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Blind transcatheter arterial embolization: A life saving modality in refractory upper GI bleed

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Abstract:
Introduction: Transcatheter arterial embolization is a minimally invasive technique which is a safe, fast and effective alternative to surgery, and is now considered the first-line therapy for upper GI bleeding, refractory to endoscopic management.
Aim & Objectives: The initial treatment modality of any case presenting with upper GI bleed is endoscopic hemostasis. However, this article highlights those cases who are refractory to initial endoscopic therapy and are the candidates for surgery or interventional embolization therapy.
Material and Methods: This case report highlights a middle-aged male presenting with endoscopic refractory GI bleed, to a tertiary care center in North- West India.
Conclusion: Transcatheter arterial embolization is typically guided by CT angiography which localizes the site of the bleeding vessel. However, in cases where no active bleeding vessel can be identified, a blind procedure is performed in which the suspected vessel is targeted for embolic therapy. In this article we discuss a case where the blind transarterial technique of vascular bed embolization has been utilized which has revolutionized the management of refractory upper GI bleed.

Keywords: Blind TAE, Refractory upper GI bleed, Trans catheter arterial embolization

CASE REPORT:

A 50-year-old male presented with a ten days history of hematemesis and melena. Initially he underwent esophagogastroduodenoscopy and endoscopic sclerotherapy for the control of bleeding from the visualized large ulcer at the first part of the duodenum. It was followed by clipping at the site of the duodenal ulcer. However, the bleeding persisted even after the interventional therapy

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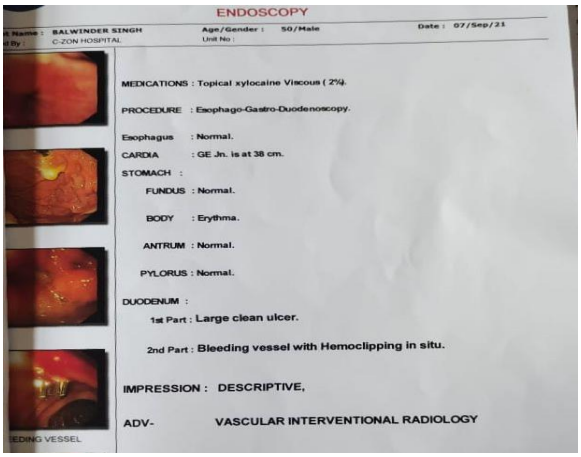

Image1: Hemoclip placed at the second part of duodenum (D2), during stabilization by esophagogastroduodenoscopy. (Source: Image taken from patient records)

At day four, the patient had a BP =86/60mmHg, HR =122 bpm, while his hemoglobin level dropped further from 9g/dL to 5.5 g/dL, and the patient had persistent melena. After stabilization of vitals with packed red blood cell transfusion, this patient was subjected to transcatheter arterial embolization, as he had massive bleeding as he was refractory to ongoing medical treatment and endoscopic intervention.

The patient was subjected to conventional angiogram by selective catheterization through the femoral approach. At first, celiac artery was catheterized and later access was gained into the common hepatic artery. Once access was secured, arteriography was performed but no contrast extravasation was seen and bleeding vessel could not be identified. So, the patient was subjected to CT arteriography. No definitive evidence of culprit vessel was found even on CT arteriography.

So, in this patient we went for a blind approach. The clipping at the duodenal site performed during UGI endoscopy, guided our way through the procedure. Super selective angiography was performed where the branches terminating to the metallic clip were selected using the Microcatheter technique. Initially, a micro catheter was inserted into the Right Gastroepiploic Artery, and coils were introduced. It was followed by the with drawl of catheter into the proximal gastroduodenal artery. The catheter was progressed from distal to proximal approach, to prevent back door hemorrhage from the collaterals arising from the right gastroepiploic and superior pancreaticoduodenal arteries. This method is known as the Sandwich embolization. Towards the end, superior mesenteric artery was visualized for the contrast extravasation to look for any revascularization of the embolized part. The bleeding eventually stopped and no ischemic complications were reported. The patient was observed for three days and discharged home satisfactorily.

DISCUSSION:

Forty years ago, Rösch et al. first described the use of angiographic transcatheter arterial embolization (TAE) for the management of patients who presented with acute gastrointestinal bleeding.

A typical candidate for this procedure has either of the following-

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1)Massive bleeding (transfusion of at least 4U of whole blood over 24 hours) or hemodynamic compromise.
2)Endoscopy-refractory acute UGI bleed.
3)Recurrent bleeding after surgery.
Usually, the gastroenterologist performing the endoscopic procedure had already identified the bleeding location, performed endoscopic therapies to control the bleeding, and ideally positioned a clip at the bleeding site. Marking with the clip, makes it easier to localize the bleeding vessel for embolization because active extravasation is only found in up to 61% of cases.[1]
Thereafter, a conventional angiography is performed which is followed by TAE, based on the vascular supply to the bleeding area. Typically, an extravasation of contrast into the bowel lumen or a false aneurysm-like lesion is seen. However, an abnormal blush of the mucosa is indicative of an inflammatory process either gastritis or duodenitis, which when correlated to endoscopy findings, can also be a positive marker on angiographic examination. The vessel to be subjected to TAE, is first selected on the basis of suspicion from history, clinical signs, scintigraphy images or CT scans. For an upper GI bleed, the celiac artery and the superior mesenteric artery are the primary culprits. After the initial angiographic procedure, if no extravasation is seen, then a super-selective angiography can be performed characteristically with the use of a microcatheter progressed into the gastroduodenal, the lesser gastric, or the splenic artery and embolized using micro coils.[2]
In cases where a dual supply of bleeding area is suspected, both the arterial sources must be embolized to cease the bleeding. This is typically seen in ulcers that erode into the gastroduodenal artery. Embolization must start distally to prevent persistent “backdoor” hemorrhage from the right gastroepiploic and superior pancreaticoduodenal vessels and then proceeded to the proximal site.[3]
A blind embolization is defined by no angiographic proof of contrast extravasation, which is typically guided by our previous information on location of bleed through the esophagogastroduodenoscopy. Marking with a metallic clip during pre-embolization esophagogastroduodenoscopy can assist with the localization. The branches terminating to the clip are super- selected using microcatheter techniques. Many embolization agents have been successful which includes coils, reabsorbable gelatin sponges, and non-resorbable polyvinyl alcohol or tris-acryl gelatin particles.[3]
In a study conducted by Anil et al.[4] on fifteen patients with endoscopic intervention refractory bleeding duodenal ulcers, the segment of the Gastroduodenal artery supplying the duodenal ulcer, as guided by endoscopically placed clips was embolized using a uniform sandwich technique with gel-foam, irrespective of contrast extravasation. The study showed 100% technical success and 93.3% clinical success rate.
Idil et al[5] conducted a study on thirty patients of acute upper GI bleed, who underwent TAE between January 2007- May 2020. Study recorded the etiology of hemorrhage, type and localization of lesion, embolizing agent used, and postprocedural complications. The technical success rate was 90.9%, while two patients developed rebleeding in early postprocedural period.
In retrospective analysis and special emphasis on embolization agents used by Fontana et al[6], on gastrointestinal bleed patients treated between Jan 2010 and Dec 2020, the study showed a technical success of 81.32%, and a clinical success of 89.01% with no significant peri and post-procedure complications. Different embolization materials were used including coils, particles, glue and gelatin sponge.

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A study by Griffiths et al[7] showed that although currently trans-arterial embolization is being used more frequently than surgery for cases with refractory upper gastrointestinal bleeding, its incidence has decreased considerably after the advent of extravagant usage of proton pump inhibitors.

Although there high technical and clinical success rates, treatment failure can occur, which is predicted by angiographic parameters especially when the number of arteries supplying the bleeding area is greater than one, and the located area is greater than 5 cm in dimension. Patients with these risk factors should be watched carefully, as recurrence of bleed can happen in the post-procedural period. In such patients, definitive surgery should be performed.[8]

COMPLICATIONS:

Although, the complication rate of TAE is low, there can occur ischemic pancreatitis, renal impairment, and coil misplacement. Complications related to angiography can occur which include development of groin hematomas and contrast-related acute kidney injury, with the same frequency as of other endovascular procedures. In addition to these, inadvertent embolization of the main hepatic artery may lead to rise in liver transaminases, progressing into hepatic failure.

CONCLUSION:

Blind trans-catheter arterial embolization has revolutionized the management refractory cases where CT arteriography could not localize the bleeding vessel. Thus, opting for a blind approach is an advancement in the minimally invasive therapies and is providing promising results. This encourages us for to further develop such modalities in the interventional cardiology in the upcoming future.

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