

A Pancreatic Pseudocyst in a Child: A Blunt Cause, a Straightforward Treatment

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Abstract

A pancreatic pseudocyst is an accumulation of fluid that is almost always sterile and rich in digestive enzymes and pancreatic juice. It is encapsulated in a wall of fibrous tissue and granulation tissue without an epithelial lining. Pseudocysts can occur from complications in the pancreas that lead to the obstruction or rupture of a pancreatic duct. Pancreatic pseudocyst is an uncommon disorder in children. We report the case of a 10-year-old boy diagnosed with a symptomatic pancreatic pseudocyst, with progressive growth that resulted from closed abdominal trauma. Due to the characteristics of the pseudocyst, a transgastric endoscopic drainage was chosen as a first-line treatment and it allowed for a complete recovery of the patient with no need for further treatments, specifically pancreatic stenting.

Keywords: Child; Drainage; Endosonography; Pancreas/injuries; Pancreatic Pseudocyst/diagnosis; Pancreatic Pseudocyst/therapy; Wounds, Nonpenetrating/complications

Introduction

Pancreatic pseudocyst is a well-recognized complication of some pancreatic diseases, namely acute or chronic pancreatitis. It is uncommon in children and generally is associated with pancreatic trauma.^{1,2} According to the Atlanta classification, a pancreatic pseudocyst is defined as a collection of fluid encapsulated within a well-defined inflammatory wall that does not contain solid elements. It is observed after a period of more than four weeks after the initial pancreatic offense.^{3,4} Unlike a true cyst, a pseudocyst has no epithelial lining,⁵ and the wall that encapsulates it is formed by fibrous and granulation tissue.⁶ A pancreatic pseudocyst usually has

an oval or rounded shape formed by an accumulation of fluid that is almost always sterile, hypocellular, and rich in digestive enzymes and pancreatic juice.⁵

Pseudocysts are usually located within or adjacent to the pancreas itself in the lesser sac.^{8,9}

Symptoms associated with pancreatic pseudocysts include abdominal pain (75%-90%), nausea, early satiety, and vomiting (50%-70%), weight loss (20%-50%), palpable masses (25%-45%), persistent fever (10%), and jaundice (10%). Pancreatic pseudocyst may cause compression on adjacent organs.⁶

Classification of pancreatic pseudocysts eases treatment. The Nealon and Walser seven classifications of pseudocysts propose, according to the clinical picture, anatomical findings, deviations in the main pancreatic duct, and whether or not there is communication with the pseudocyst.⁷

Treatment options range from medical management to different forms of drainage procedures, surgically or non-surgically. Non-surgical treatments include percutaneous drainage, guided by ultrasound or computed tomography, or an internal endoscopic approach, transpapillary or transparietal.^{9,10,11}

Our experience with adults encouraged us to perform endoscopic drainage procedures on children with pancreatic pseudocyst in suitable cases.

Case Report

A 10-year-old boy who had a car accident in May 2019, was admitted to the emergency room with a closed abdominal trauma determining acute traumatic pancreatitis, hepatic lesion, and a large volume hemoperitoneum. On admission, the patient was alert and hemodynamically stable. Abdominal examination was remarkable considering the right upper quadrant tenderness. He underwent conservative treatment, with

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improvement in the complaints. In July, when carrying out an ultrasound follow-up, a large pancreatic pseudocyst (13.6 x 7.7 x 13.7 cm) was detected, with no associated symptoms. However, a few weeks later, he referred to early satiety and increased abdominal perimeter with a painful, palpable abdominal mass in the upper quadrants. In the ultrasound, there was a dimensional increase in the pseudocyst (18.3 x 17 x 12 cm). After a multidisciplinary discussion, a minimally invasive approach with a transgastric endoscopic drainage was decided on. It was assumed that a second endoscopic intervention, namely an endoscopic retrograde cholangiopancreatography (ERCP) with pancreatic duct stenting would probably be necessary afterwards.

Given the size/weight of the child, a diagnostic radial echoendoscope (Pentax 3270 UK, Pentax Medical, Simmédica, Portugal) was used. A large hypoechoic formation, with liquid/liquid level, which compressed the entire posterior face of the stomach was identified (Fig. 1). After the puncture of the pancreatic pseudocyst with a 19 Ga Boston needle (Boston Scientific Portugal, Lisbon, Portugal), a sample of fluid was collected, and a 0.035 in guidewire (Micro-Tech, Nanjing National Hi-Tech, Germany) was inserted. A cystogastric fistula was created with a 6 Fr cystotome (Cook Medical, Cook Ireland, Ireland) and dilated to 8 mm with a balloon (Endo-Flex, Endo-Flex GmbH, Germany). Two double pigtail 7 Fr stents (one with 5 cm and another with 7 cm) were then inserted.

The fluid sample of the cyst showed an amylase level of 133,825 U/L, and the microbiological study was negative. He presented fewer complaints and was discharged, having an increased body weight and tolerating an oral diet. Four weeks later, a magnetic resonance cholangiography was performed that revealed a marked reduction in the dimensions of the collection (26 x 20 mm) without dilation or disruption of the main pancreatic duct. The ERCP was postponed and because the patient remained well, the stents were removed

three months after the procedure, with no need for further interventions. He is currently doing well one year past the endoscopic drainage.

Discussion

Pancreatic pseudocysts are intra- or peripancreatic non-epithelium-lined fluid collection resulting from inflammation or trauma. Spontaneous resolution is reported, varying from 25%-50%, and the traumatic pseudocysts in children generally have a favorable prognosis.¹¹ Generally, it is accepted that if a pseudocyst persists for six or more weeks or if a progressive increase in size occurs, a spontaneous resolution is less likely.¹⁷ Pseudocyst rupture is a possible major complication in children, whereas abscess formation, hemorrhage, and fistula formation are usually not encountered.¹²

Percutaneous, endoscopic, and surgical drainage procedures are available for large, persistent, or symptomatic pseudocysts.¹¹

Endoscopic drainage of pseudocysts was introduced in the 1980s and is reported to be safe and effective. It has become the main therapeutic modality in the drainage of pseudocysts.^{11,13} Presently, the use of endoscopic ultrasound has grown considerably.¹⁴ Endoscopic ultrasound can help in finding the optimal site for the puncture of the pseudocyst and subsequent stent placement by assessing the wall thickness and the distance from stomach or duodenum to pseudocyst, and by identifying major vascular structures.^{13,14} However, endoscopic ultrasound has been limited mostly to diagnostic use in children, with only a few case reports describing its therapeutic role in pseudocysts.¹³

Standard endoscopic ultrasound (EUS) endoscopes (with diameters ranging from 11.4 to 13.9 mm) are relatively large and at times challenging to intubate the esophagus, especially in smaller patients.¹³

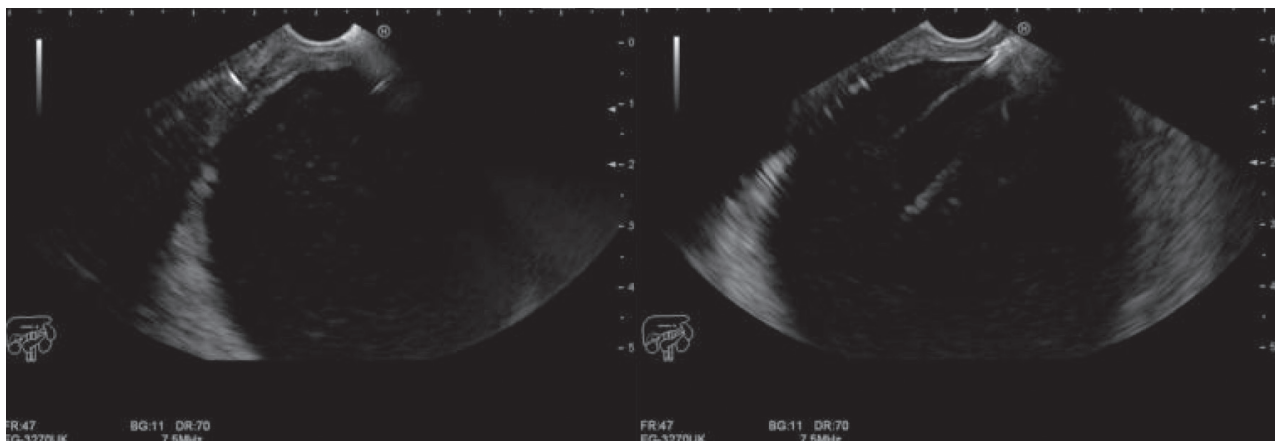


Figure 1. Endoscopic ultrasound image of a pseudocyst punch with a 19 Ga Boston needle.

In the case presented, a diagnostic radial echoendoscope with an insertion tube diameter of 10.8 mm was used, nevertheless, with difficult intubation. It is important to recognize that the esophageal intubation of a small child with a standard EUS scope carries an increased risk of cervical esophageal perforation. However, there are studies reporting successful EUS with standard echoendoscopes on children with ages ranging 6-36 months.¹⁵ It was established that standard adult EUS equipment and accessories used, in all patients, could also be used to successfully perform procedures in children 3 years of age or older.¹⁵

With regard to the best therapeutic approach, a systematic review that compared the drainage of the pancreatic pseudocyst by endoscopic, percutaneous, and surgical routes concluded that endoscopic and surgical drainage are equally effective, but that endoscopic drainage requires shorter hospitalization with lower costs and better results in patients' quality of life.¹⁰ The literature comparing endoscopic and percutaneous drainage is limited, but in one retrospective study, both modalities were found to be equally efficient. However, the percutaneous drainage group had higher rates of reintervention and a longer length of hospitalization. The development of troublesome external pancreatic fistula and infection are major drawbacks associated with percutaneous drainage.¹⁰ External pancreatic fistula is the most common complication and develops in about 8.2% of patients undergoing percutaneous drainage.¹⁶ Surgical or percutaneous drainage should be considered in patients who have anatomical reasons for avoiding endoscopy.^{16,17} In the presented case, cyst characteristics were compatible with attractive features for endoscopic therapy: size > 5 cm, gut or gastric compression, single cyst, mature cyst, and absence of a disconnected segment of pancreatic duct. Problematic features for endoscopic approach are multiple cysts, adjacent inflammation or disconnected pancreatic segment, portal hypertension, necrosis, or debris in the pancreatic pseudocyst, especially if infected.¹⁸

The choice between transmural (transduodenal or transgastric) or transpapillary drainage depends on the characteristics of the pseudocyst and its location.^{3,4} Transmural drainage requires that the cyst compress the gastric or gut lumen and permits placement of multiple stents. Transpapillary drainage requires duct communication with the pancreatic pseudocyst and is limited by the diameter of those communicating ducts. Transpapillary drainage of pancreatic pseudocyst involves the placement of a pancreatic ductal stent in cases with small collections (< 6 cm) communicating with the pancreatic duct. In our case, the child had

a pseudocyst with large dimensions (18.3 x 17 x 12 cm), which limited the transpapillary approach. Two double-pigtail plastic stents are often placed to maintain patency, thereby allowing for the complete resolution of the pseudocyst and minimizing the effect of spontaneous stent migration, but these often need replacement because of dysfunction and migration.¹⁸ Stents are typically left *in situ* for four to six weeks until an imagological exam shows cyst resolution or until clinically evident cyst infection requires stent change.¹⁹ Furthermore, the endoscopic placement of multiple plastic stents can be technically difficult. Therefore, the use of a single completely covered self-expanding metallic stent has been suggested as an alternative.¹⁸ These devices allow a single-step creation of a large diameter fistula. In a number of studies, including a recent meta-analysis, of metal *versus* plastic stents for the drainage of pancreatic fluid collections, the use of metal stents was found to be related with improved clinical success, showing fewer adverse events and reduced bleeding in comparison with plastic stents.¹⁹ However, stent migration occurs in up to 15% of patients and bleeding requiring embolization, stents becoming buried under gastric mucosa, and a biliary stricture related to mechanical compression from a stent have all been reported.¹⁸ One distinct advantage of plastic over metal stents is that they can be left *in situ* for prolonged duration, in cases of non-resolving pancreatic fluid collections or disconnected pancreatic duct.²⁰ Metal stents need to be removed after a length of time, since stent impaction, due to tissue ingrowth or overgrowth, is a possibility.²¹ In the present case, the choice of a plastic stent was due to limitations imposed by the echoendoscope (size of the stent was too large for the working channel of the echoendoscope used) and limitations imposed by the stent itself. Not only in terms of possible complications, migration, or bleeding but, probably, also because a metal stent was too long and, therefore, difficult to deploy when the stomach lumen is reduced by the mass effect of the cyst.²² As mentioned before, it was not necessary to perform ERCP. In children, pseudocysts are more commonly due to injury to the gland substance rather than the ducts.²³ Proximal ductal injuries require internal drainage with ERCP.²⁴ In this case, there was only an injury to the pancreatic gland without any damage to the ducts and so there was no need for the ERCP to be performed. No serious complication or mortality has, so far, been reported after the endoscopic drainage of pancreatic pseudocyst in children, although in adults, bleeding, infection, peritoneal leak, and recurrence of cysts can be expected in up to 20% of the cases.²¹

An appropriate diagnosis and multidisciplinary management allowed for a successful and minimally invasive treatment of this pseudocyst due to trauma in a 10-year-old patient. A multidisciplinary approach is recommended so that the best result and the best strategies can be achieved. When considering the characteristics of the pseudocyst in this specific case, a joint medical decision was made to use transgastric drainage. The pancreatic pseudocyst features were prominent for endoscopic therapy: can be seen endoscopically (compresses the entire posterior face of the stomach), size > 5 cm, with a single cyst and absence of a disconnected segment of pancreatic duct. Although the published data regarding the endoscopic therapy of pancreatic pseudocyst on children is limited, the favorable results in our case support this modality of management.

WHAT THIS CASE REPORT ADDS

- An appropriate diagnosis and multidisciplinary management may allow a successful and minimally invasive treatment of pancreatic pseudocyst in a child.
- Endoscopic drainage of pancreatic pseudocyst seems to be a safe procedure with lower costs and better results in patients' quality of life.
- Performing an ERCP is not mandatory in all cases of pancreatic pseudocyst.

References

1. Becmeur F, Dhaoui R, Rousseau P, Heintz C, Leculee R, Bientz J, et al. Post-traumatic pancreatic pseudocyst: non-operative conservative management: Report on 3 cases. *Eur J Pediatr Surg* 1993;3:302-5.
2. Cooney DR, Crosfeld JL. Operative management of pancreatic pseudocysts in infants and children: A review of 75 cases. *Ann Surg* 1975;182:590-6.
3. Rückert F, Lietzmann A, Wilhelm TJ, Sold M, Kähler G, Schneider A. Long-term results after endoscopic drainage of pancreatic pseudocysts: A single-center experience. *Pancreatology* 2017;17:555-60.
4. Banks PA, Bollen TL, Dervenis C, Gooszen HG, Johnson CD, Sarr MG, et al. Classification of acute pancreatitis 2012: Revision of the Atlanta classification and definitions by international consensus. *Gut* 2013;62:102-11.
5. Rodríguez JP, Llorente JG. Pseudoquiste pancreático gigante. *Rev Argentina Radiol* 2011;75:197-202.
6. Torres EP, Sahagún FB, Guerrero VA, Francis JM, Pineda JP. Diagnóstico y tratamiento de los pseudoquistes del páncreas en el Servicio de Gastroenterología del Hospital General de México. *Rev Med Hosp Gen* 2005;68:76-81.
7. Guardado Bermúdez F, Azuara Turrubiates A, Ardisson Zamora F, Guerrero Silva L, Villanueva Rodríguez E, Gómez de Leija N. Pseudoquiste pancreático. Revisión y reporte de caso. *Cir Cir* 2014;82:425-31.
8. Saad DF, Gow KW, Cabbabe S, Heiss KF, Wulkan ML.

Conflicts of Interest

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The authors declare that they have followed the protocols of their work centre on the publication of patient data.

9. Burciaga GC, Garza G, Leija AY. Cistogastroanastomosis por laparoscopia: manejo del pseudoquiste pancreático. *Cir Gen* 2012;34:280-5.
10. Nabi Z, Basha J, Reddy DN. Endoscopic management of pancreatic fluid collections-revisited. *World J Gastroenterol* 2017;23:2660-2672.
11. Patty I, Kalaoui M, Al-Shamali M, Al-Hassan F, Al-Naqeeb B. Endoscopic drainage for pancreatic pseudocyst in children. *J Pediatr Surg* 2001;36:503-5.
12. Arkovitz MS, Johnson N, Garcia VF. Pancreatic trauma in children: Mechanisms of injury. *J Trauma* 1997;42:49-53.
13. Ford EG, Hardin WD Jr, Mahour GH, Woolley MM. Pseudocysts of the pancreas in children. *Am Surg* 1990;56:384-7.
14. Jazrawi SF, Barth BA, Sreenarasimhaiah J. Efficacy of endoscopic ultrasound-guided drainage of pancreatic pseudocysts in a pediatric population. *Dig Dis Sci* 2011;56:902-8.
15. Sadik R, Kalaitzakis E, Thune A, Hansen J, Jönson C. EUS-guided drainage is more successful in pancreatic pseudocysts compared with abscesses. *World J Gastroenterol* 2011;17:499-505.
16. Attila T, Adler DG, Hilden K, Faigel DO. EUS in pediatric patients. *Gastrointest Endosc* 2009;70:892-8.
17. Ke L, Li J, Hu P, Wang L, Chen H, Zhu Y. Percutaneous catheter drainage in infected pancreatitis necrosis: a systematic review. *Indian J Surg* 2016;78:221-8.
18. Teoh AY, Dhir V, Jin ZD, Kida M, Seo DW, Ho KY. Systematic

review comparing endoscopic, percutaneous and surgical pancreatic pseudocyst drainage. *World J Gastrointest Endosc* 2016;8:310-8. 29. Lehman GA. Pseudocysts. *Gastrointest Endosc* 1999;49:S81-4.

18. Téllez-Ávila FI, Villalobos-Garita A, Ramírez-Luna MÁ. Use of a novel covered self-expandable metal stent with an anti-migration system for endoscopic ultrasound-guided drainage of a pseudocyst. *World J Gastrointest Endosc* 2013;5:297-9.

19. Siddiqui AA, Kowalski TE, Loren DE, Khalid A, Soomro A, Mazhar SM, et al. Fully covered self-expanding metal stents versus lumen-apposing fully covered self-expanding metal stent versus plastic stents for endoscopic drainage of pancreatic walled-off necrosis: clinical outcomes and success. *Gastrointest Endosc* 2017;85:758-65.

20. Téllez-Aviña FI, Casasola-Sánchez LE, Ramírez-Luna MÁ, Saúl Á, Murcio-Pérez E, Chan C, et al. Permanent indwelling transmural stents for endoscopic treatment of patients with

disconnected pancreatic duct Syndrome: Long-term results. *J Clin Gastroenterol* 2018;52:85-90.

21. Chandran S, Efthymiou M, Kaffes A, Chen JW, Kwan V, Murray M, et al. Management of pancreatic collections with a novel endoscopically placed fully covered self-expandable metal stent: A national experience (with videos). *Gastrointest Endosc* 2015;81:127-35.

22. Curry L, Sookur P, Low D, Bhattacharya S, Fotheringham T. Percutaneous cystgastrostomy as a single-step procedure. *Cardiovasc Intervent Radiol* 2009;32:289-95.

23. Fugazza A, Bizzarri B, Gaiani F, Manfredi M, Ghiselli A, Crafa P, et al. The role of endoscopic ultrasound in children with pancreatobiliary and gastrointestinal disorders: A single center series and review of the literature. *BMC Pediatr* 2017;17:203.

24. Lewis G, Krige JE, Bornman PC, Terblanche J. Traumatic pancreatic pseudocysts. *Br J Surg* 1993;80:89-93.

Pseudoquisto Pancreático em idade pediátrica: Uma Causa Traumática, um Tratamento Linear

Resumo:

O pseudoquisto pancreático corresponde a uma acumulação de líquido quase sempre estéril, rico em enzimas digestivas e suco pancreático, encapsulado por uma parede de tecido fibroso e tecido de granulação sem revestimento epitelial. Os pseudoquistos podem desenvolver-se a partir de complicações no pâncreas que levam à obstrução ou rutura de um ducto pancreático. Os pseudoquistos pancreáticos são uma situação pouco frequente em crianças. Apresentamos o caso de um menino de 10 anos com diagnóstico de pseudoquisto pancreático sintomático com crescimento progressivo na sequência de

um trauma abdominal fechado. Pelas características do pseudoquisto, a drenagem endoscópica transgástrica foi escolhida como tratamento de primeira linha, permitindo recuperação completa do paciente sem necessidade de novos tratamentos, nomeadamente a colocação de uma prótese pancreática.

Palavras-Chave: Criança; Drenagem; Endossonografia; Pâncreas/lesões; Pseudocisto Pancreático/diagnóstico; Pseudocisto Pancreático/tratamento; Ferimentos não Penetrantes/complicações