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Non-Surgical Management of a Ruptured Posttraumatic Pancreatic Pseudocyst in a Child

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ABSTRACT

Generally speaking, isolated pancreatic injuries are rare after abdominal blunt trauma. However, the incidence of pancreatic injuries in children has risen in recent decades. Panreatic pseudocyst represents a typical complication after acute pancreatitis due to blunt abdominal trauma. Spontaneous rupture of pseudocysts leading to acute abdominal pain has been described, however, it rarely occurs, especially in pediatric patients. We report the successful non-surgical management of a ruptured pancreatic pseudocyst in a 5-year-old girl which occured 27 days after trauma. The traumatic acute pancreatitis was due to a handlebar injury.

Key words: acute pancreatitis, abdominal trauma, pseudocyst, non-surgical management

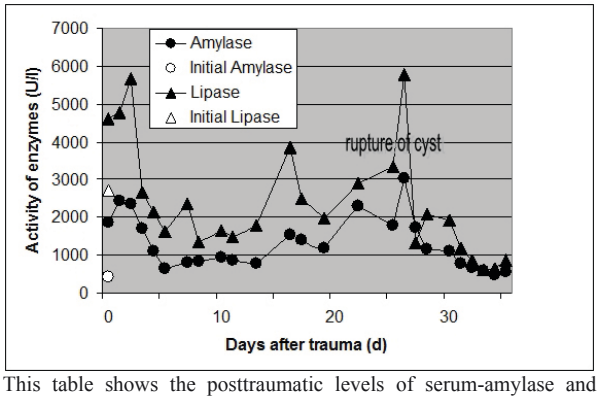
INTRODUCTION

Acute pancreatitis is very uncommon in children. Blunt trauma is responsible for its development in about 25% of published cases [1,2]. Pseudocysts develop in children after acute pancreatitis in 10 to 23% of patients. If the underlying cause is trauma, incidence increases up to 65% [3]. Therapeutic options range from nonoperative management [3, 4] via endoscopic [2] or percutaneous [5,6] drainage to open surgical procedures such as cyst- enterostomy [7, 8]. Rupture of pseudocysts has been described [4], however, it occurs seldom. We report the successful non-surgical management of a ruptured pancreatic pseudocyst.

CASE PRESENTATION

A 5-year-old girl sustained a handlebar injury causing blunt upper abdominal trauma. Two hours after injury she developed abdominal pain. On admission to our hospital pain and tenderness were described in the epigastrium. Serum amylase level obtained in the emergency room was 435 U/l and increased to 739 U/l within 3 hours. Acute pancreatitis was diagnosed. On day 2 serum amylase was elevated to 2450 U/l *(fig. 1)*. Initial ultrasound showed intraabdominal fluid but no injury of solid intraabdominal organs. The CT scan on day 2 revealed a thickening of the pancreatic tail and a small amount of free fluid in the peritoneal cavity without specific evidence of injury to other solid viscus. No transection of the gland was shown *(fig. 1)*. The injury was classified as grade II according to the classification described by Booth and Flint [9]. Antibiotics were administered for 7 days and the patient was kept on parenteral nutrition. During the second week abdominal ultrasound showed the development of 3 pseudocysts of the left lateral part of the pancreas *(fig. 2 a-c)*. The pseudocysts increased in size during the next days *(tab. 1)*. As there was no evidence of complications and the patient was in good general condition, no attempt was made to drain the cysts. The largest cyst was 80 x 80 x 70 mm at discharge on day 26 after trauma. One day later the girl was readmitted due to acute abdominal pain. Abdominal ultrasound showed intraabdominal fluid and a reduced size of the pseudocyst compared to the findings 2 days before. CT revealed pseudocysts with reduced sizes and a substantial amount of intraabdominal fluid**.** Concentration of amylase (79.800 U/l) and lipase (139.800 U/l) were high in the intraabdominal fluid. This was obviously due to a rupture of the pseudocyst. At the

Figure 1. **Amylase and lipase concentrations in serum during the first 37 days after trauma.**



This table shows the posttraumatic levels of serum-amylase and –lipase during the first 37 days. The increase of enzymatic activity during the first days was caused by a posttraumatic pancreatitis. No clinical correlation was found for the second spike of lipase at the 16. day after trauma. The free rupture of the cyst at the 26. posttraumatic day is well illustrated by a new peak of the two pancreatic enzymes (lipase 5768/ amylase 3037 U/l).

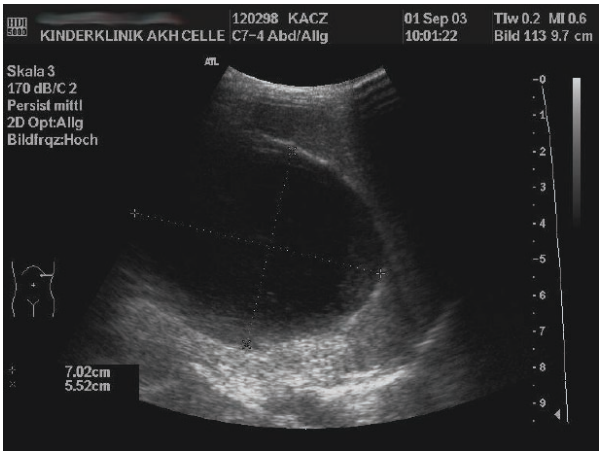
same time a new serum peak of the pancreatic enzymes was found *(fig. 1)*. A therapy with octreotide acetate was started. The intraabdominal fluid was spontaneously absorbed. In the following days the pseudocyst increased again in size leading to compression of the stomach**.** MRCP was performed and showed a normal pancreatic duct and no signs of major duct injury. The child complained constantly of vomiting. An internal drainage of the large cyst into the stomach was discussed with our interventional gastroenterology department but found not applicable. Consequently, a CT-guided drain was inserted percutaneousley *(fig. 3)*. The cyst decreased daily *(tab. 1)* and the drain could be removed 7 days later. The child was discharged 50 days after trauma in good condition. One year later the young patient has no complaints at all, while pseudocysts are not detectable by ultrasound.

DISCUSSION

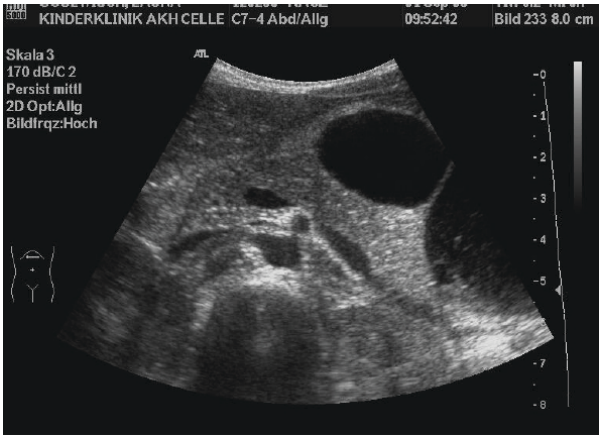
In the majority of cases pancreatic injuries from blunt trauma are associated with other intra-abdominal injuries [1]. In general, isolated pancreatic injuries are rare after abdominal blunt trauma. However, the incidence of pancreatic injuries in children has risen in recent decades [8]. Pancreatic injuries resulting from low velocity impact are quite common [5]. Especially bicycle handlebar injuries tend to be underestimated. They were described as the underlying pathomechanism in 7 out of 35 pancreatic injuries in a recent study [5]. Pancreatic injuries are difficult to confirm preoperatively [10] and no diagnostic modality has proved to be completely reliable. Signs and symptoms are frequently mild or absent. When present, pain and tenderness are usually in the epigastrium. Physical findings are subtle and are not specific for the presence of pancreatic injury. However, in this case the diagnosis of acute

Figure 2. **Ultrasound scans and schematic drawing of the cysts before rupture (26.PTD).**

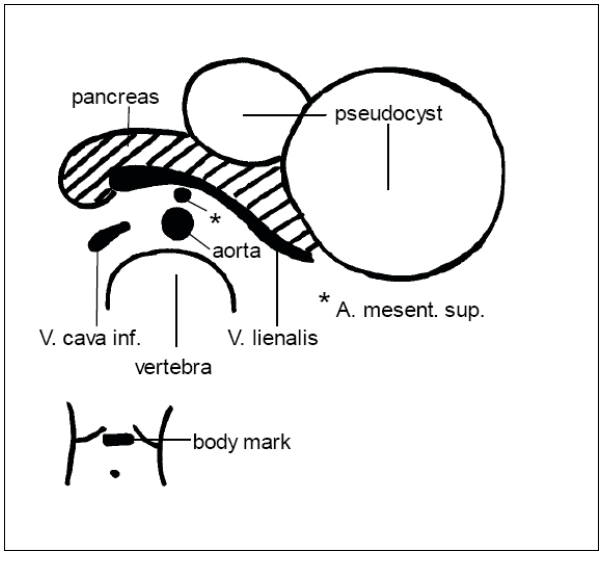
a



b



c



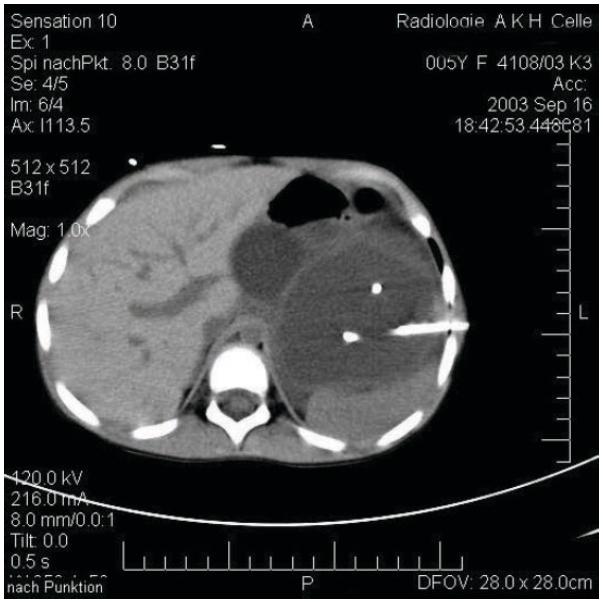
2a + b: The ultrasound examination of the upper abdomen showed two great pseudocysts of the pancreatic tail before rupture of the cyst after the 26. day after trauma.
2 c: Schematic drawing of the two largest pseudocysts corresponding to the ultrasound scans of figure 2a and 2b.

Table 1. **Posttraumatic volume of the largest pseudocyst.**

Posttraumatic day	Extension [mm x mm x mm]	Volume [cm^3]
1	no cyst	
6	no cyst	
13	43 x 43 x 45	41
15	50 x 45 x 42	47
19	70 x 67 x 53	124
21	80 x 80 x 70	224
26	88 x 83 x 80	313*
27	61 x 60 x 56	102
33	74 x 82 x 72	228
34	81 x 75 x 75	240**
35	47 x 35 x 49	42
36	35 x 32 x 50	29

This table shows the volume of the largest pancreatic pseudocyst during the first 36 days after trauma. On posttraumatic day 26 – the day after discharge - the largest of the cysts ruptured. On day 34 this cyst was treated by radiologically guided percutaneous catheter drainage. (Textmarks :* cyst rupture, ** cyst drainage)

Figure 3. **CT guided catheter drainage of the cyst.**



Percutaneous, intercostal puncture of the large pancreatic pseudocyst and insertion of the drainage catheter was performed 34 days after trauma.

pancreatitis was made early due to the initial increase in serum amylase. However, increased serum amylase levels are obtained frequently in patients with significant blunt torso trauma, but it is well known that increased amylase concentrations do not represent a confirmation of pancreatic injury. It has been reported that only 8% of patients with elevated serum amylase levels subsequent to blunt trauma had pancreatic injuries [11]. Other authors described a high frequency of hyperamylasemia with pancreatic injuries but with a poor specificity [12]. In the study of Shilyansky et al. hyperamylasemia was found in 27 of 35 children with pancreatic injuries [5].

CT scans are routinely used to evaluate abdominal trauma patients. However, in a recent study Cotton et al. analyzed whether clinical and labarotory data are useful for predicting the risk for intraabdominal injury and to avoid unnecessary imaging in children [13]. They conclude that stable children with an increased likelihood of intraabdominal injury based on physical examination findings – in particular abdominal tenderness – should undergo an abdominal CT scan [13]. However, in pancreatic trauma, CT scans only occasionally demonstrate an obvious injury. More commonly diffuse or localized pancreatic thickening or oedema of the gland are described. Between 30 and 40% of patients with significant pancreatic injuries have been reported to show a regular CT image of the pancreas [14]. In a recent study the diagnostic value of ultrasonography versus CT in hemodynamically stable children after blunt abdominal trauma was analyzed by Tas et al. [15]. They described only a moderate sensitivity of ultrasonography to detectect pancreatic injuries. However, ultrasonography represents the best method of follow-up management in these patients.

Compression of the pancreas between the vertebral column and a hard external object such as a bicycle handlebar in our case has been the traditionally assumed mechanism of injury to the pancreas in blunt trauma [16]. Craig et al. described an equal distribution throughout the gland [head, body and tail] and suggested that the gland can be compressed from varying angles [1]. In our case a force vector from the left was probably responsible for the injury of the tail.

Various therapeutic options are described. Kouchi et al. emphasize the nonoperative management of blunt pancreatic injury in children [4]. In cases with pseudocysts less than 10 cm they advise nonoperative management because these cysts show a high potential to resolve spontaneously [4]. Other authors state that drainage should be applied for patients with pseudocysts more than 6 weeks old and a diameter of more than 5 cm [17]. In the presented case nonoperative management merged into a drainage procedure before rupture of the largest pseudocyst could occur, thus preventing subsequent recurrence with compression of the stomach by the cyst.

We applied CT-guided percutaneous catheter drainage which was successful in our case within a few days. However, failures of the percutaneous drainage procedure are reported resulting in recurrent pseudocysts or an external pancreatic fistula [18]. Other groups recommend endoscopic drainage, performed by an experienced endoscopist [2]. Thus the choice of drainage procedures depends very much on the facilities and expertise in the hospital caring for the child.

Octreotide was described as an efficaceous adjunct in the conservative treatment of pediatric pancreatic pseudocysts [3]. However, octreotride was not used on a routine base in all studies [5]. In the presented case octreotide acetate was administered after rupture of the pseudocyst and consecutive percutaneous drainage. Retrospectively, the therapeutic effect

of octreotide in comparison to the drainage procedure in this case remains unclear.

Spontaneous rupture of pseudocysts are described by Kouchi et al in their retrospective study in 2 out of 10 children [4]. The size of the cysts were 2 and 10 cm and the rupture occured 30 and 52 days after trauma, respectively. Clinical findings as elevated serum amylase, sudden tenderness and ascites compared to our case.

CONCLUSIONS

We conclude that nonoperative management should remain the first therapeutic option in hemodynamically stable children with blunt pancreatic injury leading to acute pancreatitis. A symptomatic pseudocyst represents a typical complication of acute pancreatitis and can be treated successfully by percutaneous drainage. The risk of pseudocyst rupture between the 4th and 8th week after trauma is clearly evident. Therefore careful follow-up is essential in children with blunt pancreatic injury.

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