental implant surgery. Am J Ophthalmol 1996; 122: 745-746 [PMID: 8902295]
8. Callender D, Beirouty ZA, Saba SN. Valsalva haemorrhagic retinopathy in a pregnant woman. Eye (Lond) 1995; 9 (Pt 6): 808-809 [PMID: 8849558 DOI: 10.1038/eye.1995.203]
9. Deane JS, Zlakas N. Valsalva retinopathy in pregnancy. Eye (Lond) 1997; 11 (Pt 1): 137-138 [PMID: 9246299 DOI: 10.1038/eye.1997.33]
10. Kim JY, Lee DH, Lee JH, Yoon IeN. Valsalva retinopathy associated with an oratorical contest. Korean J Ophthalmol 2009; 23: 318-320 [PMID: 20046698 DOI: 10.3341/jko.2009.23.4.318]
11. Oboh AM, Weilke F, Sheindlin J. Valsalva retinopathy as a complication of colonoscopy. J Clin Gastroenterol 2004; 38: 793-794 [PMID: 15365407 DOI: 10.1097/01.mcg.0000139036.76686.1e]
12. Choi SW, Lee SJ, Rah SH. Valsalva retinopathy associated with fiberoptic gastroenteroscopy. Can J Ophthalmol 2006; 41: 491-493 [PMID: 16883367 DOI: 10.1016/s0008-4102(06)80013-x]
13. Cohen LB, Weickers JS, Gaetano JN, Benson AA, Miller KM, Durkalski V, Aisenberg J. Endoscopic sedation in the United States: results from a nationwide survey. Am J Gastroenterol 2006; 101: 967-974 [PMID: 16573781 DOI: 10.1111/j.1572-0241.2006.00500.x]
14. Paspatis GA, Manolaraki MM, Tribonias G, Theodoropoulou A, Vardas E, Konstantinidis K, Chlouverakis G, Karanamolis DG. Endoscopic sedation in Greece: results from a nationwide survey for the Hellenic Foundation of gastroenterology and nutrition. Dig Liver Dis 2009; 41: 807-811 [PMID: 19410522 DOI: 10.1016/j.dld.2009.03.003]
15. Riphaus A, Rabofski M, Wehrmann T. Endoscopic sedation and monitoring practice in Germany: results from the first nationwide survey. Z Gastroenterol 2010; 48: 392-397 [PMID: 20148841 DOI: 10.1055/s-0031-1219765]
16. Baudet JS, Bonque P, Borja E, Alarcón-Fernández O, Sánchez-del-Río A, Campo R, Aviles J. Use of sedation in gastrointestinal endoscopy: a nationwide survey in Spain. Eur J Gastroenterol Hepatol 2009; 21: 882-888 [PMID: 19352194 DOI: 10.1097/MEG.0b013e3283146fc7a]
17. Gibran SK, Kenawy N, Wong D, Hiscott P. Changes in the retinal inner limiting membrane associated with Valsalva retinopathy. Br J Ophthalmol 2007; 91: 701-702 [PMID: 17446519 DOI: 10.1136/bjo.2006.104935]
18. Bailey PL, Zuccaro G. Sedation for endoscopic procedures: not as simple as it seems. Am J Gastroenterol 2006; 101: 2008-2010 [PMID: 16968507 DOI: 10.1111/j.1572-0241.2006.00807.x]
19. Kulling D, Orlandi M, Inauen W. Propofol sedation during endoscopic procedures: how much staff and monitoring are necessary? Gastrointest Endosc 2007; 66: 443-449 [PMID: 17725933 DOI: 10.1016/j.gie.2007.01.037]
20. Yoshida H, Ayuse T, Ishizaka S, Ishibashi T, Oki K. Management of exaggerated gag reflex using intravenous sedation in prothodontic treatment. Tokohka 1 Exp Med 2007; 212: 373-378 [PMID: 17660702 DOI: 10.1620/tjem.212.373]
21. Guglielminotti J, Rackelboom T, Tesnire A, Panhard X, Mentre F, Bonay M, Mantz J, Desmonts J.-M. Assessment of the cough reflex after propofol anaesthesia for colonoscopy. Br J Anaesth 2005; 95: 406-409 [PMID: 15951323 DOI: 10.1093/bja/ael175]

**COMMENTS**

**Case characteristics**

A 43-year-old woman presented with a complaint of decreased vision after esophagogastroduodenoscopy (EGD) under propofol sedation.

**Clinical diagnosis**

Valsalva retinopathy was highly suspicious by clinical history.

**Differential diagnosis**

The differential diagnosis included diabetic retinopathy, leukemic retinopathy, and retinal arterial macroaneurysm.

**Laboratory diagnosis**

Laboratory findings were within normal limits.

**Imaging diagnosis**

Fundus examination showed a large preretinal hemorrhage surrounded by multiple small retinal hemorrhages in the posterior pole.

**Treatment**

One month later, pars plana vitrectomy was performed to treat persistent vitreous hemorrhage.

**Related reports**

Valsalva retinopathy has been reported following aerobic exercise, vigorous sexual activity, vomiting, forceful coughing, and weightlifting.

**Term explanation**

Valsalva retinopathy is a unilateral or bilateral condition that occurs when increased intrathoracic or intrabdominal pressure transmitted to the eye causes a sharp rise in the intracocular venous pressure and rupture of superficial retinal capillaries.

**Experiences and lessons**

Valsalva retinopathy should be included in the differential diagnosis when a patient complains of blurred vision following EGD.

**Peer review**

Valsalva retinopathy is not a common ophthalmic complication associated with Valsalva maneuver. This case report indicate that an unexpected sudden intra-abdominal rise in pressure can occur during EGD under propofol induced sedation, and thus could cause extensive retinal hemorrhage.
