

## C A S E R E P O R T

## Delayed, diffuse acute peritonitis secondary to misplacement of a cystogastrostomic “pigtail” drain in an outpatient after discharge

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**Summary.** *Background and aim of the work:* Pancreatic pseudocyst endoscopic drainage by pancreatogastrostomy “pigtail” drain placement is spreading worldwide, with high success-rate and low morbidity, and is increasingly performed as outpatient procedure. The paper reports an unusual very early complication of this procedure and discusses the peculiar aspects of this event in an outpatient setting. *Methods:* The first case of a 56-year-old outpatient developing a postoperative diffused acute peritonitis by gastric juice spilling caused by the misplacement of the distal end of two transgastric drains not reaching the pseudocyst is reported. As the case was programmed as outpatient and acute peritonitis symptoms occurred eight hours postoperatively, the patient was discharged and rehospitalized. A review of the literature of rare perforative complications of pancreatogastrostomy is performed. *Results:* CT scan allowed the prompt diagnosis, as it showed massive pneumoperitoneum, free fluid collection, and pigtail drain misplacement. Emergency laparoscopy allowed the removal of the two misplaced drains and gastric reparation. The procedure lasted 65 minutes, mostly needed for lavage. The patient was discharged 5 days later and outcomes are unremarkable 7 months after the procedure. *Conclusion:* The indication to endoscopic pancreatogastrostomy and its outpatient management should be carefully pondered. Pancreogastrostomy drain misplacement may cause a life-threatening acute peritonitis associated with early aspecific symptoms, resulting in a challenging situation, especially in an outpatient setting. CT-scan may allow prompt diagnosis and effective management by minimally invasive surgery. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** pancreatic pseudocyst, endoscopic drain, pigtail drain, complication, acute peritonitis, laparoscopy

### Introduction

Pancreatic pseudocysts are the most common pancreatic cysts, accounting for about two thirds of all pancreatic cysts, and complicate acute/recurrent pancreatitis in 20–40% (1) of cases. The risk of life-threatening complications reaches roughly 10% of cases and includes biliary duct or duodenal compression, rupture, compression or obliteration of major veins,

pseudoaneurysm, haemorrhage, pancreatic ascites due to a communicating pseudocyst-peritoneal fistula and infection (1, 2).

Symptomatic pseudocysts which fail to resolve spontaneously require drainage. Management options include endoscopically- or radiologically-guided drainage, or pseudocyst-jejunal or pseudocyst-gastric derivation by laparoscopy or open surgery (2). Endoscopic drainage is an effective treatment of pancreatic

pseudocysts and offers a definitive solution in almost three-quarters of the cases (3). Endoscopic approaches to pseudocysts are transpapillary and/or transmural through stomach or duodenum wall (1). The endoscopic transmural drainage of pancreatic pseudocyst results in a success rate and a recurrence rate of 85-100% and 10-15%, respectively, whereas morbidity and mortality reach 10-34% and 0-1%, respectively (3). Complications include bleeding, perforation, stent migration, and pseudocyst infection due to stent occlusion (4, 5).

Here we report the first case of a misplaced transgastric drain not reaching the pseudocyst, thus causing an early postoperative acute peritonitis by gastric juice spilling in the peritoneal cavity. Patients undergoing mini-invasive endoscopic procedures are increasingly managed on an outpatient basis and this complication may result in a difficult diagnosis to achieve before discharge, in a challenging situation for clinicians and surgeons and, of course, in a life-threatening condition for the patient; thus, the specific features of such a singular case are discussed, including the mini-invasive management.

### Case report

A 56-year-old patient affected by Child A alcoholic cirrhosis, had a self-limited Balthazar D (one peri-pancreatic collection), Ranson 1 (age>55) alcohol-related acute pancreatitis. Four months later, the patient underwent the endoscopic placement of a single cystogastrostomy "pigtail" drain for a 6-cm-symptomatic pseudocyst of pancreas body-tail. Since the pseudocyst did not reduce in size at CT-scan control, the patient underwent a redo procedure by endoscopic placement of two transgastric drains eight weeks later, as an outpatient. Despite the location of the pseudocyst at distance of the gastric wall (in the body-tail of the pancreas), the procedure was carried out without difficulty by an expert endoscopist. At postoperative control, the patient complained of mild nausea/discomfort without other signs/symptoms and was discharged. Eight hours after the procedure and two after discharge, the patient re-presented to the emergency room with tachycardia and epigastric tenderness/rebound.

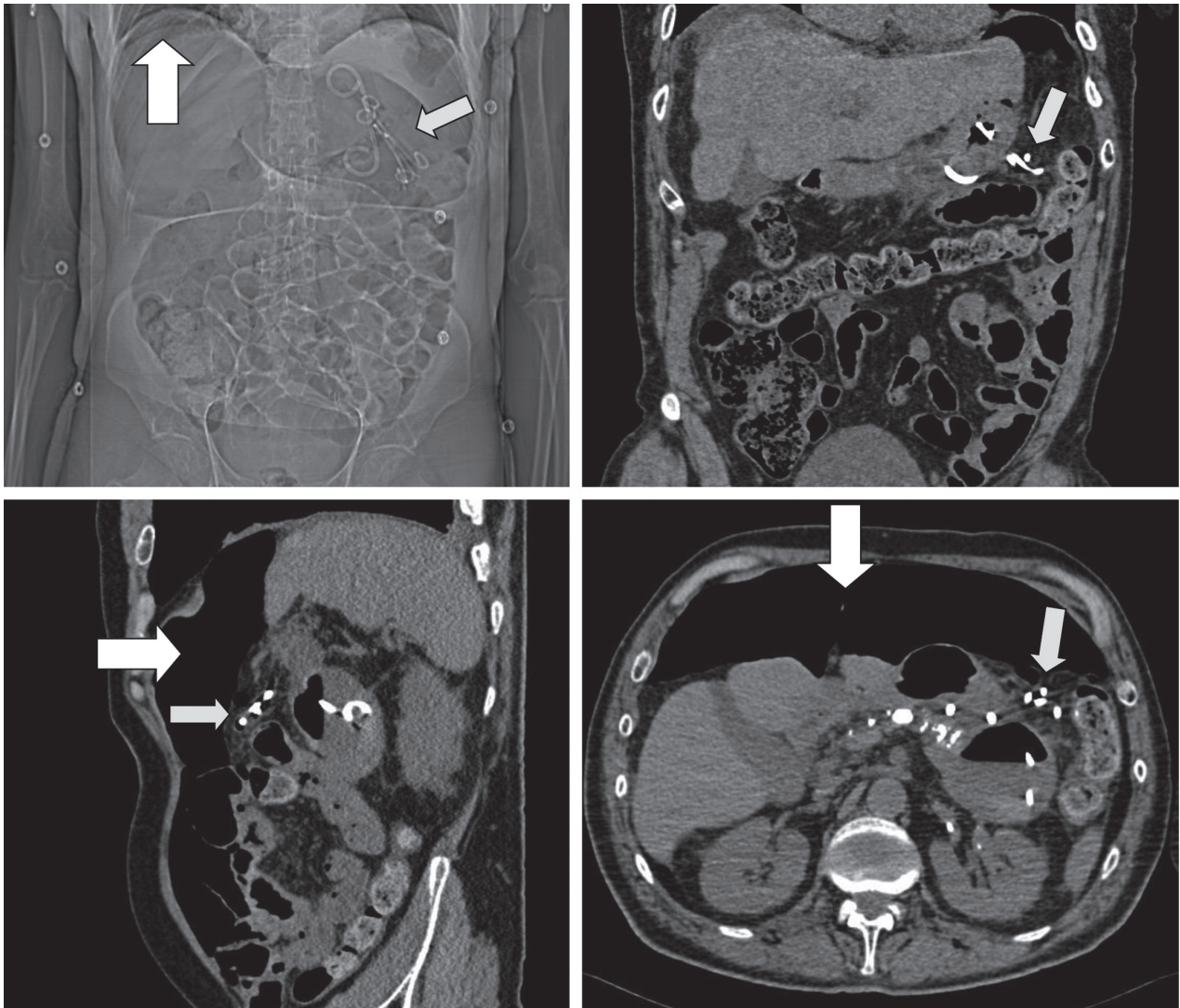
2D CT-scan (fig. 1) and 3D re-elaboration (fig. 2) showed massive pneumo-peritoneum and free fluid collection, with the distal end of two "pigtail" drains not reaching the pancreatic pseudocyst.

Emergency laparoscopy confirmed the presence of acute peritonitis and free, whitish fluid. After gastro-colic ligament division, the distal end of the two "pigtail" drains was found to be free in the omental bursa. Both drains were removed (fig. 3) and the posterior gastric wall was sutured (fig. 4). A drain was left in place. The procedure lasted 65 minutes, mostly because of the peritoneal lavage. The outcome was uneventful, with prompt recovery. The patient was discharged on postoperative day 5 and is well 7 months postoperatively.

### Discussion

The current case raises some issues concerning the transmural drainage of pancreatic pseudocyst, as well as the diagnosis and treatment of pancreatic drain misplacement. Moreover, the outpatient setting of the reported case at some level increases the potential risk for the patient and the importance of a timely and effective management of such a complication.

The two main indications for invasive management of pseudocyst are the presence of symptoms or complications, and a cyst size over than 5 cm and duration more than 6 weeks are poor predictors of spontaneous resolution without complications (6). A variety of treatment options of pancreatic pseudocysts are nowadays available, including surgical, endoscopic or percutaneous drainage (7,8). Endoscopic transmural drainage requires several conditions: the stomach/duodenal and pseudocyst must share a common wall and the distance must be <1 cm on preoperative investigations; there must be a clear impression of the wall of the stomach/duodenum at endoscopy; upper GI varices have to be absent; neoplasm and pseudoaneurysm have to be ruled out (2). Several studies identified the localization in the pancreatic head as one of the predictors of successful outcome, as well as the simultaneous insertion of multiple stents, since they may allow for a better drainage and less chance of stent occlusion (3). The inspection of the puncture



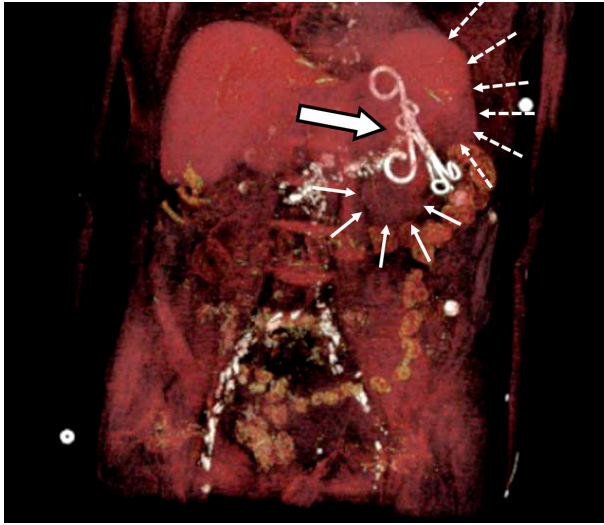
**Figure 1.** 2D CT-scan: massive pneumoperitoneum (white thick arrow) and the displaced “pigtail” drains (gray thin arrow)

site by endoscopic ultrasound (EUS) is nowadays proposed to reduce the frequency of stent misplacement, although complications are reported, including mortality (8-10). In the reported case, during the second endoscopic procedure, two drains were inserted in order to achieve a complete resolution of the pseudocyst, but cyst localization in the pancreatic body-tail should have probably considered an argument against the endoscopic transmural approach, or at least from an early discharge.

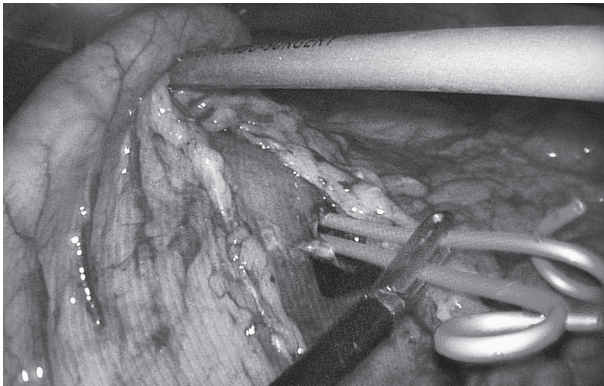
Endoscopy misplacement complications are usually diagnosed intraoperatively and managed immediately (8, 11, 12). If stent-misplacement is not recog-

nized intraoperatively, diagnosis of acute peritonitis due to gastro-peritoneal spilling may be difficult to achieve, especially if an outpatient management is planned, since the patient is followed for a limited time after the procedure, as in the present case. In this latter, indeed, the delay between the procedure and the clinical picture of diffused acute peritonitis does not allow excluding that the drains were correctly placed and accidentally moved few hours later, although the “pigtail shape” of drains should normally prevent from such a complication. A similar “delay” between the procedure and symptoms has already been described in a similar case (13), where, conversely, misplacement consisted in

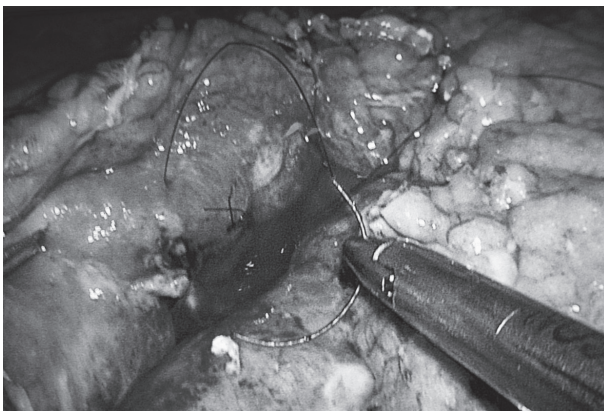




**Figure 2.** CT-scan 3D re-elaboration: stomach (thin spotted arrow), pancreatic body-tail pseudocyst (thin arrows) and the displaced “pigtail” drains (thick arrow)



**Figure 3.** Laparoscopic drain removal after gastro-colic ligament division



**Figure 4.** - Laparoscopic reparation of the posterior gastric wall

a complete drain “migration” in the peritoneal cavity; as persistent communication between the stomach and the peritoneal cavity did not exist, such an occurrence did not cause any diffuse peritonitis (13). Alternatively, in the reported case, drain misplacement may have occurred during the procedure and not after, and initial, aspecific signs/symptoms of on-going peritonitis have passed misdiagnosed as gastric juice spilling may have taken some hours to give a diffuse acute peritonitis picture. In the reported case, regardless of the timing of drain misplacement, mild nausea and discomfort were not considered worth of further exploration or overnight hospitalisation. At re-admission, physical examination and promptly performed abdominal CT scan were essential in achieving a diagnosis.

Present case’s clinical picture, timing of diagnosis and setting definitely influenced the management of such stent-related gastric perforation and do not allow for an easy generalization nor comparison with other cases. Giovannini et al. described a case of pneumoperitoneum related to the same procedure, due to a communication between the stomach and the peritoneal cavity, which was associated with mild symptoms and managed conservatively (9). Chung et al. reported a case of a migrated cystogastrostomy double pigtail stent through a pancreatic-duodenal fistula tract 6 years after its placement. In that case, stent migration occurred chronically and did not cause an open perforation nor acute peritonitis; by the way, endoscopy allowed the removal of the migrated stent without surgery (14). In general, if stent misplacement diagnosis is intraoperative, the main issue is seemingly recovering the stent, which is an easy endoscopy task if one end of the stent is still in the gastrointestinal tract; conversely, the complete misplacement of the stent is usually matter for surgeons (8), although some authors describe the successful stent retrieval by endoscopy and fluoroscopy (11, 12). If, as in the reported case, diagnosis is delayed, the main issue is arguably the management of acute peritonitis, rather than retrieving the stent. Although sporadic reports describe the conservative management of procedure-related perforation (9) and even the mini-invasive endoscopic transmural stent retrieval three days after stent positioning (13), the clinical picture of an ongoing acute peritonitis led us not to postpone surgery, and laparoscopy represented the

compromise between a mini-invasive attitude and the need of adequate drainage and lavage.

Although theoretically more difficult, the laparoscopic approach was preferred to open surgery and the procedure proved to be rapidly effective even for average laparoscopic surgeons. The emergency laparoscopic management of gastroduodenal perforations has spread in the last two decades and is nowadays considered safe and effective (15, 16). Indeed, gastroduodenal perforations are mostly peptic ulcers which are usually located in the anterior aspect of the stomach/duodenum, whereas in the present case, the perforation was located in the posterior one. Laparoscopy allowed the prompt, quick (65 min) and effective exploration of the peritoneal cavity, the easy access to the omental bursa by harmonic scalpel, drain identification and removal, gastric wall suture and peritoneal lavage. Early diet resumption and short hospital stay confirmed the advantages of such a mini-invasive approach. The short delay between perforation and surgery probably played a role in the success of such mini-invasive approach, in accordance with present literature on the subject reporting a high success rate of laparoscopic gastric perforation management if performed within 24 hours of symptoms onset (16).

A second issue concerns the adopted surgical management of the pancreatic pseudocyst: since also the second endoscopic drainage eventually failed, another surgical option could have been to perform an anastomosis between the pseudocyst and the stomach or the jejunum (cystogastrostomy or cystojejunostomy), thus treating simultaneously gastric perforation and pancreatic pseudocyst as already reported (8,17). Those authors report cases of intraoperative diagnosis of perforation immediately managed by surgery, indeed, whereas, in the reported case, the presence of diffuse acute peritonitis in a patient affected by liver cirrhosis led us to a more prudent attitude to avoid further complications, and to postpone any pseudocyst treatment.

The last issue concerns the outpatient management of such procedure, which may lead to a delay in acute peritonitis management with potential life-threatening consequences. Although one case obviously does not set the rule, the potential risk complications should be considered when deciding the ideal

hospitalization duration, and outpatient management should probably be avoided in the case of technically difficult procedures. In general, before discharge, performing a scrupulous physical examination and not postponing any imaging examination (CT-scan) whenever ongoing complications may not be ruled out, should be recommended.

In conclusion, this case shows that a partial misplacement of a cystogastric drain may cause acute peritonitis by gastric juice spilling, which may show at some hour delay after endoscopic cystogastrostomy; these features should be considered when considering an outpatient management or when examining the patient before discharge. After endoscopic cystogastrostomy, any symptom referring to the abdomen should be carefully evaluated and emergency imaging should not be postponed if a complication may not be excluded. A prompt diagnosis may allow keeping a mini-invasive attitude by treating an ongoing acute peritonitis by laparoscopy, thus letting the patient taking advantage of minimally invasive management of pancreatic pseudocyst, even in presence of a potentially life-threatening complication.

## References

1. Vitale GC, Lawhon JC, Larson GM, Harrell DJ, Reed DN Jr, MacLeod S. Endoscopic drainage of the pancreatic pseudocyst. *Surgery* 1999; 126: 616-21.
2. Rosso E, Alexakis N, Ghaneh P, et al. Pancreatic pseudocyst in chronic pancreatitis: endoscopic and surgical treatment. *Dig Surg* 2003; 20: 397-406.
3. Cahen D, Rauws E, Fockens P, Weverling G, Huibregtse K, Bruno M. Endoscopic drainage of pancreatic pseudocysts: long-term outcome and procedural factors associated with safe and successful treatment. *Endoscopy* 2005; 37: 977-83.
4. Smits ME, Rauws EA, Tytgat GN, Huibregtse K. The efficacy of endoscopic treatment of pancreatic pseudocysts. *Gastrointest Endosc* 1995; 42: 202-7.
5. Sharma SS, Bhargawa N, Govil A. Endoscopic management of pancreatic pseudocyst: a long-term follow-up. *Endoscopy* 2002; 34: 203-7.
6. Habashi S, Draganov PV. Pancreatic pseudocyst. *World J Gastroenterol* 2009; 15: 38-47.
7. Varadarajulu S, Bang JY, Sutton BS, Trevino JM, Christein JD, Wilcox CM. Equal efficacy of endoscopic and surgical cystogastrostomy for pancreatic pseudocyst drainage in a randomized trial. *Gastroenterology* 2013; 145: 583-90.
8. Henriksen FW, Hancke S. Percutaneous cystogastrostomy

- for chronic pancreatic pseudocyst. *Br J Surg* 1994; 81: 1525-8.
9. Giovannini M, Pesenti C, Rolland AL, Moutardier V, Delpéro JR. Endoscopic ultrasound-guided drainage of pancreatic pseudocysts or pancreatic abscesses using a therapeutic echo endoscope. *Endoscopy* 2001; 33: 473-7.
  10. Hikichi T, Irisawa A, Takagi T, et al. A case of transgastric gallbladder puncture as a complication during endoscopic ultrasound-guided drainage of a pancreatic pseudocyst. *Fukushima J Med Sci* 2007; 53: 11-8.
  11. Varadarajulu S. EUS-guided retrieval of a migrated transgastric pancreatic stent. *Endoscopy* 2007; 39(Suppl 1): E18-E19.
  12. Mahnken AH, Günther RW, Winograd R. Percutaneous transgastric snaring for repositioning of a dislocated internal drain from a pancreatic pseudocyst. *Cardiovasc Intervent Radiol* 2008; 31(Suppl 2): S217-S220.
  13. Wang GX, Liu X, Wang S, et al. Stent displacement in endoscopic pancreatic pseudocyst drainage and endoscopic management. *World J Gastroenterol* 2015; 21: 2249-53.
  14. Chung IH, Kim HW, Lee DK. Endoscopic removal of a migrated cystogastrostomy double pigtail stent through a pancreatico-duodenal fistula tract. *J Interv Gastroenterol* 2011; 1: 142-4.
  15. Naesgaard JM, Edwin B, Reiertsen O, Trondsen E, Faerden AE, Rosseland AR. Laparoscopic and open operation in patients with perforated peptic ulcer. *Eur J Surg* 1999; 165: 209-14.
  16. Bertleff MJ, Lange JF. Laparoscopic correction of perforated peptic ulcer: first choice? A review of literature. *Surg Endosc* 2010; 24: 1231-9.
  17. Palanivelu C, Senthilkumar K, Madhankumar MV, et al. Management of pancreatic pseudocyst in the era of laparoscopic surgery--experience from a tertiary centre. *Surg Endosc* 2007; 21: 2262-7.

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Received: 29 August 2017

Accepted: 31 August 2017

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