

# Splenic Abscess is a Rare Complication of Gastric Arteriovenous Malformation Management

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## Abstract

**Background:** In the last decade, newly development of endovascular techniques gives good chance in the treatment of GIT vascular malformations. As the frequency of its use is increasing progressively, we in this study analyze the short- and mid-term radiological and clinical outcomes of a case with gastric arteriovenous malformation treated endovascular.

**Conclusion:** Gastric AVM is rare, and its management depends on the size and extent of the lesion. We assume that the use of histoacryl in the treatment of AVM carries significant risk unlike dealing with direct AV fistula. It is safer to use coils to embolize the feeding artery.

**Keywords:** Endoscopic therapy • Cyanoacrylates • Histoacryl injection • Gastric AVM

## Introduction

Gastric AVMs have only very rarely been reported; they represent 1.4% of all intestinal AVMs [1]. Case reports of gastric AVM were published beginning in the 1880s when it was reported to cause massive upper gastrointestinal bleeding and death [2]. Since the 1970s, gastric AVM has been diagnosed with endoscopy and it is normally treated surgically [3-6]. In the 2000s, successful endoscopic therapy [7-8] and balloon-occluded retrograde transvenous obliteration [9] were reported.

Cyanoacrylates (CA) are instantaneous adhesives that have been used around the world in industrial, domestic, and medical settings since 1957. CA based glues instantaneously adhere firmly to most kinds of material at room temperature and have been used in various fields. The polymerization of CA, which is induced when they come into contact with a trace amount of water or an anion, causes them to harden and become adhesive; however, they form low viscosity liquids in the monomer state [10].

NBCA has been used in endoscopic sclerotherapy for esophageal varices and has come to be used in the treatment of bleeding disorders and Arteriovenous Malformations (AVM), in which the liquid is mixed with an oily contrast medium that is mainly composed of the ethyl ester of iodinated poppy-seed oil fatty acids (Lipiodol, Guerbet Japan, Tokyo, Japan) and injected into blood vessels. There is an increasing clinical need for vascular embolization using NBCA.

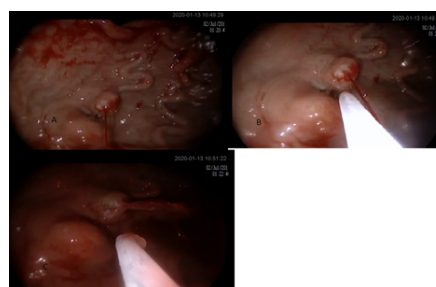
After coming into contact with blood plasma, NBCA starts to polymerize. As a result, blood vessels that are subjected to NBCA injection are embolized via three mechanisms: (1) cast and thrombus formation, (2) the adhesion of NBCA to the inner vascular wall, and (3) damage to the vascular endothelium.

## Case Report

A 42-year-old female, with an unremarkable past medical history, presented with massive hematemesis and melena. On admission, physical examination revealed normal vital data, pallor, and melena. Laboratory investigations revealed moderate normocytic anemia with hemoglobin level 8.6 gm/dl. Other laboratory investigations were normal.

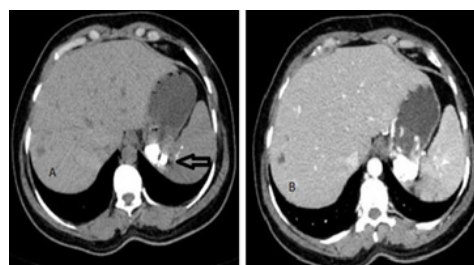
Resuscitation and blood transfusion was done. Then the patient underwent emergency esophagogastroduodenoscopy that revealed multiple large lobulated vascular lesions at the fundus with massive active bleeding (2 spurting points) (Figure 1).

Histoacryl injection was done to control the bleeding with successful hemostasis (Figure 1).



**Figure 1.** Esophagogastroduodenoscopy on admission revealed A: Multiple large lobulated vascular lesions at the fundus. B: Active bleeding (2 spurting points). C: Bleeding controlled after Histoacryl injection.

Later on, CT abdomen was done and revealed a radio-dense localized shadow of Histoacryl at the fundus of the stomach with a noted hyperdense shadow of same Hounsfield density at a mid pole of the spleen near its hilum and aggregated vessels at the fundus and greater vessels are noted suggesting gastric AVM (Figure 2).



**Figure 2.** CT abdomen Shows radio-dense localized shadow of Histoacryl at the fundus of the stomach with a noted hyperdense shadow of same Hounsfield density at a mid-pole of the spleen near its hilum and aggregated vessels at the fundus and greater vessels are noted suggesting gastric AVM.

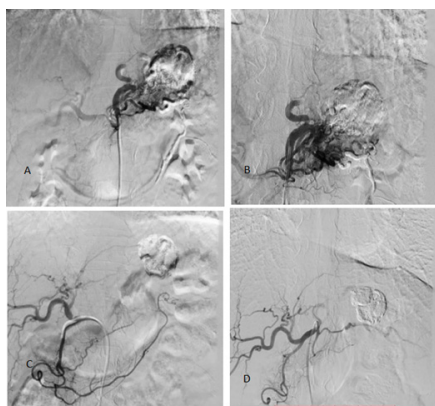
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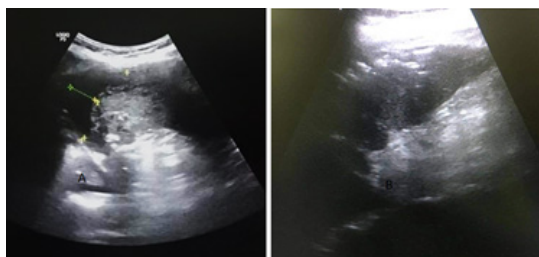
Two days later, the patient suffered from another episode of moderate hematemesis so the decision was to do AVM embolization via conventional angiography was taken.

After receiving the patient's informed consent, under general endotracheal anesthesia. Access was obtained with a 6F femoral sheath, a 6F shuttle sheath (Cook Medical, Bloomington, IN), and a 5F Cobra 1 diagnostic catheter (Merit Medical, USA) cannulate the coeliac trunk with diagnostic angiography revealed AVM which received supply from a branch of the left gastric artery, left gastroepiploic and short gastric artery to arise from terminal splenic artery delivered of renegade hi-flow 0.027 microcatheter (Boston Scientific, USA) with selective catheterization of each feeder artery separable by microcatheter and injection of 50/50 mixture of histoacryl (B. Braun Melsungen AG, Germany) and lipiodol. The final series of face, profile, and incidence of work projection by injection of the coeliac trunk revealed complete embolization of fundal AVM and unfortunately significant reflux into the splenic artery with nearly total occlusion of the splenic artery. Closure of femoral puncture by compression with no puncture site hematoma (Figure 3).

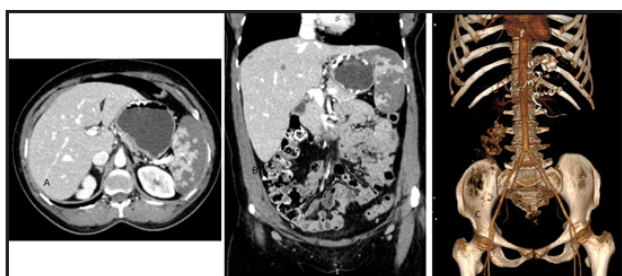


**Figure 3.** DSA noted aggregated vessels A, B; C, D disappearance of aggregated vessels of the AVM after embolization of feeder arteries.

The patient was kept under close observation. Two days later, she felt agonizing left hypochondrial pain that referred to the left shoulder. Follow up abdominal ultrasound revealed the heterogeneous architecture of the spleen with mild peri-splenic fluid collection (Figure 4). Aspiration for the collection revealed blood. Post-contrast CT abdomen revealed a large area of splenic infarction with histoacryl in the splenic artery and mild peri-splenic fluid collection (Figure 5).



**Figure 3.** US: Noted peri-splenic collection seen 5 days after procedure A; resolution of the collection after pigtail drainage B.



**Figure 5.** 3-days post-procedure contrast-enhanced CT shows reflux of histoacryl in splenic artery with nearly total splenic infarction.

After consultation of GIT physicians and GIT surgeons in our hospital, conservative management was decided with antibiotic and analgesic.

Follow-up laboratory investigations revealed thrombocytosis (platelet count reached  $1.3 \times 10^6/CC3$ ), and normocytic anemia (Hemoglobin was 7.6 gm/dl).

Two units of packed RBCs were transfused and low dose antiplatelets was started (aspirin 75 mg daily)

On follow-up after 1 week, the patient developed a big splenic abscess and moderate left pleural effusion. Aspiration, cytology, and culture revealed sterile contents. So, pigtail insertion was done for drainage of the splenic abscess and needle aspiration of the pleural fluid was under antibiotic coverage and follow up. One week later the abscess disappeared, the left pleural effusion decreased markedly, the pigtail was removed. Gradually the pleural effusion disappeared.

Follow-up after 2 months showed normal platelet count ( $250 \times 10^3/CC3$ ) and a hemoglobin level of 10.5 gm/dl.

## Discussion

Gastrointestinal AVM is considered an important vascular cause of chronic and massive bleeding [11]. It is relatively common at the caecum and ascending colon while its incidence at the stomach and small intestine are rare. The stomach is considered the rarest site of GIT AVM [12].

The diagnosis of gastric AVM is tricky and should be differentiated from angioectasia, the true gastric AVM consists of a direct connection between artery and vein [13-14]. The advance of minimally invasive intervention is a promising chance in the treatment of gastric AVM and avoid partial gastrectomy. This includes endoscopic clipping and/or endovascular treatment [15].

The common supply of gastric AVM arises from the left gastric artery. In our case, it also received supply from the short gastric arteries arising from the splenic artery and left gastroepiploic. It seems that an embryological developmental defect caused this congenital anomaly. Searching the English medical literature for articles describing this rare pathology has found it in only one similar reported case.

Angioembolization is one of the options to treat gastric vascular malformation, mostly treated by coiling of the feeding artery. In our case, we used an intra-arterial injection of histoacryl and it has refluxed into the splenic artery while microcatheter deployed in the short gastric artery and caused massive splenic infarction that progressed into a splenic abscess. Sympathetic left pleural effusion also occurred. The abscess was drained using a pigtail for 2 weeks. During this period, the left pleural effusion decreased and then disappeared after the removal of the pigtail.

Thrombocytosis (due to hyposplenism or reactive) occurred and was managed temporarily with a prophylactic dose of aspirin (75 mg daily) till the platelets returned to normal after 2 months.

In our case, we selected angioembolization for dealing with this lesion. Ischemic complications after angioembolization caused splenic infarction and splenic abscess formation with left pleural effusion. Conservative management with antibiotics, analgesics, and antiplatelets was given. Full recovery was achieved within 2 months of the bleeding episode.

## Conclusion

Gastric AVM is rare, and its management depends on the size and extent of the lesion. We assume that the use of histoacryl in the treatment of AVM carries significant risk unlike dealing with direct AV fistula. It is safer to use coils to embolize the feeding artery.

## Statement of Ethics

This study had approval from tertiary institutes in Egypt (Assiut University,

Faculty of Medicine Research Ethics Committee) and written informed consent was obtained from the patient for publication of this case report.

## Author Contributions

M. O and W.H suggested and developed the research idea and reviewed the literature. M. Write and revise the manuscript, prepare case and responsible for reporting the clinical and angiographic outcomes of the case during the follow-up period. All authors have a major contribution in preparing and editing the manuscript. All authors read and approved the final manuscript.

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