Aims and objectives

INTRODUCTION:

Acute gastrointestinal (GI) hemorrhage is a medical emergency and can lead to significant morbidity and mortality if prompt appropriate action is not taken. Endoscopic management is usually the first-line treatment for acute upper GI bleeding. However, at times, it is not possible to identify or successfully treat the cause of GI bleed. In these circumstances, angioembolization of the bleeding artery may be performed to control the hemorrhage. This may be preceded by contrast-enhanced CT abdomen to detect the source of GI bleeding. However, at times, contrast-enhanced CT and/or catheter angiography may fail to identify the culprit vessel. In these situations, empiric angioembolization of the suspected vessel may be performed guided by the site of hemorrhage identified on endoscopy or from previous surgical findings. Sparse data from the developed world and almost none from the developing world exists regarding the utility of empiric angioembolization for the management of uncontrolled GI bleeding.

OBJECTIVES:

To assess the technical success rate, complications and outcome of patients treated with empiric angioembolization for acute uncontrolled GI bleeding.
Methods and materials

Ethical exemption for this retrospective study was obtained from the institutional ethics review committee and the requirement of informed consent was waived. All patients who underwent angioembolization for GI bleeding between March, 2004 and June, 2015 were reviewed using radiology information system. Among these, patients who underwent empiric angioembolization for GI bleeding were included in the study. Empiric angioembolization was defined as embolization of a vessel when the diagnostic catheter angiogram failed to reveal the site of bleeding and the angioembolization was performed on the basis of endoscopic or contrast-enhanced CT (CE-CT) findings. Patients’ charts were reviewed to search for clinical history, endoscopic findings and clinical follow-up. Radiology information system and picture archival and communication system (PACS) were used to review the details of the angioembolization procedures. A consultant radiologist having more than 5 years of experience in interventional radiology and a fourth year radiology resident reviewed all data. Technical success, clinical success and complication rates of the empiric angioembolization procedure were calculated. Technical success rate was defined as successful occlusion of the intended vessel and its branches without any active contrast extravasation and no demonstrable collateral flow. Clinical success rate was defined as a combination of technically successful embolization with an improvement in the patient’s hemoglobin, no evidence of further hemorrhage (or decrease in hemoglobin) after embolization, and no requirement for further intervention within the first 4 weeks of embolization.

STATISTICAL ANALYSIS:

Data entry and analysis was performed using Microsoft Excel 2010. Qualitative data was expressed as frequency (percentages) and quantitative data was expressed as mean ± standard deviation. Technical success, clinical success and complication rates were expressed in percentage.
Results

A total of 32 patients underwent empiric angioembolization for acute uncontrolled GI bleeding at our institution. Among these, 22 were male and 10 were female. Mean age of included patients was 57.3 years ± 12.5 (range = 28-86 years). The most common cause of empiric angioembolization was duodenal ulcer followed by malignancy. Figure 1 shows the various causes of GI bleeding in our study.

Among included patients, angioembolization of the gastroduodenal artery (GDA) was performed in 24, left gastric artery in 2, gastroepiploic artery in 1, and ileocecal arteries in 3 patients respectively. One patient underwent angioembolization of both GDA and gastroepiploic arteries. Another patient had empiric angioembolization of super-selected branches of the superior and middle rectal arteries. In 19 patients, angioembolization was performed using polyvinyl alcohol (PVA) particles and metallic coils. Figure 2 shows the various embolization materials used for empiric angioembolization.

In all but one patient, the empiric angioembolization procedure was successful (technical success rate of 96.9%) In that particular case, empirical embolization could not performed due to unusual anatomy of the GDA. (The GDA was filling retrogradely from the SMA and was also then retrogradely filling the hepatic and gastroepiploic arteries.) The mean hospital stay was 5.8 days. Out of 31 patients that had empiric angioembolization, 7 patients died of other causes (myocardial infarction and severely debilitation secondary to underlying malignancy) within the first 30 days. Five patients were lost to follow-up. In the remaining 19 patients, re-bleeding occurred in one patient after 2 days of the initial angioembolization procedure, which was successfully angioembolized again using 2 metallic coils. Remaining 18 patients remained vitally stable without further drop in hemoglobin or re-bleeding at 30 days. Thus the 30-day clinical success rate was 94.7%.

Procedure related complications occurred in three patients (9.37%) in whom the metallic coil accidentally slipped into the right hepatic artery. However, there was no significant restriction of blood flow to the liver and no serious complications occurred in these patients. No other procedure-related complications were observed in our patients.
Fig. 1: Bar chart showing the various causes of gastrointestinal bleeding.

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Fig. 2: Bar chart showing the various embolization materials used for empiric embolization.

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Fig. 3: Empiric angioembolization of the gastroduodenal artery. (a) Pre-embolization angiogram fails to reveal active contrast extravasation from the gastroduodenal artery. (b) Post-embolization angiogram shows multiple metallic coils in the gastroduodenal artery with no distal contrast filling.

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Fig. 4: Empiric angioembolization of the left gastric artery. (a) Selective left gastric pre-embolization angiogram. (b) Post-embolization angiogram shows significantly reduced vascularity in the region of gastric fundus near the gastroesophageal junction. Embolization was performed with polyvinyl alcohol (PVA) particles (355-500 microns).

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Fig. 5: Empiric angioembolization of the ileocolic artery. (a) and (b) Pre-embolization angiograms fail to reveal any contrast extravasation from the ileocecal artery. (c) Post-embolization angiogram shows a coil in the ileocolic artery with significantly reduced vascularity as compared to the pre-embolization images.

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Conclusion

Empiric angioembolization for acute uncontrollable GI bleeding is a feasible procedure for patients in whom endoscopic management is not feasible or unsuccessful.
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