CASE REPORT

Embolization for gastrointestinal bleeding in patients with pancreatitis: Report of two cases and literature review

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ABSTRACT

Gastrointestinal (GI) bleeding is rare but potentially fatal complication of pancreatitis. Early diagnosis and timely radiologic intervention are crucial for survival as when untreated the mortality of these patients is high. We present two patients, one with chronic pancreatitis and one with acute pancreatitis, both complicated with severe upper GI tract bleeding. Patients were successfully treated with transcatheter embolization after initial endoscopic hemostasis failed. The advances in endovascular devices and embolization materials and increased number of experienced interventional radiologists have increased the importance of angiographic embolization procedures as a safe minimally invasive therapeutic method of achieving successful hemostasis associated with the low incidence of complications. Due to its advantages over surgery, it should be considered treatment of choice in patients with upper GI bleeding refractory to endoscopy.

Keywords: Embolization; gastrointestinal bleeding; pancreatitis.

INTRODUCTION

The overall incidence of arterial complications in patients with both acute and chronic pancreatitis is 4–10%.[1] Gastrointestinal (GI) bleeding is rare but potentially fatal complication of pancreatitis. It may occur in 2.5% of chronic and up to 14.5% of acute pancreatitis patients with gastritis, peptic ulcer, and esophageal varices being the most frequent causes.[2,3] However, major GI hemorrhage from the peripancreatic visceral artery pseudoaneurysm (VAP) is a rare phenomenon and a life-threatening complication of chronic pancreatitis. Early diagnosis and timely radiological intervention are crucial for survival as when untreated the mortality of these patients reaches 90%.[1,4] We present two patients, one with chronic pancreatitis and one with acute pancreatitis, both complicated with severe upper GI tract bleeding and successfully treated with transcatheter embolization. Written informed consents were obtained from both patients. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CASE REPORT

Case 1– A 45-year-old male with a history of alcohol consumption longer than 10 years presented to our department with massive hematemesis and melena preceded by the recurrent episodes of severe epigastric pain radiating to the back for the past 2 months. On admission, he was pale, blood pressure was 100/70 mmHg, heart rate was 118/min, hemoglobin level was 8.1 g/dL, serum lipase level was 438 U/L, and C-reactive protein (CRP) level was 114 mg/dL. After immediate resuscitation, he underwent upper GI endoscopy which revealed bleeding vessel surrounded with adherent clot in the posterior duodenal bulb. Endoscopic hemostasis by injection

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of 20 mL diluted epinephrine (1:10000) was performed. 8 h after initial hemostasis, massive recurrent hematemesis occurred and endoscopy was repeated with the injection of 30 mL epinephrine. Initial postprocedural course was satisfactory. 1 day after the second endoscopic treatment, there were no signs of GI bleeding and laboratory test results were improving, except for the serum CRP and lipase levels which were further elevated (193 mg/dL and 490 U/L, respectively). Upper abdominal pain was still present. Abdominal ultrasound showed diffusely hyperechogenic fibrotic pancreas with peripancreatic tissue edema and small amount of ascites indicating chronic pancreatitis and a slightly pulsating cyst-like tumefaction with thick stratified wall and inner dense fluid closely adherent to the pancreatic head and neck upper margin, 5 cm × 6 cm in diameter. Visceral artery (pseudo) aneurysm was suspected. The next morning patient experienced abundant melena accompanied with hypotension, tachycardia, and hemoglobin level downfall. An emergency diagnostic selective celiac trunk angiography using right transfemoral approach was done and identified contrast extravasation from the large mid gastroduodenal artery pseudoaneurysm. Subsequently, superselective cannulation of the gastroduodenal artery and coil embolization of the pseudoaneurysm were successfully performed (Fig. 1).

The procedure was uneventful and followed by complete patient recovery. A contrast-enhanced abdominal computed tomography was carried out on day 6 after the intervention and revealed no active bleeding and the presence of residual hematoma surrounding pancreas body and neck (Fig. 2).

He was discharged without any signs of bleeding and with stable hemoglobin levels and referred to a gastroenterologist for further treatment. During the 9-month follow-up period, he remained asymptomatic.

Case 2– A 34-year-old male was referred to our department for repeated hematemesis and melena after unsuccessful endoscopic hemostasis of two adjacent bulbar and postbulbar bleeding lesions during previous 37 days hospitalization in a regional hospital for severe acute pancreatitis. Blood pressure was 90/70 mmHg, heart rate was 110/min, hemoglobin level was 7.9 g/dL, serum lipase level was 204 U/L, and CRP level was 74 mg/dL. Abdominal computed tomography performed

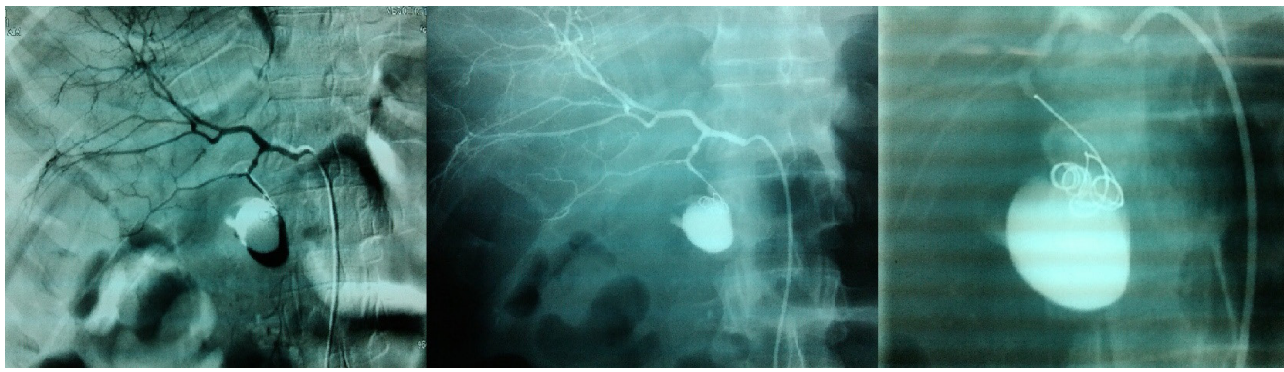

Figure 1. Angiography scans showing superselective cannulation and coil embolization of the large mid gastroduodenal artery pseudoaneurysm.

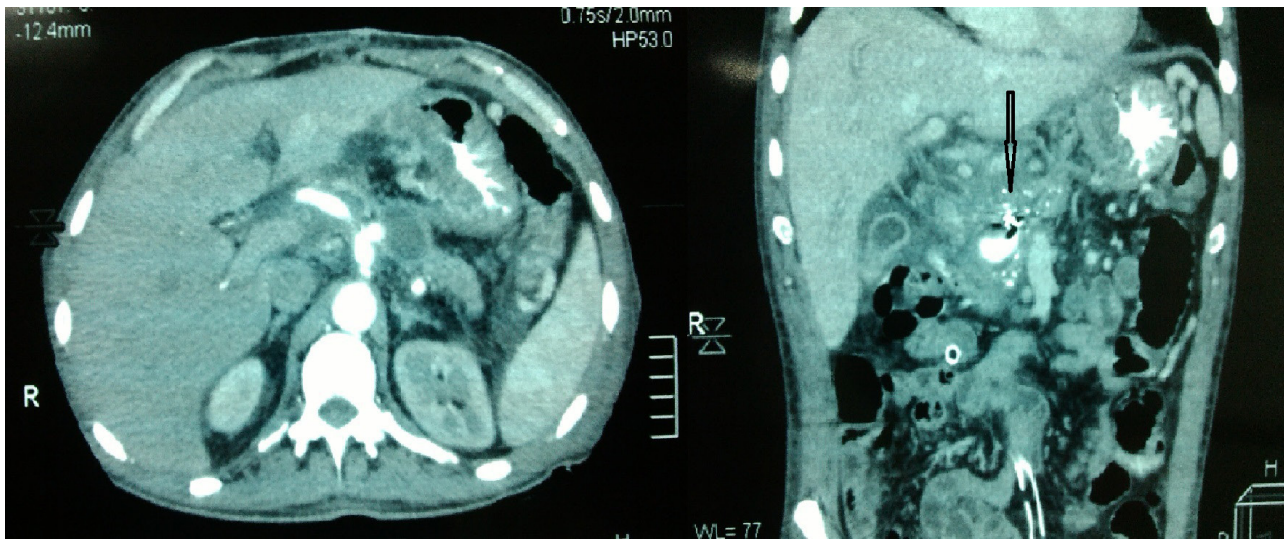

Figure 2. Computed tomography scans after the embolization depicting no active bleeding, the presence of residual hematoma surrounding pancreas body and neck and coils (arrow).

in a regional hospital 6 days before admission and 3 days before initial upper GI hemorrhage depicted multiple large acute peripancreatic fluid collections in the lesser sac and one extending to pelvis (Fig. 3).

Resuscitation followed and the patient was hemodynamically stable next 10 h when massive hematemesis and melena with hypotension ocurred. Selective celiac trunk digital subtraction angiography using right transfemoral approach revealed irregular contour of superior pancreaticoduodenal artery proximal segment with minimal contrast extravasation. After its superselective cannulation "blind" hydrogel-coated coil embolization was done and full occlusion of proximal superior pancreaticoduodenal artery was achieved (Fig. 4).

Immediate post-procedural period was uneventful and after recovery and restoration of hemodynamic stability intraabdominal fluid collections were managed with ultrasound image-guided percutaneous drainage 48 h after the embolization. Bleeding has not recurred, surgery was not required, and the patient was discharged when pancreatitis has resolved. 4 months after the treatment, he remained asymptomatic.

DISCUSSION

Pseudoaneurysms of visceral arteries secondary to pancreatitis are uncommon with the reported incidence of 5%, and splenic, gastroduodenal, hepatic, and pancreaticoduodenal being the most frequently affected arteries.[1] The patho-

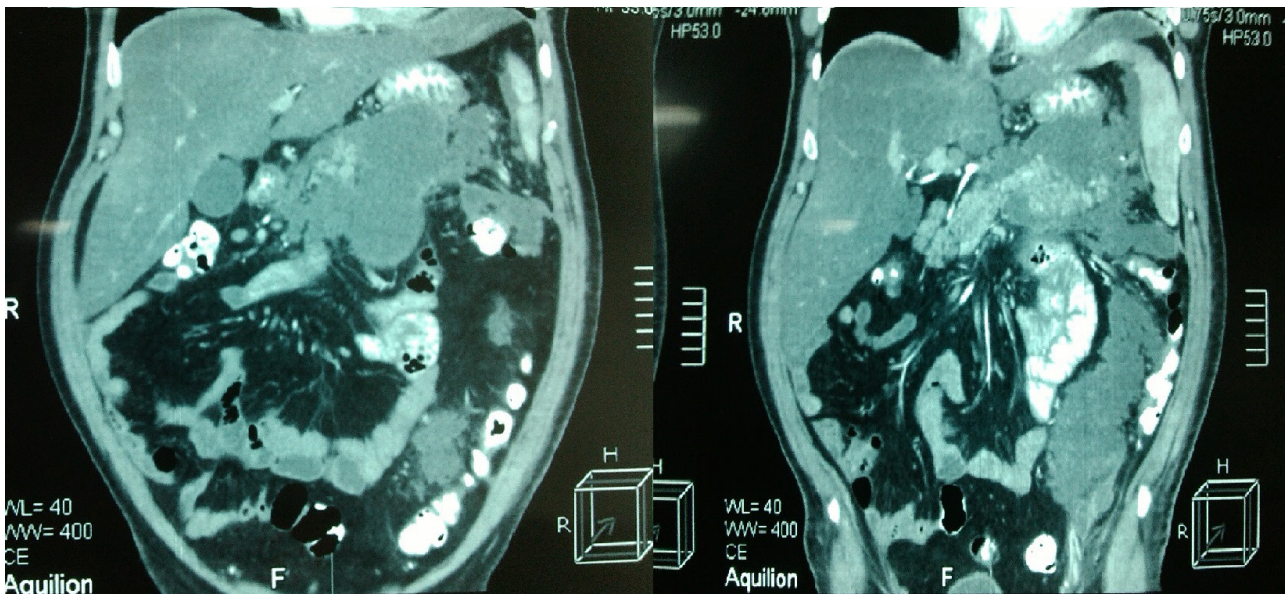

Figure 3. Computed tomography scans showing acute pancreatitis with multiple large acute peripancreatic fluid collections in the lesser sac and one extending to the pelvis.

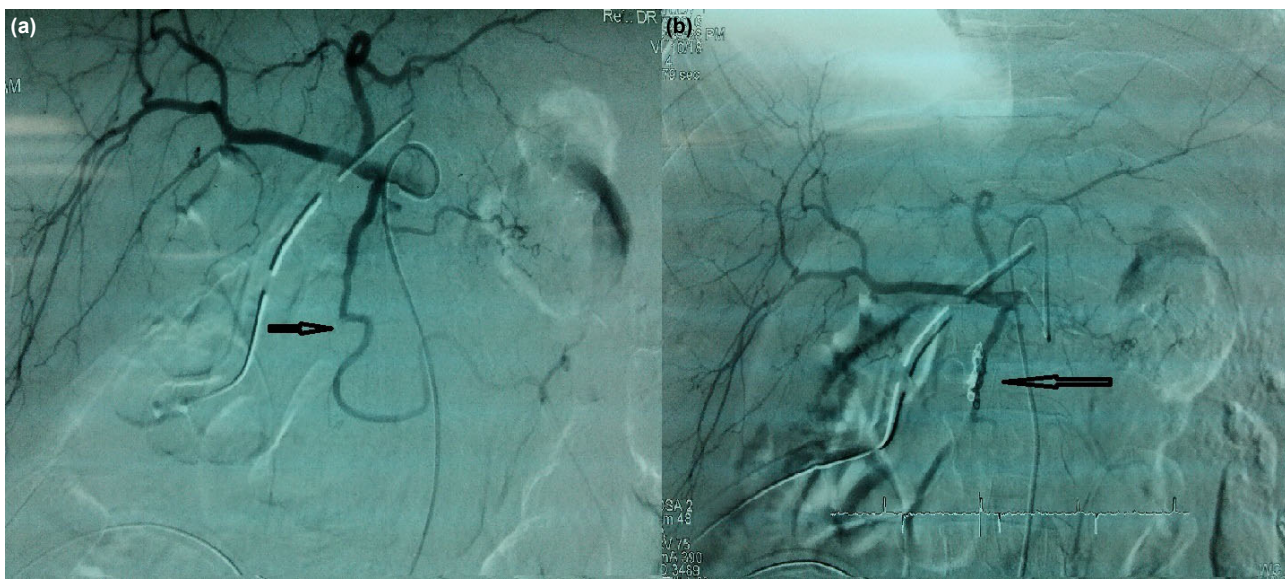

Figure 4. Selective celiac trunk digital subtraction angiography revealing **(a)** irregular contour of superior pancreaticoduodenal artery proximal segment with minimal contrast extravasation (arrow), **(b)** its superselective cannulation and blind "hydrogel-coated coil embolization (arrow).

genesis of these lesions is still controversial. They are most frequently associated with the presence of pancreatic fluid collection, abscess or pseudocyst, and proposed mechanisms of their formation include enzymatic autodigestion of a peripancreatic visceral artery exposed to proteolytic pancreatic enzymes in the setting of severe inflammation, and artery wall erosion by pancreatic pseudocyst leading to pseudoaneurysm formation.[5,6] The usual presentation of VAP is vague increasing abdominal pain different from the pancreatitis related pain.[6] Although rare, acute bleeding from these lesions is the most fatal complication of chronic pancreatitis with high mortality rate at 12–50% or even up to 90–100% of untreated patients.[6,7] The hemorrhage may occur into the peritoneum, pancreatic duct, or adjacent organ. The incidence of VAP ruptures (31% of splenic, 24% of gastroduodenal, and 21% of pancreaticoduodenal artery) is reportedly decreasing.[8]

Transabdominal ultrasound as a first line of imaging may provide initial data, but high-quality visualization requires computed tomography with arterial phase (1 mm slices) in axial and coronal plane or angiography for most accurate detection of VAP bleeding.[9] Timely and precise imaging diagnosis facilitates decision-making process. Surgical repair may include bleeding vessel ligation or pancreas resection procedures depending on the artery involved.[10] However, it should be reserved for hemodynamically unstable patients when interventional radiology is unsuccessful or unavailable as it is burdened with high recurrent bleeding and mortality rates (15–43%).[11] Arterial ligation failure occurs as a result of a surrounding tissue infection and enzymatic digestion. Other treatment options include stent placement and percutaneous ultrasound-guided thrombin injection.

Endovascular coil embolization has become the most favorable method of VAP treatment due to its high success rate and less invasiveness in comparison to surgery. When technically feasible and safe transcatheter occlusion is a method of choice for achieving hemostasis in 74% to up to 100% of patients[8,12] with reported mortality of 0–14% and morbidity of 14–25%.[13,14] Initial selective angiographic evaluation of both celiac and superior mesenteric artery before embolization is necessary. Various occluding materials and their combinations may be employed depending on the visceral bleeder type and location.[9] Although feared as a dual edge sword in patients with coagulopathy and active GI hemorrhage anticoagulant must be administered during the embolization procedure to avoid the thrombus formation at catheter tip through contact activation pathway.[7] Complete embolization of the VAP itself and also proximally and distally (front and backdoor concept of upstream and downstream artery occlusion) is mandatory. It has been advocated that VAP embolization should be followed by definitive surgical treatment.[15] Nevertheless, angioembolization may be repeated in patients with recurrent bleeding and also performed after the attempt of surgical repair[10] suggesting, along with demonstrated low recurrence rate, that successful embolization does not requires additional treatment.[1]

GI hemorrhage is considered late manifestation of acute pancreatitis. Phillip et al.[16] reported 42 days median duration from the onset of pain to erosions of peripancreatic visceral arteries occurrence in patients with acute pancreatitis, while up to 60 months from initial diagnosis to intraabdominal bleeding due to vessel erosion in patients with chronic pancreatitis. Although not representing organ failure, it is known to modestly increase the length of hospital stay and mortality rate.[17,18] The etiology may be diverse and multifactorial including peptic ulcer disease due to stress, pain relief medication or portal and splenicvenous thrombosis and subsequent varices, erosions of peripancreatic arteries by the inflammatory process and fluid collections, VAP and fistulization into the GI tract.[18] Hence, the severity of inflammation may be a risk factor, and GI bleeding might be more common in patients with complications of acute pancreatitis such as necrosis, especially infected, peripancreatic collections, sepsis, and organ failure.[19] Furthermore, both surgical and radiological percutaneous interventions for pancreatitis complications may be important risk factors for GI bleeding,[3] and it is therefore suggested that they should be performed meticulously and that the drainage catheters should be soft and placed away from major vessels to avoid bleeding.[20] Endoscopy should be initiated as primary diagnostic and treatment modality in such patients. If medical and endoscopic therapies fail further treatment options include surgery and interventional embolotherapy. Massive GI hemorrhage (transfusion of at least 4 units of blood/24 h), hemodynamic instability (systolic blood pressure <100 mmHg and heart rate >100/min), endoscopy-refractory, and recurrent bleeding after surgery are considered indications for embolization with no absolute contraindications as it should be performed as life-saving procedure.[21] Although "blind" embolization is still controversial, embolotherapy solely on the basis of endoscopic findings when no extravasation is seen angiographically seems reasonable and is advocated by many authors.[22,23]

Conclusions

Upper GI bleeding in patients with pancreatitis remains a challenge that requires multidisciplinary treatment approach. The advances in endovascular devices and embolization materials and increased number of experienced interventional radiologists have increased the importance of angiographic embolization as a safe minimally invasive therapeutic method of achieving successful hemostasis associated with the low incidence of complications. Due to its advantages over surgery, it should be considered treatment of choice in patients with upper GI bleeding refractory to endoscopy.

Informed Consent: Written informed consent was obtained from the patients for the publication of the case report and the accompanying images.

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M.D.R., A.T., D.R.; Literature search: G.S.; Writing: M.D.R., A.T., G.S.; Critical revision: M.D.R., A.T., D.R.

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REFERENCES

1. Bergert H, Hinterseher I, Kersting S, Leonhardt J, Bloomenthal A, Saeger HD. Management and outcome of hemorrhage due to arterial pseudoaneurysms in pancreatitis. Surgery 2005;137:323–8. [CrossRef]
2. Pillay WR, Lalloo S, Thomson SR, Conrads MA. Embolisation of metachronous pseudoaneurysms complicating chronic pancreatitis. HPB 2003;5(4):251–3. [CrossRef]
3. Rana SS, Sharma V, Bhasin DK, Sharma R, Gupta R, Chhabra P, et al. Gastrointestinal bleeding in acute pancreatitis: Etiology, clinical features, risk factors and outcome. Trop Gastroenterol 2015;36(1):31–5. [CrossRef]
4. Beattie GC, Hardman JG, Redhead D, Siriwardena AK. Evidence for a central role for selective mesenteric angiography in the management of the major vascular complications of pancreatitis. Am J Surg 2003;185:96–102.
5. Germanos S, Soonawalla Z, Stratopoulos C, Friend PJ. Pseudoaneurysm of the gastroduodenal artery in chronic pancreatitis. J Am Coll Surg 2009;208(2):316. [CrossRef]
6. Zyromski NJ, Vieira C, Stecker M, Nakeeb A, Pitt HA, Lillemoe KD, et al. Improved outcomes in postoperative and pancreatitis-related visceral pseudoaneurysms. J Gastrointest Surg 2007;11(1):50–5. [CrossRef]
7. Jain G, Kathuria S, Nigam A, Trehan VK. Transcatheter embolization of a giant pancreatic pseudoaneurysm: A tale of two bleeds and one thrombus? Indian Heart J 2013;65(1):91–4. [CrossRef]
8. Balachandra S, Siriwardena AK. Systematic appraisal of the management of the major vascular complications of pancreatitis. Am J Surg 2005;190(3):489–95. [CrossRef]
9. Klauß M, Heye T, Stampfl U, Grenacher L, Radeleff B. Successful arterial embolization of a giant pseudoaneurysm of the gastroduodenal artery secondary to chronic pancreatitis with literature review. J Radiol Case Rep 2012;6(2):9–16. [CrossRef]
10. Udd M, Leppäniemi AK, Bidel S, Keto P, Roth WD, Haapiainen RK. Treatment of bleeding pseudoaneurysms in patients with chronic pancreatitis. World J Surg 2007;31(3):504–10. [CrossRef]
11. Stabile BE, Wilson SE, Debas HT. Reduced mortality from bleeding pseudocysts and pseudoaneurysms caused by pancreatitis. Arch Surg 1983;118(1):45–51. [CrossRef]
12. Radeleff B, Noeldge G, Heye T, Schlieter M, Friess H, Richter GM, et al. Pseudoaneurysms of the common hepatic artery following pancreaticoduodenectomy: Successful emergency embolization. Cardiovasc Intervent Radiol 2007;30(1):129–32. [CrossRef]
13. de Perrot M, Berney T, Bühler L, Delgadillo X, Mentha G, Morel P. Management of bleeding pseudoaneurysms in patients with pancreatitis. Br J Surg 1999;86(1):29–32. [CrossRef]
14. Carr JA, Cho JS, Shepard AD, Nypaver TJ, Reddy DJ. Visceral pseudoaneurysms due to pancreatic pseudocysts: Rare but lethal complications of pancreatitis. J Vasc Surg 2000;32(4):722–30. [CrossRef]
15. Boudghène F, L'Herminé C, Bigot JM. Arterial complications of pancreatitis: Diagnostic and therapeutic aspects in 104 cases. J Vasc Interv Radiol 1993;4(4):551–8. [CrossRef]
16. Phillip V, Rasch S, Gaa J, Schmid RM, Algül H. Spontaneous bleeding in pancreatitis treated by transcatheter arterial coil embolization: A retrospective study. PLoS One 2003;8(8):e72903. [CrossRef]
17. Banks PA, Bollen TL, Dervenis C, Gooszen HG, Johnson CD, Sarr MG, et al. Classification of acute pancreatitis-2012: Revision of the Atlanta classification and definitions by international consensus. Gut 2013;62:102–11. [CrossRef]
18. Shen HN, Lu CL, Li CY. The effect of gastrointestinal bleeding on outcomes of patients with acute pancreatitis: A national population-based study. Pancreatology 2012;12(4):331–6. [CrossRef]
19. Sharma PK, Madan K, Garg PK. Hemorrhage in acute pancreatitis: Should gastrointestinal bleeding be considered an organ failure? Pancreas 2008;36:141–5. [CrossRef]
20. Flati G, Andrén-Sandberg A, La Pinta M, Porowska B, Carboni M. Potentially fatal bleeding in acute pancreatitis: Pathophysiology, prevention, and treatment. Pancreas 2003;26(1):8–14. [CrossRef]
21. Shin JH. Recent update of embolization of upper gastrointestinal tract bleeding. Korean J Radiol 2012;13(1):S31–9. [CrossRef]
22. Loffroy R, Guiu B, D'Athis P, Mezzetta L, Gagnaire A, Jouve JL, et al. Arterial embolotherapy for endoscopically unmanageable acute gastroduodenal hemorrhage: predictors of early rebleeding. Clin Gastroenterol Hepatol 2009;7:515–23. [CrossRef]
23. Padia SA, Geisinger MA, Newman JS, Pierce G, Obuchowski NA, Sands MJ. Effectiveness of coil embolization in angiographically detectable versus non-detectable sources of upper gastrointestinal hemorrhage. J Vasc Interv Radiol 2009;20:461–6. [CrossRef]

OLGU SUNUMU - *ÖZET*

Pankreatitli hastalarda gastrointestinal kanama için embolizasyon: İki olgu raporu ve literatür taraması

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Gastrointestinal kanama, pankreatitin nadir fakat potansiyel olarak ölümcül bir komplikasyonudur. Erken tanı ve zamanında radyolojik müdahale, tedavi edilmediğinde bu hastaların mortalitesi yüksek olduğundan sağkalım için çok önemlidir. Her ikisi de şiddetli üst gastrointestinal sistem kanaması ile komplike olan biri kronik pankreatitli, diğeri akut pankreatitli iki hastayı sunuyoruz. İlk endoskopik hemostaz başarısız olduktan sonra hastalar transkateter embolizasyon ile başarılı bir şekilde tedavi edildi. Endovasküler cihazlardaki ve embolizasyon malzemelerindeki gelişmeler ve deneyimli girişimsel radyologların sayısındaki artış, düşük komplikasyon insidansı ile ilişkili başarılı hemostaz elde etmek için güvenli bir minimal invaziv terapötik yöntem olarak anjiyografik embolizasyon prosedürlerinin önemini artırmıştır. Cerrahiye göre avantajları nedeniyle endoskopiye dirençli üst gastrointestinal kanaması olan hastalarda tedavi seçeneği olarak düşünülmelidir.

Anahtar sözcükler: Embolizasyon; gastrointestinal kanama; pankreatit.

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