

A Case Report of Successful Endovascular Treatment of «Sentinel Bleeding» in Patient with Adverse Anatomy

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ABSTRACT

Introduction: Surgical treatment of pancreatic cancer (pancreaticoduodenectomy - PDE), has a high risk of postoperative complications (up to 30-70%) due to its difficulty, one of such undesirable outcomes is bleeding (up to 10% of all post PDE complication. Since 1991, a non-fatal gastrointestinal bleeding (GIB) or bleeding through drainage that follows PDE, is called - "sentinel bleeding"; and it is a predictor of further massive fatal bleeding.

Material and methods: We present data of 64 yo male after gastropancreaticoduodenectomy (GPDE).

Diagnosis: Moderate differentiated (MD) ductal adenocarcinoma of pancreatic head. Massive GIB with source of bleeding as pseudoaneurysm of right hepatic artery occurred on 21st day after GPDE. It was impossible to implant stent-graft and we failed to primary embolize with "front-to-back-door" technique: against the background of further and recurrent bleedings, patient underwent coiling of pseudoaneurysm and subsequent coil implantation into right hepatic artery and common hepatic artery. Due to new recurrence of GIB – patient underwent successful "front-to-back-door" embolization with combination of coils and Onyx.

Results: After «front-to-back-door» embolization patient was discharged in satisfactory condition without recurrence of bleeding. Follow-up period is 18 months: no recurrence of bleeding.

Conclusions: Bleeding after PDE should be considered as «sentinel bleeding» and embolization should be used. Surgical hospital, carrying on resections of pancreas as a routine, should have a CathLab unit, equipped with wide specter of angiographic instruments and 24/7 surgical team with experience of hemostatic interventions.

Keywords: pancreatic cancer, pancreaticoduodenectomy, «sentinel bleeding», stent-graft, endovascular hemostasis, «front-to-back-door» embolization

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INTRODUCTION

Pancreatic cancer (PCa) is a oncological disease, often proceeding with nonspecific and unexpressed clinical manifestations, which lead to late detection and a low level of radical surgical interventions (10-25%) (Rogal et al. 2016; Kapranov et al. 2019; Kabanov et al. 2018; Treckmann et al. 2008).

Morbidity in Russian Federation increased more than 15% more, for last 5 years (Kaprina et al. 2015; Kaprina et al. 2018). Pancreaticoduodenectomy (PDE) is one of the most difficult operation in abdominal surgery with 5% of mortality and high risk of postoperative complications (30-70%) (Treckmann et al. 2008; Barannikov & Sahno 2018). Bleeding after PDE occurs in 5-10% of all complications and leads to 30-58, 5% mortality (Rogal et al. 2016; Kabanov et al. 2018; Treckmann et al. 2008).

“Sentinel bleeding” – term that means non-fatal bleeding through drainage or gastrointestinal bleeding (GIB) that follows PDE, and is a predictor of further massive fatal bleeding (Brodsky & Turnbull 1991).

MATERIAL AND METHODS

We present a case report of male, 64 years old, with preliminary diagnosis «tumor of pancreatic head», who was

admitted to surgical department of Belgorod Regional Clinical Hospital named after St. Iosaf. Patient for 2 months suffered from weight-loss, periodic pain in epigastric region and right hypochondrium, decreased appetite. 2 months earlier patient underwent endobiliary stenting due to constriction of common bile duct (medium jaundice).

Patient was examined.

Abdominal ultrasonic examination: hipodensive tumor of pancreatic head up to 3 cm in diameter, tumor is closely localized with duodenum (susp. on involving duodenum into cancer conglomerate).

Multislice computed tomography (MSCT): hipodensive tumor, sized 24x20x37mm; in close connection with duodenum, infiltrating parapancreatic fat, involves gastroduodenal artery. Pancreatic duct is expanded up to 7mm.

Blood samples: CA-19-9 – 502, 9 U/ml (normal range 0-37 U/ml).

Clinical diagnosis: pancreatic cancer T2NxMx, condition after endoscopic stenting of common bile duct.

Patient underwent gastropancreaticoduodenectomy (GPDE), after which he was discharged on 12th day in satisfactory condition. Histological examination: moderate

differentiated (MD) ductal adenocarcinoma of pancreatic head; absence of metastases in regional lymphatic nodes.

RESULTS

On 25th day after GPDE, gastrointestinal bleeding occurred: hypotension 70/40 mm hg., melena, haematemesis – patient underwent: blood tests (Hb 84 g/l, RBC 3,0*10⁶/ml); esophagogastroscoy (blood fills stomach and jejunum); MSCT with contrast enhancement (pseudoaneurysm of right hepatic artery) and intensive care: hemostatic therapy, transfusion of quarantine fresh-frozen plasma (QFFP) and blood components – after stabilization of condition, patient was transported to CathLab. Angiography of celiac trunk was made pseudoaneurysm (PsA) 5x5mm and adverse anatomy (angulation of proximal part of celiac trunk, localization of PsA “on the top” of angulation of right hepatic artery (angle almost 50°) – all that made position of guiding catheter unstable (fig. 1).



Figure 1: Angiography of celiac trunk pseudoaneurysm of right hepatic artery, 5x5mm (arrow).

Attempt to insert a stent-graft – failed due to anatomy, all attempts to set stent-graft into correct position moved guide-catheter, guide-wire and stent into aorta. Attempt to make “front-to-back-door” embolization – failed due to high-speed blood flow (migration of implanted coil to distal part of right hepatic artery (RHA) after implantation and further stabilization of hemodynamic parameters). In that situation – coiling of PsA was made (fig. 2), with satisfactory angiographic picture: absence of extravasation of contrast agent, pseudoaneurysmal sac was not visualized.

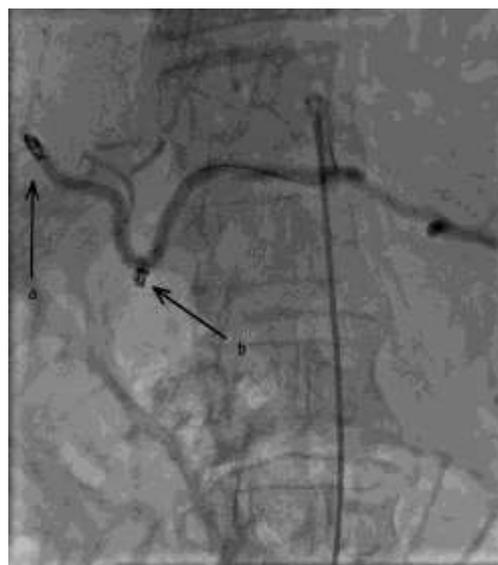


Figure 2: Angiography result of primary embolization migration of first coil to distal branches of RHA (arrow “a”), coiled pseudoaneurysm (arrow “b”).

On 5th day after embolization – recurrence of GIB, and second angiography (due to unstable hemodynamics, patient was transported directly to CathLab): expansion of PsA (fig. 3).



Figure 3: Angiography expansion of pseudoaneurysm (arrows).

Additional embolization was made, during which, according to place of coil implantation, it was supposed that right hepatic artery has fistula with jejunum – that led to implantation of coils into proximal part of right hepatic artery and distal part of common hepatic artery (fig. 4).



Figure 4: Angiography result of second embolization coils were implanted to right and common hepatic arteries, some loops of coil are located outside the vessel (arrows).

On 4th day after second hemostatic embolization – recurrence of bleeding, direct transfer of patient to CathLab, angio revealed bleeding source (fig. 5): reversed blood flow through anastomosis between left and right hepatic arteries; absence (migration) of one of coils was also noticed and contrast leakage into jejunum (arterio-digestive fistula). With technical difficulties (due to adverse anatomy), using microcatheter technic, embolization of distal part of right hepatic artery with coils and Onyx and additional embolization of proximal part of right hepatic artery with Onyx was made.



Figure 5: Angiography reversed blood flow - anastomosis between left and right hepatic arteries as a source of bleeding with retrograde blood supply (arrows). Absence of one, previously implanted coil.

Control angiography: no extravasation, reversed blood supply of distal branches of right hepatic artery through anastomosis from left hepatic artery (fig. 6). Usage of “front-to-back-door” embolization became possible due to redistribution of blood flow after second embolization.



Figure 6: Angiography results of “front-to-back-door” embolization. Distal and proximal embolization with coils and Onyx (arrows).

MSCT with contrast enhancement at discharge: MSCT-A revealed architectonics of arterial system of liver, jejunum was closely located to liver and angulation of right hepatic artery which confirmed the suspicion on the presence of arterio-digestive fistula (fig. 7).

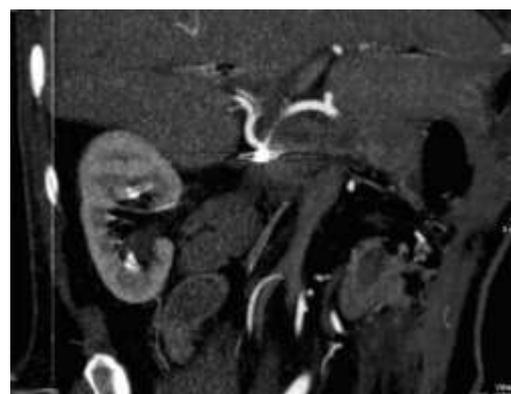


Figure 7: MSCT RHA, embolized PsA, jejunum with closely location to liver and angulation of right hepatic artery.

DISCUSSION

Patient was discharged without recurrence of bleeding in satisfactory condition under supervision of surgeon and oncologist.

At the moment of march 2020, follow-up is 18 months, patient underwent chemotherapy, there was no recurrence of bleeding, and no progression of cancer, or no other effects after GPDE.

Main reason of formation of PsA with different location and “sentinel bleeding” is leakage of pancreatic juice (Kabanov et al. 2018; Lai et al. 2009). According to data of ISGPS (International Study Group of Pancreatic Surgery) (Wente et al. 2007), in case of light or medium bleeding, MSCT is a first step in diagnostics of bleeding source, but in case of severe bleeding and massive blood loss – direct angiography with possibility of transfer to embolization should be made immediately. According to analysis of this case report, it can

be supposed that absence of information about presence of arterio-digestive fistula at the time of first bleeding is a result of patient status (strong hypotension). According to Marie Cerna (2015), side lesions of major (trunk) artery/branch - should be treated by implantation of stent-graft (fig. 8),

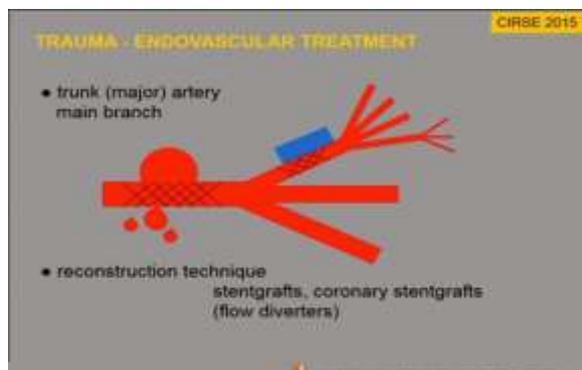


Figure 8. Endovascular treatment of trunk (major) artery main branch trauma, Maria Cerna, Cirse 2015.

But in some cases (mostly in non-terminal, smaller branches) – embolization “behind” and “before” lesion (“front-to-back-door” embolization) – can be used ¹¹ (fig. 9).

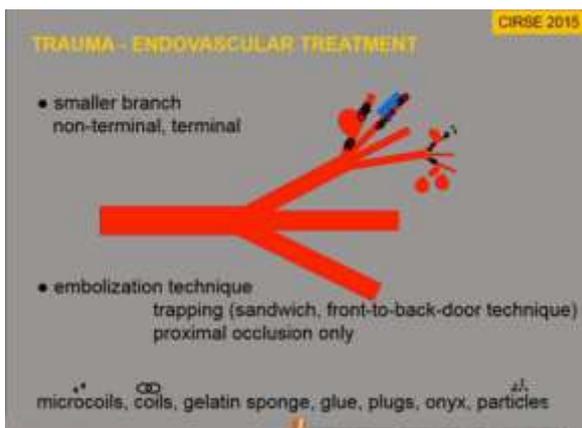


Figure 9: Endovascular treatment of non-terminal smaller artery branch trauma, Maria Cerna, Cirse 2015.

In patients with “sentinel bleeding”, more effective can be not only “front-to-back-door” embolization with combination of coils and liquid embolic agent, but also use of puncture drainage of pancreatic juice collection and further closure of arterio-digestive fistula with percutaneous nBCA infusion (Tarkhanov et al. 2019; Sarafraz et al. 2018; Ece & Tünay 2018).

It should be noticed, that Onyx should be used by skilled endovascular surgeon, because Dimethyl sulfoxide (DMSO) in case of incorrect use can enlarge defect of vessel and increase risk of recurrent bleeding.

CONCLUSION

Each bleeding after PDE should be considered as “sentinel bleeding”, a predictor of life-threatening massive bleeding. Patient with suspicion on “sentinel bleeding” should be examined with MSCT-A, but in case of instability

condition – direct angiography. Endovascular hemostasis can be used as a method of choice in case of arrosive bleeding after PDE. Good equipment of CathLab, correct diagnostic algorithm and treatment tactics, regular training of surgeon – are basic predictors of successful endovascular hemostasis, even in case of adverse anatomy.

CONFLICT OF INTEREST

None

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