Refractory gastric variceal bleeding treated through endoscopic ultrasound-guided coiling and N-butyl-2-cyanoacrylate application☆

Tratamiento ecoendoscópico con coil y N-butil-2-cianocrilato de hemorragia varicosa gástrica refractaria

Twenty percent of patients with portal hypertension develop gastric varices. The risk for bleeding varies from 5 to 10%, and some authors have reported up to 16%.[1] Gastric variceal bleeding has greater severity and a higher mortality rate than esophageal variceal bleeding.[2]

Endoscopic intravariceal cyanoacrylate (CYA) injection is first-line treatment for acute bleeding, as well as for secondary prophylaxis.[3] Hemostasis is achieved in 90% of the cases and the risk for rebleeding is 15 to 30%. The most dreaded complication is CYA pulmonary embolism that manifests clinically in approximately 5% of cases.[4,5]

Endoscopic ultrasound-guided CYA injection has the advantage of direct visualization. It corroborates variceal obliteration through Doppler ultrasound and enables CYA injection to be directed at the perforating or feeding veins.[6]

The technique of coil injection under echo-endoscopic guidance, followed by CYA injection (B-CYA plus Lipiodol or O-CYA, alone), was developed in the last decade. The aim of the combined treatment was to inject a smaller amount of CYA, thus reducing the risk for embolization.[7]

A 51-year-old man presented with gastric variceal bleeding (IGV 1) with hemodynamic decompensation refractory to endoscopic and hemodynamic therapy.

The patient was diagnosed with idiopathic cavernous transformation of the portal vein. The usual causes of portal thrombosis were ruled out.[8] Multiple episodes of gastric variceal bleeding were treated endoscopically with B-CYA injection (1 ml each session, 4 sessions) plus Lipiodol, achieving control of the acute bleeding, but not eradicating the varices.

During the fourth episode of bleeding, the patient was referred to our hospital. In accordance with the surgical expertise at our center, derivation through a mesocaval shunt was performed for treating prehepatic portal hypertension. Shunt thrombosis occurred one week after the intervention. The patient presented with variceal rebleeding, for which splenic artery embolization with coils was performed through angiography to decrease splenic circulation and the fundal variceal pressure (fig. 1).

Endoscopic ultrasound therapy was carried out because of IGV-1 persistence and a new rebleeding episode. The largest IGV-1 (15 mm in diameter) was chosen, using a linear or sector echoendoscope (Fujinon EG530 OUT, New Jersey, USA). The distal esophageal wall was punctured with a 19-gauge echoendoscopic needle (EchoTip Ultra, Cook Medical, Bloomington, Indiana, USA) until reaching the interior of the selected varix (fig. 2). The coil (MicroNester®, 10 mm-7 cm, Cook Medical, Bloomington, Indiana, USA) was introduced, pushing the needle stylet under endosonographic vision. A mixture of B-CYA (1 ml) and Lipiodol (1 ml) was then injected. Doppler ultrasound was used to confirm the absence of blood flow at the interior of the treated varix after injection.

No complications were reported and the Doppler echoendoscopic control at 4 months showed gastric varix obliteration.

The treatment of choice for gastric variceal bleeding is endoscopic injection of CYA inside the varices. Doppler echoendoscopic monitoring ensures complete obliteration of the varices, reducing the possibilities of rebleed.[9] Echoendoscopic-guided placement of stainless steel coils during the same session reduces the risk for systemic CYA embolization. The most widely-used coil in fundal varices is a spiraled coil with synthetic fibers adhered to the surface, which induce thrombosis, preventing CYA dispersion. The size of the coil employed is dependent on the size of the varix, and the most commonly used sizes are from 10 to 20 mm in diameter. One or more coils can be introduced in each procedure.

Puncture is carried out through the distal esophagus to reduce the risk for bleeding because the thicker muscle layer of the esophageal wall collapses the puncture path.

The combination of coil and glue increases hemostasis, obliterates the fundal varices, and reduces the risk for embolization.[9] In a randomized study on 32 patients, presented at the 2017 Digestive Disease Week, Chaves et al. concluded that the combined technique reduced the amount of cyanoacrylate needed to eradicate the lesions.[10]

Bhat et al.[9] conducted a retrospective analysis of 152 patients with gastroesophageal varices type 2 (GEV-2) and IGV-1 with active bleeding (5% of the cases), secondary prophylaxis (69%), and primary prophylaxis (26%), with 99% technical success. The mean number of coils used was 1.4 (range: 1-4 coils) and the mean volume of O-CYA injected was 2 ml (range: 0.5-6 ml). Echoendoscopic control with Doppler was carried out on 100 patients that showed complete variceal obliteration in 93% of the subjects. Rebleed occurred in 8% of the patients with gastric varices and in 3% with esophageal varices. However, complete obliteration was observed in 3% of the cases. In regard to complications, only one patient presented with symptomatic pulmonary embolization.[11]

The combination of echoendoscopic-guided coil introduction and CYA injection as treatment of gastric roof varices is efficacious and safe and can be used when conventional treatment fails.

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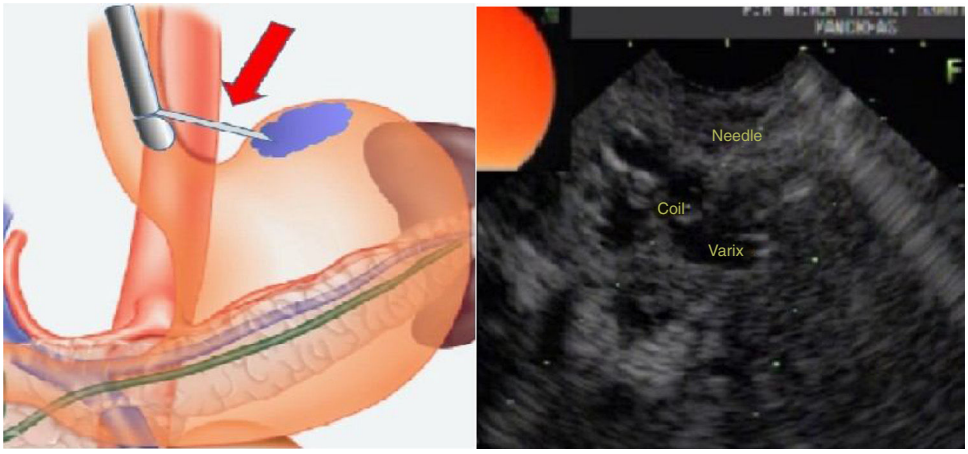

Figure 1 Transesophageal puncture diagram. Echoendoscopic-guided insertion of the coil and cyanoacrylate.

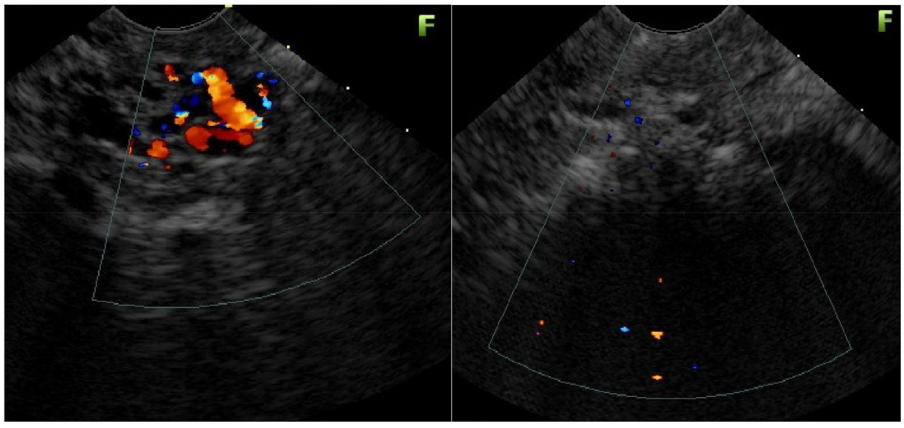

Figure 2 Endoscopic ultrasound with Doppler showing the IGV-1 before and after endoscopic treatment.

Comparative studies are needed to determine its role as first-line treatment in fundal variceal bleeding.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article.

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Conflict of interest

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Fecal microbiota transplantation for severe complicated *C. difficile* colitis in a patient with acquired immunodeficiency syndrome☆

Trasplante de microbiota fecal en el tratamiento de colitis grave complicada por *C. difficile* en un paciente con síndrome de inmunodeficiencia adquirida

Clostridium difficile infection (CDI) continues to be the main cause of hospital-acquired diarrhea and one of the main causes of nosocomial infection. For the last two decades, CDI burden has increased in terms of incidence, morbidity, mortality, and costs.[1] The wide spectrum of CDI manifestations ranges from asymptomatic patients to fulminant presentations with toxic megacolon.[2] Treatment strategies should be based on disease severity, previous history of CDI, and individual patient risk for recurrence.

Vancomycin is the treatment of choice for severe or complicated CDI. Metronidazole is appropriate for mild disease, and fidaxomicin is a therapeutic option for patients with recurrent CDI or with a high risk for recurrence. Fecal microbiota transplantation (FMI) has been associated with recurrent CDI symptom resolution, but its role as primary treatment and in severe CDI has not been established.[3] There is a subgroup of CDI patients that develop fulminant presentations that are refractory to conventional treatments.[4] We present herein the case of a patient with HIV infection and colitis due to *Clostridium difficile* that was successfully treated through fecal microbiota transplantation.

A 28-year-old man was diagnosed with stage C3 human immunodeficiency virus/AIDS (CD4+ T-lymphocyte count of 41 cells/μl and viral load of 127,305 copies/ml), treated for central nervous system toxoplasmosis and hospital-acquired pneumonia with pyrimethamine, clindamycin, and piperacillin-tazobactam. At the tenth day of treatment, the patient developed diarrhea, abdominal distension, and hyperleukocytosis with 61,400 cells/μl. PCR for *Clostridium difficile* toxins was positive for the hypervirulent 027/NAP1/Bl strain (Cepheid Xpert® C. difficile assay, USA). Treatment was begun with 125 mg PO of vancomycin every 6 h and 500 mg IV of metronidazole every 8 h. Due to lack of improvement at 48 h, we increased the dose of vancomycin to 500 mg PO every 6 h. After 12 days of treatment, the patient had clinical deterioration manifested as increased abdominal pain and distension (fig. 1). Therefore, we began the protocol for fecal microbiota transplantation. The donor was the patient's mother, who had no history of chronic disease and whose body mass index was 24. She was screened for hepatitis viruses A, B, and C and for HIV. Stool culture, ova and parasite exam, and *Clostridium difficile* toxin stool test were negative. Fifty grams of stool were collected from the donor and suspended in 100 ml of 0.9% saline solution. The sample was homogenized through a filter until a liquid solution was produced. Two days prior to the procedure all antibiotics were suspended, including the metronidazole and vancomycin. After the patient signed a statement of informed consent, he was infused with 100 ml of the prepared sample through a nasojejunal catheter, given that no urgent colonoscopies were available at that time. Forty-eight hours after the infusion, the patient showed dramatic clinical improvement, with resolution of pain and abdominal distension and a decrease in leukocytes from 62,000 to 12,000 cells/μl (fig. 2). The patient was released and has not presented with disease recurrence at the one-year follow-up.

In a systematic review that included a total of 536 patients from 36 clinical trials, FMT efficacy was 87% after the first procedure. Resolution of diarrhea varied according to the infusion site: when the FMT was infused in the stomach, efficacy was 81%; in the duodenum/jejunum it was 86%; in the cecum/ascending colon it was 93%; and in the distal colon it was 84%.[5] The number of reports that support the use of FMT in the acute phase of severe cases is on the rise.[6] However, there is concern with respect to the greater potential risk for sepsis and infections following FMT. A recent retrospective multicenter study on 80

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