Our Experience with the Treatment of Visceral Pseudoaneurysm due to Pancreatic Pseudocyst: A Case Report

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Abstract

Introduction: The development of a false aneurysm—pseudoaneurysm “as a consequence” of pancreatic pseudocyst erosion is often the fatal cause of intra-abdominal bleeding. Autodigestion causes leakage of pancreatic proteolytic enzymes which weakens the wall of adjacent visceral arteries. Most often it affects arteria lienalis in 30% to 50% and gastroduodenal artery in 10% to 15% of cases [1].

Pseudoaneurysms of gastroduodenal artery: (PAGD) are rare and mostly associated with pancreatitis. It is very important to think of the possibility of developing of this complication already during the treatment of a pancreatic pseudocyst, to recognize them in time and immediately cure them in order to avoid possible life-threatening conditions [2]. This work is based on the example of our successfully treated patient points to important moments in the formation and subsequent treatment of a pseudoaneurysm associated with a Pancreatic Pseudocyst (PPAP).

Methods: Bleeding from a pseudoaneurysm associated with a pancreatic pseudocyst is a very rare and specific complication, therefore making of prospective or retrospective studies is of no benefit regarding the size of the obtained file. Benefits can be seen in evaluating the treatment of this complication and in pointing out the wrong steps which should be avoided in the future. In this specific example we demonstrate the pre-surgery condition, surgical treatment and post-surgery condition of our successfully treated patient.

Case presentation: A 35-years-old patient was admitted to the Gastroenterology Clinic due to acute pancreatitis Balthazar E with forming pseudocysts. He was hospitalized for 14 days. The patient was released into outpatient care without any consultation with a surgeon or intervention radiologist. Subsequently he was transported by an ambulance in a hemorrhagic shock with the urgent need for surgery. The cause was arterial bleeding into the pancreatic pseudocyst from the basin of a. lienalis. A pseudoaneurysm of a. gastroduodenal is the secondary finding. Due to the urgency of the situation, the extreme size and the location of the pseudoaneurysm in acute inflammation altered area, we have decided for rapid surgery in order to stabilize the patient’s condition. Bleeding was stopped by the cross stitches in the pseudocyst wall (we came to the conclusion that the risk of dissecting and suspending of the pseudoaneurysm exceeds the benefit in the acute stage). An important step (as confirmed later) was the bursectomy sewing at the end of surgery to control possible recurring bleeding into the pancreas pseudocyst. After the consultation with the intervention radiologist the occlusion of the pseudoaneurysm was scheduled 48 h after the stabilization of the patient’s condition. On the day of the planned interventional radiological treatment the patient bled again into the pseudocyst which was detected early by leakage of hemorrhagic contents through the bursectomy.

A second urgent surgery was needed with bleeding stops through the wall of the pseudocyst with cross stitches and packing.

Subsequently interventional radiological treatment was performed within 48 h with the occlusion of the pseudoaneurysm. The patient was monitored by the surgeon and after 5-years the hernioplasty was performed. The patient was completely without difficulties. He weighs 10 kg more. The control CT angiography after 5-years since the surgery showed no signs of pseudocysts in the area of pancreas. The pseudoaneurysm is closed and regraded.

Conclusion: Arterial pseudoaneurysms in pancreatitis are accompanied by non-specific symptoms. We should think of GDA pseudoaneurysm in each patient with bleeding into the pancreas.
pseudocyst [3]. There are two basic factors which increase lethality of these patients—necrotizing pancreatitis and the need for urgent surgery. The limiting factor is also the lack of experience of one workplace regarding the treatment of these patients. The significance of this study is based on a thorough documentation of a particular patient and on the recommendation for the treatment of such patient.

Keywords: Pancreatic pseudocyst; Gastroduodenal artery pseudoaneurysm; Bursectomy

Abbreviations

TVA: True Visceral Aneurysm; VAP: Visceral Pseudoaneurysm; PAE: Percutaneous Angiographic Embolization; PPAP: Pancreatic Pseudocyst-Associated Pseudoaneurysm; PAGD: Gastroduodenal Artery Pseudoaneurysm

Introduction

The incidence of bleeding into pancreas pseudocysts is still high despite advances in diagnostics. It ranges from 6% to 17% [4]. Currently the preferred treatment modality is the endovascular method consisting in the percutaneous angiographic embolization (PAE) [5]. With the development of new screening methods and increase in their availability the frequency of diagnostic aeurysmal visceral artery degeneration increases. Nevertheless, both types of aneurysms are real (TVA) and pseudoaneurysm (VAP) are rare in visceral arteries. The incidence range is 0.01% to 2% [6]. In 80% of cases it is an aneurysm of the hepatic, splenic and gastroduodenal arteries [7]. Currently new endovascular and percutaneous transabdominal methods are chosen. They are gradually replacing the traditional approach consisting in the surgical intervention. A number of articles are published on this topic. In our specific case we would like to point out to the important steps in deciding how to successfully treat a patient with bleeding pseudoaneurysm of artery gastroduodenal. This patient has been monitored in our facility for several years.

Methods

Bleeding from a pseudoaneurysm associated with a pancreatic pseudocyst is a very rare and specific complication, therefore making of prospective or retrospective studies is of no benefit regarding the size of the obtained file. Benefits can be seen in evaluating the treatment of this complication and in pointing out the wrong steps which should be avoided in the future. In this specific example we demonstrate the pre-surgery condition, surgical treatment and post-surgery condition of our successfully treated patient. After release into the outpatient care the patient was monitored by a surgeon every six months and after four years he agreed to anterior abdominal plastics due to the hernia in the scar in the post-bursectomy area.

Case Presentation

1st hospitalization: A 35-years-old patient was urgently admitted to the University Hospital in Bratislava in the Gastroenterology Clinic (the only independent Gastroenterology Clinic in Slovakia) with symptoms of acute pancreatitis (first attack) 12 h after excessive alcohol use. The patient was hospitalized for 5 days and went to outpatient care at his own request. During the hospitalization the patient was negativistic. He refused the introduction of the enteral intake was stopped. The patient’s feeding was parenteral only. The patient was treated with Tienam (Merck, Sharp & Dohme) 3 mg × 500 mg i.v., oral medication consisted in the Edicin-glycopeptide antibiotic (Wellcome Production, France) 2 ml × 0.6 ml a subcutaneous injection. Fraxiparine-low molecular weight heparin (Glaxo Wellcome Production, France) 2 ml × 0.6 ml a subcutaneous injection, Kreon-pancreas enzymes (Abbott Products GmbH, Germany) to support digestion and Edicin-glycopeptide antibiotic 500 mg (Sandoz Pharmaceuticals dd, Slovenia) every 6 h for the risk of bulker pseudocyst infection. The condition was adjusted and the patient was re-admitted to the outpatient treatment. The question remains whether an intervention radiologist should not have been consulted during this hospitalization in order to consider targeted CT angiography and subsequent treatment. For this question RTG...
facility responded that it focused on the extensive progression of the finding in terms of pancreatic necrosis and the minor leakage in the a. lienalis basin was unambiguous at that time. The gastroenterologist indicates that the patient’s blood picture was not worsened (when he was released, he had leukocytes 8.000 and Hb 117. This means that without a decrease compared with Hb 124 in the hospital). Results of auxiliary screening is illustrated in Figure 2. During the second hospitalization another CT was performed with a pseudocyst description with gradual septal seizure, bleeding stopping and absent pseudoaneurysm of artery gastroduodenal.

**3rd hospitalization:** The patient was urgently admitted for the third time but this time, to the Surgical clinic with symptoms of hemorrhagic shock. It was only the 4th day after being released from the Gastroenterology Clinic.

Upon admitting the patient was hypotensive, tachycardic, Hemoglobin 6.30 g/dL (decrease from 11.7 g/dL when released 4 days earlier from Gastroenterology clinic), the urgent CT is portrayed in Figure 4 which shows two possible bleeding sources Figure 5.

Within 2 h since the admitting of the patient an urgent surgery was performed. The abdominal cavity was opened by a transverse cut. There was more than 1 l of blood with the coagula of the older data around the liver, above and below it and on the other side of the spleen bed as well. Through the omental blister we get to the pseudocyst of the pancreas in the size of approximately 130 mm × 100 mm. We perform pseudocyst incisions of 50 mm in length. Subsequently we remove the necrotic matter and the coagula. We succeed in finding the source of fresh active bleeding in the lower part of the pseudocyst in the basin of a. lienalis. Hemorrhage is difficult to stop. we perform repetitions with Prolene 4-0 with a patch. By the repeated cross stitches haemostasis is successful. The pseudoaneurysm from the area of artery hepatica propria or artery gastroduodenal was not seen because risk in the given area exceeds the benefit. During the surgery 7 erythrocyte concentrates (in a total of 1950 ml) and 2 fresh frozen plasmas (in a total of 360 ml) were administered. At the end of the surgical procedure we decided to implement bursectomy for better postoperative monitoring (Figure 6). In the bursectomy communicating with the incised pseudocyst, we insert peroxide longeta. We add Sandostatin (Novartis) to the treatment with a dose of 0.1 s.c. injection three times daily for 7 consecutive days. The first dose was given 1 h before laparotomy. PAMBA, Kanavit, Dicynone are also used as standard hemostyptic drugs.

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Bilirubin-total bilirubin value of 152 µmol/l and conjugated bilirubin 127 µmol/l increases after the surgery. Consequently, a CT scan is performed on the 4th day after the surgery with a description of the progression of pseudoaneurysm of a. gastroduodenal is with suppression of extra hepatic bile ducts (Figure 7).

The definitive solution of the condition by the intervention radiologist scheduled for the 5th day after the surgery was not implemented. On the day of planned surgery recurring bleeding returns (ascertained simply by blood leakage through bursectomy). The patient is transported into the operation theater and in total...
anesthesia the patient is subjected to a revision of the pseudocyst through bursectomy in the lower part of the pseudocyst there is the active leakage of arterial blood. After repeated cross stitches with Prolen 4-0 and absorbable fibrin sealant patch (Johnson & Johnson) bleeding stops and bursectomy was plugged by a veil which was subsequently left in the bursectomy (Figure 8).

Fourty eight hours after the reoperation due to rebleeding, when the patient was stabilized digital subtraction angiography with embolization of artery gastroduodenal in local anesthesia was performed (Figure 9). After the performance the lumen of pseudoaneurysm by contrast substance and artefacts from the embolization material is not present. The pseudoaneurysm size regression is noticeable in anteroposterior in the size of 39 mm (previously 42 mm), 11 mm to 36 mm (previously 50 mm).

There was also a regression of dilation of the bile ducts, ductus hepatocholedochus into 11 mm (16 mm previously). Intrahepatic bile ducts up to 4 mm. Present small embolization material in the peripheral branch of the right hepatic artery in the segments S6 and S7, in the venous phase with adequate filling.

4th hospitalization: The patient came to resolve hernia in the bursectomy area. A mesh plastic by a soft polypropylene mesh Prolene (Ethicon) was performed. The mesh was deposited sublay and secured by Mayo plastic (Figure 10,11).

Table 1: Balthazar CT classification.

<table>
<thead>
<tr>
<th>Pancreas damage degree – native CT</th>
<th>Points</th>
<th>Necrosis range – contrast CT</th>
<th>Points</th>
</tr>
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<tbody>
<tr>
<td>A: normal pancreas</td>
<td>0</td>
<td>0 necrosis</td>
<td>0</td>
</tr>
<tr>
<td>B: increased pancreas</td>
<td>1</td>
<td>less than 30% of necrosis</td>
<td>2</td>
</tr>
<tr>
<td>C: inflammation, changes in pancreas and peripancreatic grease</td>
<td>2</td>
<td>30% to 50% of necrosis</td>
<td>4</td>
</tr>
<tr>
<td>D: peripancreatic fluid collection</td>
<td>3</td>
<td>more than 50% of necrosis</td>
<td>6</td>
</tr>
<tr>
<td>E: more fluid collection and gas in pancreas</td>
<td>4</td>
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Discussion

The mechanism of aneurysm and pseudoaneurysm development in visceral arteries is known. Autodigestion causes leakage of pancreatic proteolytic enzymes which weakens the wall of adjacent visceral arteries. It can be said that in artery lienalis there is a more frequent occurrence of true aneurysms while in common hepatic artery and artery gastroduodenal is pseudoaneurysms predominate. Generally, pseudoaneurysms are more susceptible to rupture than true aneurysms [8]. But also, aneurysms of extra parenchymal hepatic arteries have a high Rate of rupture and their diagnosis and urgent treatment is important [9]. Pseudoaneurysm (VAP) rupture can cause bleeding into the gastrointestinal tract, peritoneal cavity, retroperitoneum or Pseudocyst [10]. The incidence of aneurysms and pseudoaneurysms does not depend on age and Gender. The introduction of endovascular techniques has also changed the surgical treatment criteria. In the past, in the era of “open surgery”, there were the following criteria: Symptomatic aneurysm, aneurysm of women in the fertile age and asymptomatic aneurysm in the size greater than 2 cm in risky patients. Currently, in the era of “Invasive Radiological Techniques”, there is the tendency to resolve
all pseudoaneurysms for the risk of bleeding at the time of diagnosis and all aneurysms with any degree of bleeding. There are 3 most common criteria for intervention-size, pain, bleeding. In general, in TVA (True Visceral Aneurysm) the main criterion is the size of the TVA itself, unlike VAP where the most common criterion is the attempt to control bleeding. It is also generally recognized that all symptomatic aneurysms in women of fertile age require intervention [11]. Angioembolization is currently considered to be the first line treatment in patients with Bleeding from pseudoaneurysm [12]. There are many endovascular embolization techniques such as coiling, gel solution, plug deployment, covered stent exclusion, injection of polyvinyl alcohol, and injection of absorbable gelatin particles. Access to femoral artery is the most common and the alternative is artery brachialis. The efficiency of the transcatheter endovascular embolization of pseudoaneurysm caused by pancreatitis ranges from 67% to 100% [13]. In the case of the impossibility of performing minimally invasive endovascular performance an open surgery is still available as an alternative. However, planned surgical treatment should be limited to patients in whom transcatheter embolization is not technically possible or the previous embolization failed or after successful embolization, a pseudoaneurysm reappeared. Minimal invasiveness, intra-aneurysmal thrombosis, regression of aneurysm size and low rate of complications are major advantages of transcatheter intervention compared to conventional treatment [14].

Conclusion

Endovascular angioembolization is a “choice method” and patients should therefore undergo the initial CT angiographic examination as soon as possible [15]. 1st advice to create a multidisciplinary team composed of a surgeon, gastroenterologist, interventional radiologist and intensivist in the diagnosis of acute pancreatitis at the University Hospital (the largest hospital in Slovakia) is our long-standing effort. We assume that this would be beneficial to us and patients. In the correlation of CT finding with the clinical picture there would not be a situation involving the release of a patient with extensive pseudoaneurysm of artery gastroduodenal is to outpatient care without prior consultation with the intervention radiologist and surgeon. If this procedure would be followed in the case of our patient, the intervention radiologist could have addressed this condition with a shut-off of the flow into the pseudoaneurysm of a, gastroduodenal before a sudden abdominal disorder occurs with acute bleeding into the pseudoaneurysm. 2nd advice to show the importance of the bursectomy for the better postoperative. Thanks to bursectomy, we noticed rebleeding in time (ascertained simply by blood leakage through bursectomy). 3rd advice to show how important it is for interventional radiology to be a part of the hospital. The University Hospital in Bratislava is the largest hospital in Slovakia, but its peculiarity is that it consists of 5 hospitals located in various places in the capital of Slovakia. Each of these hospitals has some workplaces specifically invasive radiology is concentrated on a workplace in another hospital (this is related to forwarding pictures, ordering the term, transferring the patient and his return to our clinic by an ambulance after the performance).

References