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ORIGINAL ARTICLE

Predictors of positive angiography and evaluation of the outcome of transcatheter control of non variceal upper gastrointestinal hemorrhage

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KEYWORDS

Transarterial embolization;
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Abstract *Purpose:* To identify clinical factors influencing the positive angiographic findings identifying the bleeding source by angiography and to evaluation of the clinical outcome of embolization in angiography positive and in empiric embolization without identifying the bleeding source of upper gastrointestinal (UGI) bleeding.

Materials and methods: Twenty-one patients were candidates for transcatheter angiography and embolization and followed up for 3–38 months.

Results: Transcatheter angiography and embolization was technically and clinically successful in 95% and 86% respectively. Angiography identified the source in 11/20 and no source of bleeding seen in 9/20 in whom empiric embolization was carried out. Technical and clinical success or complications were not different. No procedure related major complications were encountered. Early and late mortalities were not different. Blood transfusion requirement and rate of hemoglobin drop were higher in positive compared to empiric group 9 vs 7 U and 5.7 vs 6.5 g/dL respectively ($p = 0.02$), ($p = 0.1$). Coagulopathy was found in 64% ($n = 7$) in positive and in 38% ($n = 3$) in empiric group ($p = 0.02$). Recurrent UGI bleeding was noticed in patients with coagulopathy and were treated by coils alone.

Conclusion: Transcatheter angiography and embolization is safe and effective. Embolization can be done empirically even when angiographically negative is based on endoscopic localization of bleeding source.

1. Introduction

Acute massive upper gastrointestinal (UGI) bleeding in adult is due to duodenal ulcer in about 30%-40% and gastric ulcer in 20–25%. In total, a mortality of 5%-15% has been unchanged during the last three decades often related to

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comorbidity (1). Endoscopy is the first line examination and treatment of UGI bleeding and achieves bleeding control in up to about 95% of the patients. After primary treatment failure and recurrence of bleeding, a second endoscopic attempt, surgery or endovascular embolization should be considered (2,3). When primary hemostasis has been obtained without recurrence after endoscopic treatment the mortality is less than 2%. However, in about 15% of cases endoscopy is either not available or unsuccessful (4).

Re-bleeding after primary control of bleeding is seen in about 25% of cases and these patients have mortality of about 10%. In about 5% of UGI bleeding it is not possible to stop the bleeding in the first place and in these cases the mortality is about 30% (2).

The sensitivity of angiography in detecting the bleeding source is dependent on the severity of bleeding, and is highest in hemodynamically instable patients with transfusion requirements and a bleeding of at least 1–2 mL/min before recognizing the bleeding can be expected. Further, the sensitivity is dependent on the localization of the bleeding, whether the bleeding is localized or diffused, if it is intermittent, arterial or venous, the degree of gastric and intestinal content of air, peristaltics, and patient cooperation. The sensitivity is probably no more than 50–60% (3,5,6).

Transarterial embolization (TAE) is an effective treatment with good long term results. Technical success can, in experienced hands, be achieved in 90–98% of cases (4). But about 10% will have rebleeding within 3 days (7). Primary clinical success with hemostasis in the group of patients with technically successful embolization is about 80% (4), and secondary clinical success after reembolization is achieved in more than 80% (8).

In many institutions transcatheter arterial embolization is considered as the first-line intervention for massive UGI bleeding after failed endoscopic treatment (9,10).

Many authors postulated that when the bleeding source is not identified which is considered as negative angiography and this constitutes high percentage of patients, embolization is not possible (11). Other authors concluded that: high rate of technical and clinical success was obtained with empiric transarterial embolization (TAE) comparable to identifiable TAE in patients with massive bleeding from duodenal ulcers. There were no severe complications. Empiric TAE is an effective and safe method when a bleeding site cannot be determined by angiography (12).

2. Purpose

To identify clinical factors influencing the positive angiographic findings identifying the bleeding source of nonvariceal upper gastrointestinal bleeding and to evaluation of clinical and technical outcome for transcatheter embolization of angiographically positive patient and empiric embolization of angiographically negative patient in whom angiography could not identify the bleeding source.

3. Materials and methods

This is retrospective review of all patients (n = 178) who underwent arterial embolization for acute non variceal UGI hemorrhage at a university hospital and private practice Hospital between July 2010 to October 2014. Fifteen cases were excluded because of incomplete medical records. All patients (n = 163) had an episode of massive acute bleeding within 7 days of the procedure. Patients who were presented with fresh hematemesis or circulatory instability underwent emergency endoscopy procedures by experienced endoscopists. When massive bleeding was inaccessible or unresponsive to endoscopic treatment, patients were referred for TAE, which was the first alternative to endoscopic therapy. CT angiography was obtained whenever possible, and it was not performed in patient who had renal impairment without regular dialysis and when the patient was hemodynamically unstable.

Technical success was defined as target area devascularization and clinical success was defined as clinical cessation of gastrointestinal bleeding (clearing of nasogastric aspirates and/or melena) and stabilization of the hemoglobin and hematocrit level, requiring no more than 2 units (U) of packed red blood cells after the procedure.

If a patient required more than 2 U or hemodynamic instability persist or persistent hemorrhage that required therapeutic endoscopy, repeat embolization, or surgery after the primary procedure, the procedure was considered failure.

Clinical data were obtained from the patient's medical record including: patient's age, gender, comorbidity, endoscopic diagnosis, blood transfusion requirement before and after angiography, number of blood units infused, PTT, prothrombin time and INR platelets count., rate of drop of hematocrit value per in gram per 24 h, rate of hemoglobin drop g /24 h and serum creatinine level, hospital course, and in-house mortality either hemorrhage-related mortality or for other reasons.

Coagulopathy was defined by an international normalized ratio >1.5, partial thromboplastin time >45 s, or platelet count less than 80,000 /μL. Thirty days post procedure complication can be classified as minor or major complications according to definition by SIR as an unplanned increase in the level of care, prolonged hospitalization, permanent adverse sequelae, or death. Median follow-up was 12 months ranged from 3 to 26 months average of 13 months.

3.1. Procedure

After obtaining informed consent for the procedure, diagnostic angiography through common femoral artery access with 5 Fr sheath was carried out followed by diagnostic celiac and superior mesenteric angiography. All patients then underwent selective embolization of at least one vessel, chosen by evidence of contrast extravasation at angiography which considered positive angiography or empiric embolization based on endoscopic or contrast enhanced CT before angiography. When angiography was negative, endoscopic findings were used to target embolization (empiric embolization), and the left gastric artery was chosen as the target vessel for gastric bleeding and the gastroduodenal GDA and its branches were chosen for duodenal bleeding. If subsequent angiogram demonstrated collateral flow or continued extravasation, a secondary or tertiary embolization was performed. For embolotherapy, Hilal microcoils platinum 0.18 or Tornado embolization microcoils Gelfoam pledgets or Gelfoam slurry (Pharmacia & Upjohn, Kalamazoo, MI) were deployed close to the bleeding site via superselective catheterization. Sandwich technique used coils