

Pancreatic pseudocyst in a 4-year old boy: case report

Ali Egab Joda, M.B.Ch.B. , F.I.C.M.S. - Pediatric surgeon ¹

Alaa Yaser, M.B.Ch.B. - Senior house officer in pediatric surgery²

¹ College of Medicine – Al Mustansiriya University, Department of pediatric surgery - Central Child Teaching Hospital

² Department of pediatric surgery -Central Child Teaching Hospital

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Address for Correspondence:

**Ali Egab Joda . Senior Lecturer in
pediatric surgery / College of
Medicine – Al Mustansiriya
University**

**Pediatric Surgeon / Department of
pediatric surgery - Central Child
Teaching Hospital Email:
ali.egab.joda@gmail.com
Mobile: 07725465090**

**Alaa Yaser . Senior house officer in
pediatric surgery / Central Child
Teaching Hospita Email:
alaayasir32@yahoo.com
Mobile: 07801528949**

Abstract

Pancreatic pseudocyst is an uncommon condition in childhood and is almost always associated with pancreatitis which may result from trauma or other rare diseases like biliary tract disease, viral illness & drugs or may be related to complications of metabolic diseases. However, unlike adult experience, trauma is the most common cause of pancreatic pseudocysts in children. Most pseudocysts are uncomplicated with few nonspecific symptoms, so they are challenging lesions to diagnose and to treat except when they are large. Therefore, a high index of clinical suspicion is necessary to make an early diagnosis & this require integration of careful medical history, clinical examination and laboratory investigations, but imaging studies such as ultrasound, computed tomography scan & magnetic resonance imaging are very helpful in establishing the diagnosis. Its management is markedly different depending on the cause and size of the cystic lesion of the pancreas. Initially the conservative approach for asymptomatic patients is preferable, on the basis that an appreciable percent of pseudocysts will resolve spontaneously, otherwise different surgical options may be implemented for symptomatic patients or when there are complications. We report a case of a large pancreatic pseudocyst in a four-year-old boy following pancreatitis due to blunt abdominal trauma by a bike injury. The child was treated conservatively for 4 weeks after the development of pancreatic pseudocyst then he underwent an open trans-gastric cystogastrostomy which was very effective and free of complication postoperatively. The presentation, diagnosis and surgical intervention are discussed.

Key words: pancreatic pseudocyst, pancreatitis, abdominal trauma, children.

INTRODUCTION

A pseudocyst is defined as a collection of pancreatic juice enclosed by a wall of fibrous or granulation tissue. As the resulting cyst has no true endothelial lining, it is classified as a pseudocyst. It usually arises as a consequence of acute or chronic pancreatitis. Its formation usually requires four or more weeks from the occurrence of acute pancreatitis.⁽¹⁾ Pseudocyst complicate acute pancreatitis in approximately 10-30% of cases but the incidence may reach up to 50% when associated with traumatic injury to the pancreas.⁽²⁾

Etiology: Pseudocysts may complicate the clinical picture of any cause of pancreatitis including:⁽³⁾

- 1- Systemic diseases: viral illness, inflammatory disorders like rheumatoid arthritis, Systemic lupus erythematosus, hemolytic uremic syndrome, inflammatory bowel disease.
- 2- Trauma: blunt abdominal trauma or following endoscopic retrograde cholangio-pancreatography.

- 3- Congenital anomalies: pancreas divisum, annular pancreas, choledochal cyst, gastric or duodenal duplication.
- 4- Metabolic diseases: hyperlipidemia, hypercalcemia, cystic fibrosis, Reye syndrome.
- 5- Drugs & toxins: diuretic, anticonvulsant, corticosteroid, cytotoxic.
- 6- Idiopathic.

Although alcohol-related pancreatitis is the major cause of pseudocysts related to chronic pancreatitis in adult, trauma is the most common cause of pancreatic pseudocysts in children.⁽¹⁾

Pathogenesis of Traumatic pseudocysts: Blunt trauma to abdomen causes compression of the pancreas onto the vertebral column with secondary disruption of pancreatic duct or its major branches & damage of the acinar cells that leads to activation & release of digestive enzymes that autodigest the pancreatic parenchyma. The localized collection of pancreatic secretions become walled off by granulation tissue & form a pseudocyst within any part of pancreatic tissue (head, body, tail) or immediately adjacent to it.⁽²⁾

Diagnosis: A pseudocyst of the pancreas is more common in boys.⁽⁴⁾ The presenting symptoms include epigastric pain, abdominal mass, fever, vomiting, jaundice, signs of gastric obstruction, feeling of bloating, anorexia and weight loss.^(2,5) on examination there will be tense, tender, cystic mass in the epigastrium or left upper quadrant. Blood investigation may reveal leukocytosis, elevation of serum amylase & lipase. plain abdominal radiogram reveals non-specific findings ranging from distended loop of small intestine (sentinel loop), calcification, dilatation of transverse colon (cutoff sign), ileus, left sided pleural effusion and a soft tissue shadow of pseudocyst may be identified.⁽⁶⁾ Upper gastrointestinal contrast studies typically show anterior displacement of the stomach consistent with a mass in the lesser sac. Abdominal ultrasound & CT scan are important for accurate diagnosis & also helpful for evaluating thickness of cyst wall & changes inside cyst during ensuing treatment. The sensitivity rate of US for the detection of pseudocyst is about 75-90%, compared with 90-100% for CT scan.⁽⁷⁾ Other modalities of investigations include magnetic resonance imaging (MRI) & endoscopic retrograde cholangiopancreatography (ERCP), these techniques provide better evaluation of the ductal system, biliary & pancreatic anomalies and may be an important tool of therapeutic intervention in case of ERCP.⁽⁸⁾

Treatment & timing of intervention: Pseudocysts will resolve spontaneously in most occasions, while that with thick-walled, large (over 6 cm in diameter), have lasted for a long time (over 12 weeks) or associated with chronic pancreatitis are less likely to resolve spontaneously.^(1,9) A great controversy has surrounded the management of pancreatic pseudocyst & ranged from prolong observation to immediate exploration or delayed drainage in order to promote maturation of the fibrous wall.

It is reasonable to adopt an initial conservative approach in asymptomatic patients, on the basis that an appreciable percent of pseudocysts will resolve spontaneously ⁽⁹⁾ particularly in the post-acute cases provided that close clinical and radiological follow-up is undertaken. The indication of surgical intervention is individualized as in symptomatic patient, cyst more than 6 cm, development of complications, long lasting cyst, presence of congenital anatomical defects & concern about possible malignancy.^(2,10)

There are three primary methods of surgical intervention:⁽²⁾ percutaneous drainage, endoscopic drainage & open surgery (which include excision, external or internal drainage). Excision is reserved for small cyst of the body or tail of the pancreas by distal pancreatectomy (with or without splenectomy). External drainage is the preferred technique for infected cyst (cyst requiring urgent drainage before 4-6 weeks' period required for cyst wall maturation), but it carry high mortality, recurrence and fistula rates of over 10% ⁽¹¹⁾. Internal drainage is the method of choice for uncomplicated mature pseudocyst.⁽¹²⁾ Of the several method of internal drainage, by far the most frequently used methods are transgastric cystogastrostomy, cystoduodenostomy & cystojejunostomy, to a roux en- Y- loop of jejunum.

CASE REPORT

A 4-year old boy was brought by his parents to the private clinic complaining of recurrent attacks of abdominal pain, repeated vomiting, and loss of appetite with decreasing weight. there was an obvious upper abdominal fullness noticed by his parents increasing in size in the last two weeks. After history taking, the family report a blunt trauma to the upper abdomen during a bike riding one month ago, followed by severe abdominal pain, fever & vomiting so that he was admitted to the emergency department then the pediatric surgical ward in the medical city of Imamain Kadhumaiin hospital. Blood & radiological investigation was done for him and was treated conservatively for 7 days with the administration of intravenous fluid, I.V broad spectrum antibiotics,

nasogastric tube and kept under observation with monitoring chart. The child recovered uneventfully and discharged home after one week, then he started taking food orally, with oral antibiotics & analgesics at home.

On presentation, Physical examination revealed a swelling in the epigastrium & left upper abdomen without tenderness, tympanic on percussion, normal bowel sounds, normal vital signs, but the child looked losing weight because of repeated vomiting & anorexia. The vomiting was about 3-4 times per day of the ingested food & gastric content. Investigations were done for him in a form of abdominal ultrasound (fig.1), upper GIT contrast study (fig.2), white blood count, serum amylase & lipase level, and lastly abdominal C.T scan (fig.3). Barium meal revealed gastric compression & anteriorly displaced stomach. Abdominal ultrasound revealed well defined cystic mass in the central epigastric region with echogenic debris, hypervascular wall on color Doppler study, closely related to the pancreas. Abdominal C.T scan revealed thick wall cystic lesion at the lesser sac measuring 10.5 X 8.5 cm displacing the stomach anteriorly & squashing the left kidney posteriorly.

In addition, our patient had leukocytosis, elevated serum level of amylase 3 times above normal & high level of serum lipase which is more specific for pancreatic pathology.

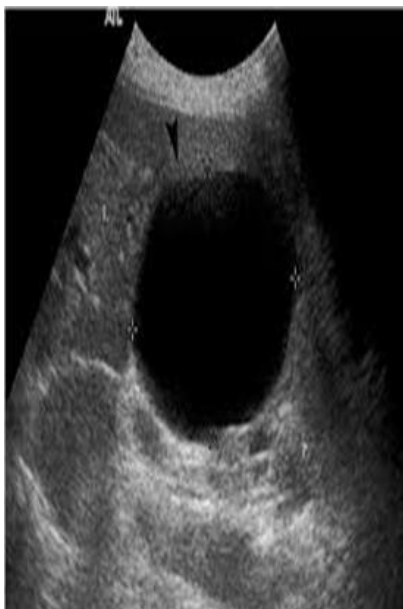


Figure 1: Abdominal US



Figure 2: Barium meal



Figure 3: Abdominal CT

Because it was symptomatic with potential risk of complications & after explanation to the family & taking written consent, we decided to proceed with the surgical intervention on elective bases a few days later. The operation was done in the Central Child Teaching Hospital, under general anesthesia, an upper abdominal transvers incision was made, inspection of the abdomen reveals a large pancreatic pseudocyst in the lesser sac. A gastrotomy at the anterior wall was performed (fig.4), then the posterior gastric wall opened (fig.5), identification of the wall of pseudocyst adjacent to stomach was performed, a window was opened and about 450 ml of cystic fluid was aspirated, it was dark – brown thin fluid. Consequently, a

cystogastrostomy was performed with absorbable interrupted sutures (fig.6). The anterior gastrotomy was closed with a two layers absorbable suture (fig.7) and no drains were placed. A nasogastric tube was left in the stomach & removed after 3 days, then he started taking oral fluid gradually. Solid food was allowed to be taken after 10 days of liquid food intake.



Figure 4: Anteriorgastrotomy

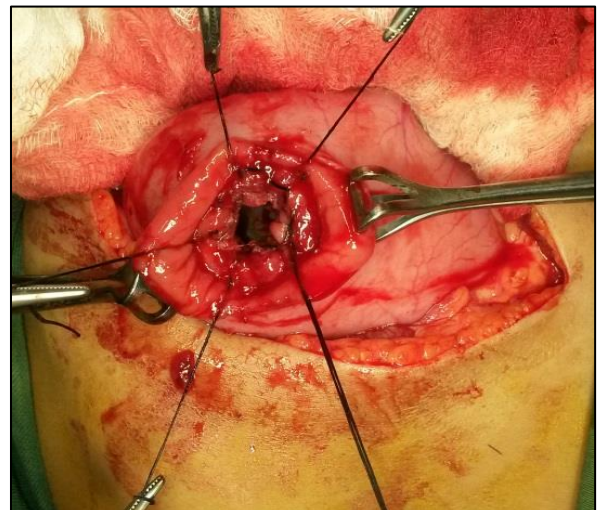


Figure 6: Cystogastrostomy



Figure 5: opening of posterior gastric wall



Figure 7: Closure of anterior gastrotomy

Postoperative course was uneventful and the child was discharged on the 5th postoperative day. The boy was followed up every two weeks then monthly with a new ultrasound examination which revealed absence of pancreatic pseudocyst and otherwise normal findings. The child now after one year of follow up having a good health & free of any sequelae.



Figure 8: Before surgery



Figure 9: 6 months after surgery

DISCUSSION

Although pancreatic pseudocysts in children are rare, they are the most common cystic lesions of the pancreas; accounting for 75-80% of such masses.⁽²⁾ the majority being secondary to blunt pancreatic trauma though it may rarely be associated with chronic pancreatitis, parenchymal diseases, metabolic disease, drugs & toxins.⁽³⁾ The exclusion of these conditions and medications is important as a history of trauma may often be difficult to obtain particularly in instances of child abuse.⁽¹³⁾ Idiopathic causes comprised up to 25% of the cases in a series of pediatric pseudocyst.⁽¹⁴⁾

The pancreas is the fourth most commonly injured intra-abdominal organ in children who sustain blunt trauma.⁽¹⁵⁾ A history of blunt abdominal trauma suggesting pancreas injury include seatbelt injury, handlebar injury, punch or kick to the epigastrium.⁽¹⁶⁾ An illness resembling pncreatitis, followed by symptoms free interval of few weeks is significant, yet a negative history of trauma is not uncommon. Here in case of our patient, a history of abdominal trauma was recorded during bike riding.

Although the majority of children with pancreatic pseudocyst presented late with a tetrad of clinical features (epigastric pain, fever, vomiting and cystic epigastric mass), Pseudocysts may be associated with additional symptom like hematemesis & the patient appeared at first examination to have peptic ulcer, gastritis, or esophageal varices rather than a pseudocyst.⁽⁵⁾ Basturk et al said that a diagnosis of pancreatic cyst in children may be mistaken with other diseases.⁽¹⁷⁾ The presences of an upper abdominal mass, tenderness, fever & gastric obstruction were the most consistent findings on physical examination. In this case report; the patient presented with abdominal pain, repeated vomiting & palpable abdominal mass, but without tenderness or fever.

Laboratory data often demonstrated leukocytosis, an elevated serum amylase, and occasionally hyperbilirubinemia.⁽²⁾ Persistent hyperamylasemia is consistent with a diagnosis of pseudocyst even in the absence of an abdominal mass.⁽¹⁸⁾ In children, serum amylase is less sensitive and specific for pancreatitis than it is in adults. In one study, 40% of children with proven pancreatitis had a normal serum amylase.⁽¹⁹⁾ Indeed, many other conditions may cause a raised serum amylase, including appendicitis, intestinal obstruction, disorders of the salivary glands, and renal failure.⁽¹⁸⁾

Spontaneous resolution of a pseudocyst is more frequent in children than in adults, about 54% of pseudocyst undergo spontaneous resolution in six-week time.⁽⁹⁾ Spontaneous resolution may also occur if the cyst ruptures into the gastrointestinal tract forming a cyst-enteric fistula.⁽²²⁾ Persistent or chronic pseudocyst should be drained to improve symptoms and treat complications, and the traditional guidelines for drainage include pseudocyst that persists for >4-6 weeks and >6 cm in diameter.^(1,9) Such a chronic cyst has a low likelihood of complete resolution and is associated with significant morbidity. A waiting period with supportive care & periodic ultrasound or CT scan is worthy to be tried in the hope of spontaneous resolution or maturation of the cyst. Since our patient presented with symptomatic and matured cysts, this

waiting period did not apply and surgical intervention was justified.

The main objections to external drainage procedure is a high recurrence rate, prolonged persistence of fistula, excessive losses of fluid and electrolytes and severe skin breakdown,⁽²³⁾ even though, external drainage should remain the treatment of choice in those rare cases in which the cyst wall is thin, immature or evidence of abscess is encountered at operation.

Numerous studies have compared percutaneous to open surgical drainage of pancreatic pseudocysts.⁽²⁴⁾ While some comparisons showed no difference,⁽²⁵⁾ a higher morbidity & mortality were reported in the percutaneous approach by others.⁽²³⁾ Similar results in terms of success, morbidity and mortality have been reported by Melman et al study,⁽²⁶⁾ comparing endoscopic drainage with surgery. More recent, complication rates of open surgery have been in the region of 5 - 15%,⁽²⁷⁾ with little or no mortality, combined with the very low rate of recurrence, mean that this option is still effective & having low morbidity compared with other management approaches.

The type of internal drainage depends on the location of the cyst. For cysts that occur in the body or tail of pancreas either a cysto-jejunostomy or cysto-gastrostomy is performed. For cysts that occur in the head of pancreas a cysto-duodenostomy is usually performed.⁽²⁾ Open Cysto-gastrostomy has the advantage of being a simpler and more readily accomplished technical procedure, it is most useful when the cyst is retrogastric and adherent to the posterior wall of the stomach.

In this case, the pseudocyst was large & of more than six weeks' duration in the lesser sac & it was densely adherent to the posterior gastric wall, hence transgastric cystogastrostomy was performed without any complications in addition it has the advantage of ease & speed of performance (operative time 55 min).

A theoretical disadvantage of this anastomosis is that it allows free access of hydrochloric acid and food particles into the cyst cavity & postoperative gastrointestinal hemorrhage which was observed in few cases. This is directly related to the effects of gastric acid entering the cyst cavity or that the edges of the stomach wall not well sutured.⁽²²⁾

The excellent results observed in children following this procedure seem to outweigh its disadvantages, this type of internal drainage is regarded the procedure of choice & has success rate of 85-90%⁽²⁾.

When cyst-gastrostomy is employed, they recommend using a tube gastrostomy for gastric drainage and keeping the patient without oral intake for approximately ten days. This prevents acid and food particles from entering the cyst and places the pancreas at rest.⁽²⁸⁾ During this time interval, the child may be maintained on peripheral hyperalimentation.

Because of lack of total parenteral nutrition in our country we kept the patient on maintenance intravenous fluid with electrolytes supplement for 4 days then the nasogastric tube removed to start a gradual oral feeding, although hematemesis developed on the second postoperative day, it was stopped by giving H2-blocker (ranitidine).

Our patient had no significant complications postoperatively. Four weeks later, a new ultrasound revealed absence of pancreatic pseudocyst completely, the boy was followed up for one year & was having a good health & free of any sequelae.

Conclusion: Open cystogastrostomy for pancreatic pseudocyst in children is very effective in relieving symptoms as it promotes adequate internal drainage with few postoperative complications and a short hospital stay.

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