Case Analysis

Serious Complications Following Angiographic Therapy for Lower Gastrointestinal Hemorrhage

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Mesenteric angiography is valuable in diagnosing and managing acute massive lower gastrointestinal (LGI) hemorrhage. The modern superselective angiography or embolization is effective in controlling LGI hemorrhage and is associated with a low rate of post-embolization ischemia; however, it may still cause serious complications. Three serious complications resulting in prolonged hospitalization or surgical intervention were reviewed. [J Soc Colon Rectal Surgeon (Taiwan) 2007;18:53-58]

Lower gastrointestinal (LGI) bleeding is defined as hemorrhage distal to the Treitz’ ligament, ie, the small intestine or colon; however, over 80-85% of cases arises from the colon.¹ The most common causes of LGI bleeding include diverticulosis, angiodysplasia, neoplasm, inflammatory bowel disease, ischemic colitis, infectious colitis, and anorectal diseases.²-⁴ Spontaneous resolution of LGI bleeding occurs in more than 80-85% of cases, and the mortality rate is less than 3%.¹,⁵ Although LGI hemorrhage will stop spontaneously in many cases, acute massive LGI hemorrhage could cause hemodynamic instability and could even be fatal. Therefore, patients should be stabilized while diagnostic studies are performed. Search of origin of LGI hemorrhage can sometimes be difficult and frustrating, and diagnostic techniques, such as colonoscopy, radionuclide imaging, colon series, angiography can help identify the site of bleeding and manage it.⁶ Mesenteric angiography is valuable in diagnosing and managing acute massive LGI hemorrhage.¹,⁷,⁸ Angiography with or without embolization is helpful in treating LGI hemorrhage; however, it may cause some serious complications occasionally. We report three uncommon serious complications resulting in prolonged hospitalization or surgical intervention.

Report of Three Cases
This is a retrospective review of three patients with massive LGI bleeding who developed severe complications after angiography.

Patient 1 was a 71-year-old female who had a colonoscopy during physical examination three days ago and seven small polyps were removed by colonoscopic polypectomy. She was sent to our emergency room (ER) because of massive fresh bloody stool with mild abdominal distention. Her vital signs were stable and the abdomen was soft without peritoneal sign. Colonoscopy was arranged immediately but the visualization was poor due to massive blood mixed with stool. Therefore, emergent angiography was performed. Emergent angiography revealed abnormal engorgement of a blood vessel in the right side colon and angiodysplasia was first considered.(Fig. 1) No active bleeder was identified. No more bloody stool was noted following angiography but she started to have spiking fever up to 38-39 ° C and felt right lower quadrant pain off and on for
4 days. Her physical examination showed tenderness at the right lower quadrant area with muscle guarding. The bowel sounds were hypoactive and the abdomen was distended. The abdominal CT scan showed inflammation in the right iliac fossa due to colitis or appendicitis (Fig. 2). Laparotomy was performed under the impression of appendicitis or ischemic colitis. At exploratory laparotomy, ischemic change of cecum and ascending colon was found and the inflammatory appendix was coated with purulent peel. Partial colectomy with ileocolic anastomosis was done (Fig. 3). The post-operative course was smooth. Patient 2 was a 71-year-old male who suffered from sudden onset of massive bloody stool and was sent to our ER immediately. Physical examination at the ER showed a soft abdomen without tenderness. The vital signs were stable except for a drop in blood pressure to 80/60 mmHg. Emergent angiography was performed but no active bleeder was found. Blood transfusion and fluid resuscitation were given at the ER and he was admitted for close observation. Persistent bloody stool with clot passage was noted off and on in the following eight days. Gastroduodenoscopy was performed on the third day after admission and showed a 1.0 cm polyp and diverticulosis at the sigmoid colon without active bleeding. Ascending colon bleeding was suspected by Tc-99m RBC scan. Laparotomy was suggested because the LGI bleeding could not be controlled conservatively. The entire colon was filled with blood, and the mucosa was edematous with ischemic change (Fig. 4). Subtotal colectomy with ileo-rectal anastomosis was performed. The bleeding stopped and the patient was discharged without complications. Patient 3 was a 72-year-old male who suffered from massive bloody stool off and on for two days and also had mild abdominal pain, nausea and abdominal distension. At the ER, angiography revealed extravasation of contrast from the ascending colon, and angiodysplasia with bleeding was considered. Trans-arterial embolization (TAE) was not successful and the patient was admitted for close observation. The bleeding stopped after admission. However, the patient still had abdominal pain, distention and vomiting four hours after TAE. Pancreatic mass with fluid accumulation in the retroperitoneum was suspected by the abdominal CT scan (Fig. 5). The complete blood count, electrolytes, coagulation tests, serum amylase and lipase were within normal range. The patient denied jaundice history. Endoscopic retrograde cholangiopancreatography (ERCP) was arranged on the next day and it showed a duodenal ulcer and external compression with complete obstruction of the second portion of the duodenum. Nothing per os with nutrition and fluid supply were given. Poor appetite with abdominal distention, vomiting were still noted two weeks after admission. Delayed passage of contrast through the second portion of the duodenum was found in the upper gastrointestinal (UGI) series (Fig. 6). The abdominal echo revealed a hypoechoic mass about 7 cm in length at the anterior aspect of the abdominal aorta, most probably a retroperitoneal hematoma. Abdominal distention and vomiting subsided and his appetite improved in the third week of hospitalization. Follow-up UGI series and abdominal ultrasonography were normal. The patient was discharged without complications four weeks after admission.

**Discussion**

Hemorrhage from the colon in adults is commonly caused by diverticular disease, angiodysplasia, colonic neoplasms, ulcerative colitis, ischemia, or other less common lesions such as coagulopathy, radiation sequelae and drug toxicity.\(^1\)\(^-\)\(^4\) Approximately 10-15% of patients with haemotachezia have UGI bleeding identified by panendoscopy. Small bowel origin is rare and it accounts for 1-11% cases of LGI hemorrhage.\(^5\)\(^-\)\(^7\) The incidence of LGI hemorrhage was estimated to be in the range of 20-27 cases per 100,000 adults and it increased significantly with advancing age in the United States.\(^3\)\(^-\)\(^4\) The mean age of these patients ranged from 63 to 77 years.\(^2\)\(^-\)\(^4\) Since most hemorrhages stop spontaneously, the majority of patients can be managed conservatively.\(^10\) Unfortunately, 10-15% of LGI hemorrhage cases require therapeutic intervention.\(^5\) The principles of management are 1. hemodynamic stabilization, 2. identification of bleeding site and
confirmation of the diagnosis, and 3. specific therapeutic intervention. Many diagnostic methods are available for determining the source of LGI hemorrhage, the most common of which are colonoscopy, radionuclide (Tc-99m RBC) scan, computed tomography, and mesenteric angiography. The goal of these tests is to identify the site of hemorrhage in order to give the most appropriate treatment. Although a number of diagnostic examinations are available, localization of the bleeding site fail in 8 to 35% of patients.

Colonoscopy and therapeutic intervention have become the first line methods to manage LGI hemorrhage; however, the application of colonoscopy is limited because large amounts of blood mixed with stool may hinder the visualization of the bleeding point in cases of acute massive LGI bleeding. Therefore, the role of mesenteric angiography has become more important due to its advantages, including no requirement for bowel preparation, ability to localize the bleeding point, and attempt of therapeutic management. In general, angiography with embolization and colonoscopic treatment are complementary. Patients with severe active LGI hemorrhage should be treated with angiography and embolization, while patients with less severe, intermittent bleeding should undergo colonoscopy.

Extravasation of contrast into the bowel lumen can be detected with mesenteric angiography if there is a bleeding rate of at least 1 mL/min. The overall diagnostic yield of angiography ranges from 40% to 78%. Some adverse events associated with angiographic intervention may be related to systemic reaction or catheter-induced vascular trauma. Reported complications include contrast allergy, nephrotoxicity, hematoma, pseudoaneurysm, arteriovenous fistula, and distal emboli from a dislodged thrombus. Fortunately, the incidence of complications is low. The overall complication rate of angiographic procedures for LGI hemorrhage ranges from 2% to 4%. Severe complications occur in about 0.5% of cases and fatal disasters occur in 0.03-0.06%. Bandi et al reported the incidence of post-embolization colonic infarction to range from 10 to 20% in the 1980s. The complication rate was high and complications could be related to the weaker connective blood supply of the LGI tract predisposing the colon to a increased risk of post-embolic ischemia. The lack of collateral vessels, especially in the colon, increases the risk of ischemia. After 1992, the postembolic infarction rate dramatically decreased because of modern superselective microcoil embolotherapy. To date, several studies reported that over 90% of superselective microcoil embolizations could achieve hemostasis without major ischemic complications. Embolization at the level of the vasa recta or marginal vessels could minimize ischemic complications.

Post-angiographic retroperitoneal hematoma is rare but sometimes life-threatening. It may result in abdominal pain, intestinal obstruction, hypotension, and tachycardia. Profound vomiting with abdominal pain is the typical presentation. Abdominal CT scan should be performed if retroperitoneal hematoma is suspected. In addition, UGI series is usually characteristic and diagnostic. Altered hemostasis is the most likely cause of retroperitoneal hematoma. These patients should be observed closely and treated by fasting, nasogastric decompression and parenteral fluid therapy.

Conclusion
Superselective microcoil embolization is a safe and effective management modality for LGI hemorrhage, especially in patients with high surgical risk. Mesenteric angiography is frequently life-saving in patients with acute massive LGI hemorrhage, and it should be reserved for cases with massive bleeding that precludes colonoscopy, with recurrent or persistent bleeding, or in which a bleeding site could not be identified. Although complications are rare, meticulous technique is still necessary to avoid complications.

References
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