

Rare Case: Unilateral Acute Primary Angle-closure Glaucoma After Colonoscopy in Malang, East Java, Indonesia

Supriono^{1*}, Amalia Nurul Hatinah², Mochamad Fachrureza¹, Syifa Mustika¹, Bogi Pratomo Wibowo¹

¹Division of Gastroentero-Hepatology, Department of Internal Medicine, Saiful Anwar General Hospital - Faculty of Medicine Universitas Brawijaya, Malang, Indonesia.

²Department of Internal Medicine, Saiful Anwar General Hospital, Faculty of Medicine Universitas Brawijaya, Malang, Indonesia.

***Corresponding Author:**

Supriono, MD. Division of Gastroentero-Hepatology, Department of Internal Medicine, Saiful Anwar Hospital - Faculty of Medicine Universitas Brawijaya. JL. JA. Suprpto No. 2, Malang, Indonesia.

Email: supriono_ipd.fk@ub.ac.id.

ABSTRACT

Glaucoma is a heterogeneous group of optic neuropathies characterized by a progressive loss of retinal ganglion cells (RGCs) with corresponding visual field defects, and one of the main risk factors is elevated intraocular pressure (IOP). Furthermore, colonoscopy procedures require insufflation of the colon lumen with gases which can increase intraabdominal pressure (IAP) and ends with an elevation of IOP. Glaucoma is an infrequent complication due to colonoscopy; in this case, a 63 years-old woman was diagnosed with glaucoma after a colonoscopy procedure. A few hours after the colonoscopy, the patient suffered blurred vision in the left eye, and the physical examination revealed mixed conjunctival and ciliary injection with visual acuity of 1/300. There was an increase in IOP with a value of 40,2 mmHg on Schiottz tonometry. This case presented the pitfalls of the procedure and the importance of taking glaucoma awareness before a colonoscopy.

Keywords: colonoscopy, glaucoma, intraabdominal pressure, intraocular pressure.

INTRODUCTION

Glaucoma is a heterogeneous group of optic neuropathies characterized by a progressive loss of retinal ganglion cells (RGCs) with corresponding visual field defects, and one of the main risk factors is elevated intraocular pressure (IOP).¹ Meanwhile, colonoscopy is an endoscopic examination of the large bowel, and the distal part of the small bowel with a fiber optic camera on a flexible tube passed through the rectum.² As the colon is insufflated during colonoscopy, facilitating the visualization of the colonic lumen, the dilated bowel loops transmit the pressure and increase

intraabdominal pressure (IAP).³ Intraabdominal hypertension (IAH) might lead to an increase in the IOP.^{3,4} Elevated IOP is a risk factor for several ophthalmic pathologies, such as anterior ischemic optic neuropathy, retinal vascular occlusion, and glaucoma.^{5,6} Due to the high worldwide prevalence of glaucoma and the wide use of colonoscopy as a screening examination, there is a potential risk for glaucoma in patients undergoing colonoscopies. Therefore, this case report aims to raise awareness of colonoscopy complications in relation to glaucoma to prevent further irreversible morbidity.

CASE ILLUSTRATION

A 63 year-old woman was admitted to the hospital for a colonoscopy after complaining of hematochezia with decreased body weight. The preparation was suboptimal, and the colonoscopy was performed with an air insufflation technique and without sedation, contributing to severe abdominal pain during the scope insertion.

Based on the clinical evaluation, the patient appeared to be in pain with a vas score of 6/10, blood pressure 118/61 mmHg, heart rate of 74 beats/minute, oxygen saturation of 98% in ambient air, and right lower abdominal pain. The colonoscopy also revealed ulcerative proctitis, multiple polyps of the rectosigmoid, and diverticula of the transverse colon, as shown in **Figure 1**.

A few hours after the colonoscopy, the patient suffered blurred vision in the left eye, while ophthalmological examination showed mixed conjunctival and ciliary injection, visual acuity of 1/300, and hardening of the left orbit

on palpation with IOP of 40.2 mmHg on Schiottz tonometry. The anterior chamber was shallow, the cornea was edematous, the pupil was mid-dilated with a diameter of 4 mm and unresponsive to light, the iris crypt was unclear, and the lens was hazy. Moreover, the contralateral eye had a shallow anterior chamber with normal pressure and a hazy lens.

In outpatient care, some tests were performed, including gonioscopy which showed narrowing of the anterior chamber angle. Additionally, the ocular computed tomography (OCT) presented thinning of the inferior retinal nerve fiber layer (RNFL), confirming the diagnosis of closure angle glaucoma. The patient was given oral acetazolamide and timolol 0,5% ED to lower the pressure in the eye. After five days, the pain was getting less severe, conjunctival and ciliary injections were decreased, the left eye visual acuity was 6/20, and IOP on Schiottz's tonometry was 14 mmHg (**Figure 3**).

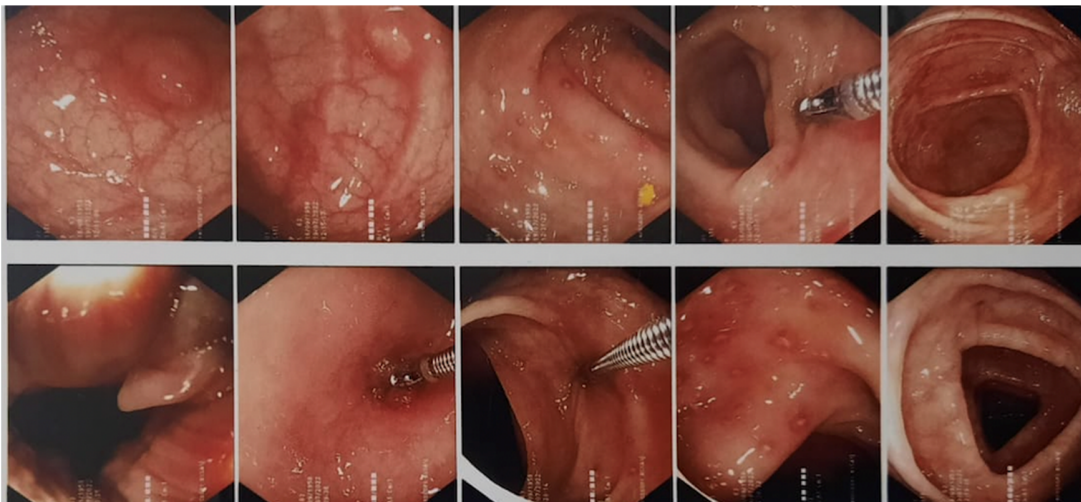


Figure 1. Multiple ulcers and multiple polyps reveal in the rectosigmoid.

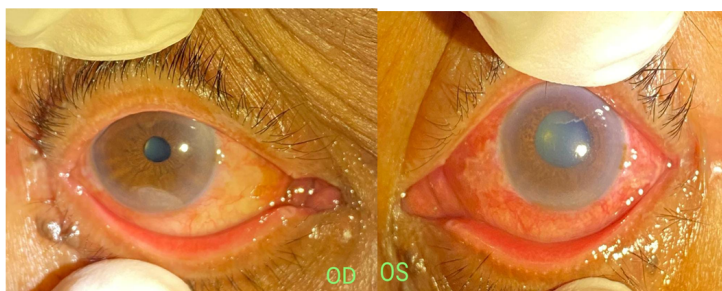


Figure 2. Ocular presentation after the colonoscopy procedure.



Figure 3. Ocular presentation after treatment of glaucoma.

DISCUSSION

Colonoscopy is one of the most frequently performed interventional endoscopic procedures for screening, diagnosis, and treatment.⁷ During the procedures, the elevation in IAP created by air to enhance the image quality can increase IOP and cause undesirable spikes in IOP.⁷ Meanwhile, a high IOP above 21 mmHg is one of the most important risk factors for glaucoma.⁸ This is an optic neuropathy that leads to structural and functional defects within the eye, particularly optic disc damage, and visual field loss. There are two main forms of illness, namely open-angle, and angle-closure.⁸

Angle-closure glaucoma affects a total of 20 million people worldwide,^{9,10} and the number is estimated to increase to 23 million in 2020, as well as 32 million in 2040.¹⁰ It is also known as one of the leading causes of irreversible blindness worldwide, affecting 3.9 million people in 2010.⁹ In Indonesia, the prevalence of glaucoma was 4.6 per 1.000 populations in 2007.¹¹ Furthermore, angle-closure glaucomas is a true ophthalmic emergency that might cause progressive damage to the optic nerve.¹²

Increased IOP is a major risk factor for glaucoma since it causes pressure on the retinal layer, culminating in thinning of RGCs and visual disturbances. IOP is determined by the production and drainage of aqueous humor. Other risk factors of glaucoma that should also be considered are increasing age, family history, and female.¹

IAP occurs in the abdominal cavity due to the interaction between the abdominal wall and visceral organs. Colonoscopy using air

insufflation techniques can cause distension and leads to IAH, which decreases systemic venous return, episcleral vein flow, and drainage of aqueous humor. IAH also increases intracranial pressure (ICP) by reducing drainage of the sagittal sinus. It changes the TLD (translaminar gradient difference) and causes an increase in IOP to return the TLD to its original state.^{13,14} Along with pain due to unsedated procedures and suboptimal bowel preparation, IAH can disrupt the balance of production and drainage of aqueous humor as well as increase IOP.

In our gastroenterology department, the operators can carry out a colonoscopy in less than 30 minutes. Hence, the procedure was performed mainly without sedation after considering the benefit and the risk. In this case, the colonoscopy was performed without sedation with procedure took about 20 minutes. The patient experienced pain during the procedure, which caused neurogenic shock. Midazolam is a good option to reduce anxiety and calm the patient because it relaxes the extraocular muscles and lowers IOP during ocular procedures.⁷ It must also be noted that the pre-procedural anxiety levels of the patient undergoing colonoscopy might affect this situation, but in this case, the pre-procedural anxiety levels were not questioned.

The standard Trendelenburg tilt position during procedures was associated with a more significant increase in IOP compared to a reverse Trendelenburg tilt, which was associated with a slight reduction in several patients.¹⁵ These changes were reversed in patients when intra-abdominal pressure was below 14 mmHg and operative time was not beyond 90 minutes.¹⁵ In this case, colonoscopy was performed in the lateral decubitus position, which is also known to increase IOP.^{16,17} Due to the short-term procedure, which was less than 30 minutes, the effect of different positions during colonoscopy did not significantly increase IOP. Therefore, the reverse Trendelenburg tilt position is recommended when the procedure takes more than 90 minutes.

CONCLUSION

This case report is the first instance of unilateral acute primary angle-closure glaucoma after a colonoscopy procedure in Malang,

Indonesia. This investigation suggested the importance of pre-procedural ophthalmologic examination to patients at risk of developing glaucoma and anxiety before colonoscopy. Additionally, selecting the appropriate sedation drug based on the patient's condition and performing the reverse Trendelenburg tilt position when the procedure is more than 90 minutes can help reduce the risk of glaucoma post-colonoscopy.

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