Novel treatment (new drug/intervention; established drug/procedure in new situation)

Percutaneous minimally invasive necrosectomy following endoscopic transgastric drainage in acute necrotising pancreatitis

Michelle Lisa Gardener,¹ Keith Roberts,¹ Gareth Morris-Stiff,² Andrew M Smith¹

¹Hepatobiliary Surgery Department, St James's University Hospital NHS Trust, Leeds, UK;

²Surgery Department, Cwm Taf NHS Trust, Llantrisant, RCT, UK

Correspondence to Dr Michelle Lisa Gardener, mgardener@doctors.org.uk

Summary

A patient who had undergone failed transgastric placement of two cystgastrostomy stents referred to the regional pancreatic unit with ongoing sepsis for further management. Following stabilisation, percutaneous minimally invasive necrosectomy (MIN) was performed. MIN resulted in sustained clinical resolution of the sepsis and normalisation of serum C reactive protein levels. The transgastric drains were removed by MIN and, importantly, the patient did not develop a gastric fistula. To our knowledge, this is the first report of MIN following endoscopic cystgastrostomy stent placement. Pancreatic necrosis progresses from solid to semisolid to liquid states over a period of several months. Transgastric drainage should be reserved for subjects with either a pancreatic abscess or predominantly liquid necrosis reserving MIN for patients with systemic sepsis and those with semisolid necrosis. As increasing strategies to treat pancreatic necrosis become available clinicians must be alert to the development of new complications of these treatments.

BACKGROUND

Necrotising pancreatitis complicates approximately 20% of patients with severe acute pancreatitis, and is associated with a high rate of morbidity and mortality.¹ Secondary infection of the necrotic tissue, leading to sepsis and multi-organ dysfunction, is one of the main causes of death.²⁻³ Management strategies are varied and depend on the patient, the composition of the necrotic tissue, any fluid collections,⁴ and local practice. The optimum course of management is controversial.¹⁻⁵

The traditional management for infected pancreatic necrosis is open necrosectomy, but this invasive procedure has high rates of complication and death.¹⁻⁶ The 'step up' study has demonstrated that minimally invasive necrosectomy (MIN) is effective and associated with fewer complications.¹⁻⁵ Another technique is drainage of infected necrotic tissue via an endoscopically placed transgastric stent¹⁻⁵⁻⁷ but problems with this technique include stent blockage when the consistency of the necrosis is mainly solid, and stent displacement.

Performing percutaneous MIN in a patient with cystgastrostomy drains could be complicated by the development of a gastric fistula. We managed such a patient with percutaneous necrosectomy with a successful outcome and present the case. This report highlights the need for individualised management of patients with acute necrotising pancreatitis.

CASE PRESENTATION

A 44-year-old man was admitted to his local hospital with gallstone-induced pancreatitis. Admission blood tests showed an amylase of 1885 U/l, white cell count of $19.6 \times 10^9/l$ and a bilirubin of 38 $\mu\text{mol/l}$. During the course of admission, the patient developed sepsis as demonstrated

by a persistent rise in inflammatory markers associated with recurrent fever. This led to investigation by means of a CT scan 4 weeks following presentation, which demonstrated necrosis of the body and tail of the pancreas together with a large peri-pancreatic fluid collection related to the pancreatic body (18.5×10.5 cm).

Total parenteral nutrition (TPN), insulin therapy for new onset diabetes and intravenous antibiotic therapy were instigated. Due to persistent elevation of the white cell count, C reactive protein (CRP) and temperature as well as a lack of clinical improvement, endoscopic cystgastrostomy was performed and a 10F double pigtail stent inserted. Copious volumes of thick pus were initially drained and this was followed by a short period of clinical and radiological improvement. CT imaging performed 10 days later to investigate rising inflammatory markers revealed further fluid collections indicating the stent had become blocked. Furthermore gas was identified within the collections suggesting secondary infection. A further endoscopy was performed at which pus was seen draining into a hole in the posterior wall of the stomach. Imaging demonstrated the stent had migrated to lie entirely within the necrotic cavity (figure 1). A second endoscopic cystgastrostomy was performed with a 9 cm/10F double pigtail stent, and again thick pus was seen draining.

TREATMENT

Due to a persistent lack of clinical improvement, 10 weeks following presentation, the patient was transferred to the regional pancreatic unit. A CT scan showed a residual peri-pancreatic thick-walled collection containing gas despite well-positioned drains. The 13.5×5.2 cm collection replaced most of the pancreas in keeping with extensive

Figure 1 CT image demonstrating the migrated stent within the pancreatic necrosis, which contains gas, indicating secondary infection.

necrosis. Nasojejunal (NJ) feeding was commenced and TPN discontinued.

Given the predominant solid nature of the necrosis it was felt that a further transgastric approach would not be successful. A percutaneous 12F non-locking pigtail catheter was inserted under CT guidance using a left retroperitoneal approach. MIN was performed by upsizing the percutaneous drain (32F) and performing necrosectomy using a rigid cystoscope. This was performed four times at weekly intervals. At the second and third procedures the cystgastrostomy stents were removed. There was no evidence of a gastric fistula at any point as assessed by giving the patient dilute methylene blue to drink before and following the procedure. At the final necrosectomy, the cavity was clear of necrotic material and lined with healthy granulation tissue. The process of repeated necrosectomy was associated with a gradual decrease in inflammatory markers and sustained clinical improvement.

OUTCOME AND FOLLOW-UP

The patient was left with a low volume amylase rich pancreatic fistula. He was discharged with a drain insitu and was receiving the somatostatin analogue octreotide (200 mcg subcutaneous three times a day).⁸ Figure 2 illustrates the trend in the patient's CRP, as a marker of inflammatory burden, during the episode of pancreatitis and its management. This patient's recovery was sustained following discharge from hospital and during a 3-month follow-up the pancreatic drain was removed after resolution of the fistula.

DISCUSSION

We report for the first time that MIN can be performed safely in a patient with previous cystgastrostomy stent placement. We were able to deliver both transgastric stents

Figure 2 C reactive protein (CRP) levels during the course of pancreatitis. This illustrates temporary improvement associated with the placement of cystgastrostomy stents and a gradual improvement following the commencement of repeated minimally invasive necrosectomy. The cystgastrostomy drains were removed during the second and third. The elevation of the CRP after the third necrosectomy was associated with a brief episode of sepsis possibly secondary to bacterial translocation.

through the retroperitoneum and there was no development of a gastric fistula. Had the patient developed a fistula we had planned to treat this conservatively and continue NJ feeding. TPN was avoided due to infective complications associated with line insertion.⁹

It can be predicted that increasing numbers of patients will be treated by endoscopic means as pancreatitis is a common problem and endoscopic procedures are widely performed.

In this case cystgastrostomy drainage was not associated with a sustained improvement in clinical condition as the majority of necrosis was solid/semisolid. Transfer to a specialist unit permitted percutaneous necrosectomy of infected necrotic tissue via MIN. This approach is supported by recent studies.¹⁻⁶ Simple drainage of infected material is encouraged, by transgastric or percutaneous approach, when a liquid component predominates (pancreatic abscess or liquefied necrosis).¹⁰ Necrosectomy is required if solid or semisolid necrosis is present though it must be appreciated that this is more effective as necrosis becomes increasingly liquid.¹¹ Placement of a cystgastrostomy stent without necrosectomy will allow only the liquid component to drain and is likely to result in stent occlusion. Percutaneous necrosectomy is associated with less comorbidity and complications than open necrosectomy,¹⁻¹² particularly in an unwell patient such as in this case.

This case highlights the opinion of Carter,¹³ who states that the management of patients with acute pancreatitis is tailored to the needs of the individual patient.

Learning points

- ▶ One fifth of patients with severe acute pancreatitis develop necrotising pancreatitis.
- ▶ Transgastric cystgastrostomy is likely to fail if attempted early in the disease process when necrosis is mainly solid; percutaneous MIN or open necrosectomy is required to debride solid or semisolid necrosis.
- ▶ It appears safe to perform MIN following previous placement of transgastric stents
- ▶ Percutaneous MIN is associated with less comorbidity and mortality than open necrosectomy.
- ▶ Management of acute necrotising pancreatitis should be tailored to the individual patient considering causation, the nature of necrosis, organ dysfunction and nutritional requirements. Early discussion with a specialist unit is essential in patients with organ dysfunction.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **van Santvoort HC**, Besselink MG, Bakker OJ, *et al.*; Dutch Pancreatitis Study Group. A step-up approach or open necrosectomy for necrotizing pancreatitis. *N Engl J Med* 2010;**362**:1491–502.
2. **Cheung MT**, Ho CN, Siu KW, *et al.* Percutaneous drainage and necrosectomy in the management of pancreatic necrosis. *ANZ J Surg* 2005;**75**:204–7.
3. **Tang LJ**, Wang T, Cui JF, *et al.* Percutaneous catheter drainage in combination with cholelithotomy-guided debridement in treatment of peripancreatic infection. *World J Gastroenterol* 2010;**16**:513–7.
4. **Belle S**, Collet P, Post S, *et al.* Temporary cystgastrostomy with self-expanding metallic stents for pancreatic necrosis. *Endoscopy* 2010;**42**:493–5.
5. **Steinberg WM**. A step-up approach, or open necrosectomy for necrotizing pancreatitis. *N Engl J Med* 2010;**363**:1286–7; author reply 1287.
6. **Navaneethan U**, Vege SS, Chari ST, *et al.* Minimally invasive techniques in pancreatic necrosis. *Pancreas* 2009;**38**:867–75.
7. **Seifert H**, Biermer M, Schmitt W, *et al.* Transluminal endoscopic necrosectomy after acute pancreatitis: a multicentre study with long-term follow-up (the GEPARD Study). *Gut* 2009;**58**:1260–6.
8. **Montorsi M**, Zago M, Mosca F, *et al.* Efficacy of octreotide in the prevention of pancreatic fistula after elective pancreatic resections: a prospective, controlled, randomized clinical trial. *Surgery* 1995;**117**:26–31.
9. **Al-Omran M**, Albalawi ZH, Tashkandi MF, *et al.* Enteral versus parenteral nutrition for acute pancreatitis. *Cochrane Database Syst Rev* 2010;**1**:CD002837.
10. **Cheung MT**, Li WH, Kwok PC, *et al.* Surgical management of pancreatic necrosis: towards lesser and later. *J Hepatobiliary Pancreat Sci* 2010;**17**:338–44.
11. **Papachristou GI**, Takahashi N, Chahal P, *et al.* Peroral endoscopic drainage/debridement of walled-off pancreatic necrosis. *Ann Surg* 2007;**245**:943–51.
12. **Parekh D**. Laparoscopic-assisted pancreatic necrosectomy: a new surgical option for treatment of severe necrotizing pancreatitis. *Arch Surg* 2006;**141**:895–902; discussion 902–893.
13. **Carter R**. Percutaneous management of necrotizing pancreatitis. *HPB (Oxford)* 2007;**9**:235–9.

This pdf has been created automatically from the final edited text and images.

Copyright 2012 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Gardener ML, Roberts K, Morris-Stiff G, Smith AM. Percutaneous minimally invasive necrosectomy following endoscopic transgastric drainage in acute necrotising pancreatitis. *BMJ Case Reports* 2012;10.1136/bcr.03.2012.6137, Published XXX

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow

Keep up to date with all published cases by signing up for an alert (all we need is your email address) <http://casereports.bmj.com/cgi/alerts/etoc>