A CASE OF TRAUMATIC RUPTURE OF THE PANCREAS. COMBINED SURGICAL AND ENDOSCOPIC MANAGEMENT

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Traumatic rupture of the pancreas is a rare and difficult diagnostic and therapeutic problem. The authors present a case of traumatic rupture of the pancreas (grade IV on AAST scale) where concurrent endoscopic and surgical management was used.

Key words: injury of the pancreas

Retroperitoneal location of the pancreas markedly limits probability of its traumatic injury. The incidence of traumatic injuries of the pancreas in patients after a blunt abdominal trauma is 2-12% (1, 2). In vast majority of cases injury of the pancreas is limited to its focal contusion and superficial injury of its capsule. Adequate assessment of integrity and tightness of the pancreatic duct is a decisive factor for long term complications and patient prognosis.

CASE REPORT

A 27-year female visited the Hospital Emergency Department due to severe epigastric pain that started a few hours after a blunt abdominal trauma. She was kicked in her abdomen by an adult person.

Physical examination demonstrated epigastric pain with marked guarding. Abdominal ultrasound imaging revealed an unclear hypoechogenic, well delineated 17x21 mm lesion in the head of the pancreas and similar 20x10 mm lesion in the body of the pancreas, without free fluid in the abdominal cavity. Amylase activity was increased: plasma 521 U/l, urinary 8501 U/l. Other laboratory tests were unremarkable.

The diagnostic work-up was extended and computed tomography imaging of abdominal cavity revealed a transverse hypodense band, 8 mm in width, in the isthmus of the pancreas, that could correspond to interrupted integrity of the pancreatic parenchyma. No traumatic changes were found in the other abdominal organs. The patient was qualified to ERCP at the operating room, under the general anesthesia. After contrasting of a distal segment of the duct of Wirsung, a massive contrast leakage to the retroperitoneal space was observed. An attempt of endoscopic insertion of a by-pass stent to the pancreatic duct was undertaken, but was unsuccessful. Pancreatic sphincterotomy was performed and an endoscope was left in the duodenum along with a leader inserted to the pancreatic duct. The patient was qualified to surgical management.

The abdominal cavity was opened using a transverse epigastric incision and approximately 1 liter of bloody discharge was found as well as numerous foci of Balser’s necrosis and a hematoma in the mesentery of the transverse colon. Bursa omentalis was opened and the pancreas was revealed with complete interruption of its integrity at the level of the isthmus and marked separation of its fragments (fig. 1). After dissection of the pancreatic margins, an endoscopic leader was found, inserted in the proximal duct of Wirsung with its tip directed to the tail of the pancreas. Subsequently a catheter was inserted over the leader and a contrast agent was given to confirm its proper location in the pancreatic duct.
Under the endoscopic guidance the Amsterdam prosthesis (thickness 7 Fr, length 12 cm) and the pancreatic parenchyma was sutured over the prosthesis, with single sutures PDS 2/0 (fig. 2, 3).

The postoperative period was complicated by a pancreatic fistula that was controlled with drainage. Sandostatin analogs were given, achieving gradual reduction of pancreatic secretion over the subsequent days of hospitalization. The patient was discharged from the Department in good general condition on the 26th postoperative day, with daily discharge output from the fistula approximately 200 ml.

A follow-up CT imaging of abdominal cavity performed on the 41st day after the procedure demonstrated 2 limited, peripancreatic fluid collections with diameters up to 30 mm, with a prosthesis seen in the duct of Wirsung. ERCP procedure performed on the 63rd postoperative day demonstrated tightness of the whole duct of Wirsung. Further follow-up in the outpatient setting demonstrated normal recovery with complete closure of the pancreatic fistula and absorption of fluid collections after approximately 2 months.

**DISCUSSION**

Traumatic rupture of the pancreas, despite availability of extensive and different imaging techniques, continues to be a serious diagnostic and therapeutic problem.

Injuries of the pancreas include consequences of blunt and penetrating traumas. Blunt traumas in adults are mainly caused by abdominal injuries related to traffic accidents or battery, while in children pancreatic injuries are mainly caused by epigastric trauma sustained in bicycle accidents. Penetrating injuries resulting from stab wounds and gunshots are relatively rare.

Retroperitoneal location of the pancreas largely limits probability of its traumatic injury; in blunt trauma the injury of the pancreas results from compression of the pancreatic parenchyma by the adjacent bodies of lumbar vertebrae. The literature data indicate that incidence of pancreatic injury after a blunt abdominal trauma ranges from 2 to 12%, while in more than 80% of cases these are multorgan abdominal injuries involving parenchymal organs and large blood vessels (1, 3). Mortality depends on location and extent of injury of the pancreas and adjacent organs and ranges from 5 to 30% (1, 3); most deaths occur within the first few hours due to hemorrhagic complications.

Diagnosis of traumatic injury of the pancreas is not easy. Delayed diagnosis and evaluation of the extent of injuries markedly
A case of traumatic rupture of the pancreas. Combined surgical and endoscopic management

Affect the prognosis and presence of late complications (4). Retroperitoneal location of the pancreas results in non-specific symptoms of its abnormalities. They involve epigastric and lumbar pain of variable intensity, however even complete interruption of the pancreatic parenchyma can be asymptomatic.

Concentration of pancreatic enzymes in the blood and urine is characterized by low sensitivity and specificity, resulting in lack of diagnostic utility (5, 6).

FAST (focused assessment with sonography for trauma) ultrasound is an imaging modality used routinely in the assessment of post-traumatic patients, with unstable hemodynamic parameters, able to detect free fluid in the abdominal cavity which is an indication to surgical exploration. However, retroperitoneal location of the pancreas and obesity hamper detailed ultrasound assessment of extent of the injury, and thus computed tomography imaging is an investigation of choice in each patient with stable hemodynamic parameters. When performed within 24 hours of the trauma, it is characterized by up to 80% sensitivity, however it demonstrates normal image of the pancreas within the first 12 hours even in 40% of patients and thus imaging verification is recommended after 12-24 hours (3, 7).

However, computed tomography is not a valuable tool for the evaluation of injuries resulting in interruption of integrity of the duct of Wirsung; its estimated sensitivity is up to 43% in such cases (7). In any case when interruption of integrity of the pancreatic duct is suspected, ERCP is recommended; its advantages include both diagnostic and therapeutic aspects, precise assessment of injuries of the pancreatic duct (tab. 1) and effective endoscopic management of interrupted integrity of the duct of Wirsung, avoiding disabling extensive procedure (8-10).

Condition of the patient, extent of pancreatic injury and coexisting injuries determine further management. A 5-point scale prepared in 1990 by American Association for the Surgery of Trauma (AAST) (tab. 2) is commonly used to assess pancreas injuries.

In vast majority of patients (60%) superficial contusions are found (grade I). Severe contusion with rupture of the pancreatic parenchyma (grade II) is found in 20% of patients. In the remaining cases an extensive pancreatic damage occurs with interruption of the pancreatic duct, bile ducts, adjacent organs and large blood vessels (2).

If there are parenchymal contusions or capsule ruptures without interruption of the

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### Table 1. Classification of injuries of the pancreas in endoscopic retrograde cholangiopancreatography

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description of the injury</th>
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<tbody>
<tr>
<td>I</td>
<td>normal image of the pancreatic duct</td>
</tr>
<tr>
<td>IIa</td>
<td>damaged branch of the pancreatic duct with leakage of the contrast agent in the pancreatic parenchyma</td>
</tr>
<tr>
<td>IIb</td>
<td>damaged branch of the pancreatic duct with leakage of the contrast agent to the retroperitoneal space</td>
</tr>
<tr>
<td>IIIa</td>
<td>interrupted integrity of the pancreatic duct in the body or tail of the pancreas</td>
</tr>
<tr>
<td>IIIb</td>
<td>interrupted integrity of the pancreatic duct in the head of the pancreas</td>
</tr>
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### Table 2. Classification of pancreatic injuries according to American Association for the Surgery of Trauma

<table>
<thead>
<tr>
<th>Grade</th>
<th>Type of injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>hematoma slow grade contusion without damage of the pancreatic duct</td>
</tr>
<tr>
<td></td>
<td>tear superficial tear without damage of the pancreatic duct</td>
</tr>
<tr>
<td>II</td>
<td>hematoma severe contusion without damage of the pancreatic duct and tissue deficit</td>
</tr>
<tr>
<td></td>
<td>tear severe contusion without damage of the pancreatic duct and tissue deficit</td>
</tr>
<tr>
<td>III</td>
<td>tear interruption of distal pancreas or injury of the pancreatic parenchyma with interruption of integrity of the pancreatic duct</td>
</tr>
<tr>
<td>IV</td>
<td>tear interruption of integrity of the head of the pancreas or injury of the parenchyma of the head of the pancreas including hepato-pancreatic ampulla</td>
</tr>
<tr>
<td>V</td>
<td>tear</td>
</tr>
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</table>

duct of Wirsung (AAST I/II), conservative management is acceptable, while in patients qualified to laparotomy surgical management is limited to careful debridement, effective hemostasis and external drainage. Management of parenchymal injuries and closure of the pancreatic capsule with sutures is a controversial issue and according to some authors may subsequently result in pseudocyst formation (11).

Presence of serious injuries of pancreatic parenchyma located in the body/tail of the pancreas (AAST III) is an indication to distal resection with splenectomy (attempts to spare spleen should be undertaken in children below 10 years of age) (10).

Extent of management in cases of extensive damages of head and isthmus of the pancreas has not been determined yet. Distal pancreatectomy with splenectomy with closure of the distal pancreatic stump should be considered. Anastomosis of the body and tail of the pancreas with Roux loop of the small intestine and closure of the distal pancreatic stump, i.e. distal resection, is an alternative management. Pancreatoduodenectomy is a management of choice in extensive injuries involving duodenum and head of the pancreas. If, due to patient’s condition, Whipple’s procedure is impossible, two-stage procedure is acceptable: stage I – damage control with resection of prepyloric part of the stomach, mobilization of the ileum and sectioning and ligation of the common hepatic duct, stage II – reconstructive procedure after 48 hours, if patient is stable (11, 12).

Combined endoscopic and surgical management used by the authors resulted in avoidance of an extensive disabling procedure, while insertion of a prosthesis resulted in maintenance of integrity of the pancreatic duct. Suturing of the pancreatic parenchyma over the prosthetic pancreatic duct allowed the pancreas to recover with preservation of tightness and patency of the duct of Wirsung. Presence of postoperative pancreatic fistula could be associated with the fact that the contused pancreatic parenchyma was approximated using sutures, which had decisive effect on subsequent healing.

In conclusion, authors want to emphasize that concurrent endoscopic and surgical management could be recommended in selected cases of pancreatic injuries with interruption of integrity of the pancreatic duct.

REFERENCES