

Acute pulmonary embolism following endoscopic sclerotherapy for gastroesophageal variceal hemorrhage: A case report and literature review

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Abstract

Gastroesophageal variceal hemorrhage is a substantial cause of death in patients with portal hypertension. Cyanoacrylate injection is a widely used endoscopic treatment for variceal hemorrhage. We report herein the case of a 49-year-old male with decompensated alcoholic cirrhosis, who received endoscopic sclerotherapy to stop gastroesophageal variceal hemorrhage during hospitalization. The following day, he developed acute progressive dyspnea, and computed tomogram of pulmonary artery revealed acute pulmonary embolism at the right lower pulmonary artery. A final diagnosis of sclerotherapy-associated pulmonary embolism was made, and he gradually improved conservatively without anticoagulant treatment 2 weeks after hospitalization.

Keywords

Pulmonary embolism, varices, cyanoacrylate embolism, glue, sclerotherapy

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Introduction

Sclerotherapy with N-butyl-cyanoacrylate, a watery solution that polymerizes immediately when in contact with blood, is widely used for the treatment of gastric variceal bleeding. Most complications associated with cyanoacrylate injection treatment include transient fever, tissue necrosis at injection site probably leading to perforation, post-sclerotherapy ulcer, portal and splenic vein thrombosis with and without splenic infarction, and most importantly pulmonary embolism. Risk factor includes volumes and speed of injection and the size of gastric varices.^{1,2} We present herein a case of pulmonary embolism following.

Case report

A 49-year-old male patient with type 2 diabetes mellitus and Child-Pugh class B alcoholic cirrhosis (MELD score 19, PT 18.5, APTT 34.1, INR 1.69) was hospitalized due to primary *Streptococcus constellatus* bacteremia, and had received penicillin G sodium treatment. Two days after hospitalization, he developed massive hematemesis, and emergent endoscopy was performed which revealed large gastroesophageal varices (GOVs) type 2 with blood spurting at the cardia of stomach. The patient then received a total of 15.6 mL of cyanoacrylate injection until bleeding was stopped (Figure 1). The following

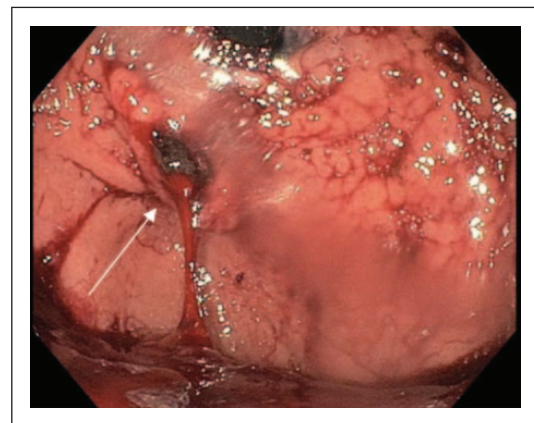


Figure 1. Endoscopy revealed large gastroesophageal varices (GOVs) type 2 with blood spurting at the cardia of stomach, which was stopped by cyanoacrylate glue injection.

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Figure 2. Chest X-ray revealed bilateral patchy opacity suspected pulmonary venous congestion.

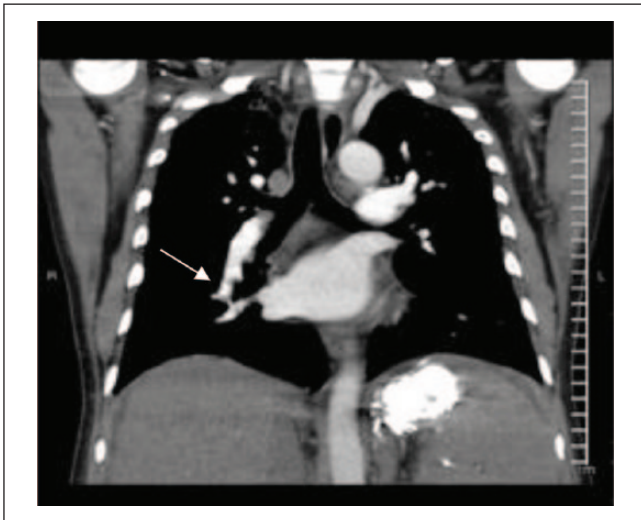


Figure 3. CTPA showed concentric intraluminal hyperdense filling defect within anterior and lateral basal segmental branches of right lower pulmonary artery, and suspected sclerotherapy-related pulmonary embolism.

day, he developed acute progressive dyspnea with partial pressure of oxygen (PaO_2) from arterial blood gas of 80 mmHg at room air. Acute pulmonary embolism was suspected, chest X-ray (Figure 2) and computed tomogram of pulmonary artery (Figure 3) was emergently carried out and exhibited a concentric intraluminal hyperdense filling defect within a lumen of anterior and lateral basal segmental branches of right lower pulmonary artery. Echocardiogram showed normal pulmonary pressure without cardiac abnormalities. A final diagnosis of sclerotherapy-associated pulmonary embolism was made. He was managed conservatively without anticoagulant treatment due to high risk of bleeding tendency from decompensated cirrhosis, and gradually improved and discharged home 2 weeks after hospitalization.

Discussion

Pulmonary embolism is a rare but life-threatening complication of sclerotherapy. In a review article, Saraswat and Verma³ concluded that the incidence of embolization ranged from 0.5% to 4.3%. Alexander et al.⁴ described that the risk of embolism included the volume of glue, injection rate, and the size of gastric varices. Another study showed that the volume of glue was associated with the risk of embolization.⁵ Our patient illustrates that the risk of pulmonary embolism is associated with the large volume of cyanoacrylate.

The pathophysiology of pulmonary embolism during endoscopic sclerotherapy is associated with a portosystemic vascular shunt (Figure 4), especially a gastrosplenorenal shunt which reopens from embryonic vascular pathways. This shunt is a high flow shunt portal circulation to systemic circulation and may carry clots or embolic material from injected varices to the systemic venous flow, right heart, and then pulmonary circulation.⁶

There were 17 cases of sclerotherapy-associated pulmonary embolism, including our patient (Table 1).⁵⁻¹⁵ The median age of the patients was 56 years (range 11–77 years, IQR 41 and 60 years), and 58.8% were male. The etiology of cirrhosis includes alcohol (3, 17.6%), hepatitis B (3, 17%), hepatitis C (2, 11.7%), others (3, 17.6%), and unknown cause (6, 35.2%). Cyanoacrylate was used as sclerosing agent in all patients and the mean volume of the injected

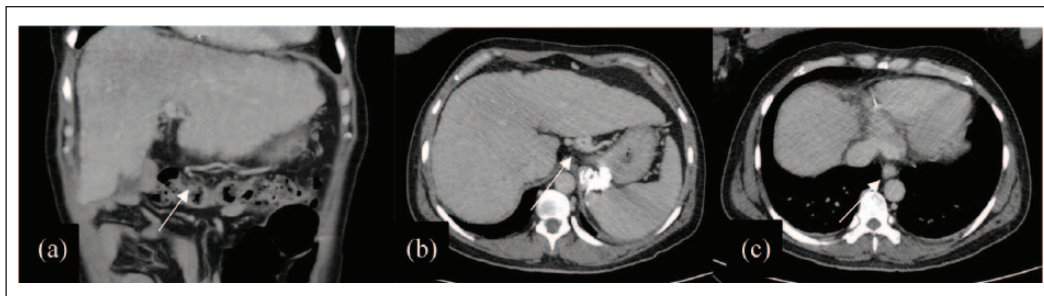


Figure 4. Preoperative contrast-enhanced abdominal CT scan from this patient shows portosystemic shunt. (a) Dilated gastroepiploic vein. (b) Dilated left gastric vein. (c) Esophageal varice.

Table 1. Previous report of sclerothepathy-related pulmonary embolism.

No.	Sex	Age	Underlying disease	Clinical feature	Diag-nosis	Sclerothepathy		Onset of pulmonary embolism following sclerothepathy	Location of emboli	Treatment	Outcome
						Type	Volume (mL)				
1. Hwang et al. ⁵	Female	42	N/A	N/A	GV	Cyanoacrylate	4	N/A	N/A	Supportive treatment	Recovery
2. Hwang et al. ⁵	Male	48	N/A	N/A	GV	Cyanoacrylate	3	N/A	N/A	Supportive treatment	Recovery
3. Hwang et al. ⁵	Male	56	N/A	N/A	GV	Cyanoacrylate	4.5	N/A	N/A	Supportive treatment	Recovery
4. Hwang et al. ⁵	Male	60	N/A	N/A	GV	Cyanoacrylate	4	N/A	N/A	Supportive treatment	Recovery
5. Hwang et al. ⁵	Male	46	N/A	N/A	GV	Cyanoacrylate	3.5	N/A	N/A	Supportive treatment	Recovery
6. Hwang et al. ⁵	Female	57	N/A	N/A	GV	Cyanoacrylate	6	N/A	N/A	Supportive treatment	Recovery
7. Marion-Audibert et al. ⁶	N/A	77	Alcoholic cirrhosis	Hematemesis	GOV2	Cyanoacrylate	6	A few minutes	Bilateral PA	CPR	Died of severe persistent bleeding
8. Wirthoft et al. ⁷	Female	60	Alcoholic cirrhosis	Hematemesis	GOV2	Cyanoacrylate	2	Prophylaxis intubation	Bilateral PA	Supportive treatment	Recovery
9. Van Beek and van Erpecum ⁸	Male	30	Portal vein thrombosis	Hematemesis	IGV1	Cyanoacrylate	2	N/A	Bilateral PA	Supportive treatment	Died of abdominal sepsis
10. Robaina et al. ⁹	Male	61	Cryptogenic cirrhosis	Elective sclerothepathy	GOV2	Cyanoacrylate	1.3	24h	Bilateral PA	Supportive treatment	Recovery
11. Chew et al. ¹⁰	Male	34	HBV cirrhosis	Hematemesis	GOV2	Cyanoacrylate	4	10 days	Bilateral PA	Supportive treatment	Recovery
12. El-Essawy and Al-Harbi ¹¹	Female	40	HBV cirrhosis	Elective sclerothepathy	IGV1	Cyanoacrylate	6	1 day	Bilateral PA	N/A	Recovery
13. Ashraf et al. ¹²	Female	65	HCV cirrhosis	Coffee ground vomiting and melena	GOV2	Cyanoacrylate	12	Immediately	Bilateral PA	CPR	Died of massive pulmonary emboli
14. Javed and Salamat ¹³	Female	60	HCV cirrhosis	Melena	IGV1	Cyanoacrylate	12	1 day	Bilateral PA	Supportive treatment	Died of liver failure
15. Prytula et al. ¹⁴	Male	11	Liver fibrosis	Hematemesis	IGV1	Cyanoacrylate	1	Shortly	N/A	Supportive treatment	Recovery
16. Marco de Lucas et al. ¹⁵	Male	58	HBV cirrhosis	UGIB	IGV1	Cyanoacrylate	7	24h	Bilateral PA	Supportive treatment	Recovery
17 Our patient	Male	49	Alcoholic cirrhosis	UGIB	GOV2	Cyanoacrylate	15.6	24h	Right lower PA	Supportive treatment	Recovery

GV: gastric varix; GOV: gastroesophageal varix; IGV: isolated gastric varix; HBV: hepatitis B virus; HCV: hepatitis C virus; PA: pulmonary artery; CPR: cardiopulmonary resuscitation; UGIB: upper gastrointestinal bleeding.

cyanoacrylate mixed with lipiodol was 5.5 ml (range 1–12 mL). Clinical manifestations of sclerotherapy-related pulmonary embolism is similar to pulmonary embolism, which varies from asymptomatic to severe hypoxia with cardiac arrest. Onset of symptoms also varies from immediate after procedure to late onset up to 10 days. The location of pulmonary embolism is mostly the bilateral pulmonary arteries (9, 53%). Of 17 patients with available information, 14 (82%) received only supportive care and 2 received cardiopulmonary resuscitation due to variceal bleeding and massive pulmonary embolism. One patient (6%) died from massive pulmonary embolism.

Conclusion

This case report shows that pulmonary embolism may occur during endoscopic sclerotherapy of gastric varices and is usually related with the volume of cyanoacrylate glue injection.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

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Informed consent

Written informed consent was obtained from the patient's legally authorized representative for their anonymized information to be published in this article.

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