

# Gastrosopic Pancreatic Necrosectomy – reporting the first two cases performed at Mater Dei Hospital

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## Abstract

Infected pancreatic necrosis was conventionally treated with open surgical techniques, but this approach was associated with a very high morbidity and mortality. Over the past two decades minimally invasive techniques have proved to be both effective and safe.

We present two cases of walled-off pancreatic necrosis secondary to severe biliary acute pancreatitis. Both patients were males in the fifties suffering from organ failure related to their disease. Regular pancreatic computed tomographic scans (CT) demonstrated evolving walled-off pancreatic necrosis.

Pancreatic necrosectomy was performed safely and effectively with readily available ERCP and gastroscopic equipment, using EUS as a crucial adjunct for confirmation and localisation. This procedure should be considered as the treatment of choice for this condition which commonly causes organ failure.

## Key Words

Severe acute pancreatitis (SAP), minimally invasive techniques, walled-off pancreatic necrosis (WOPN), necrotising pancreatitis (NP), acute pancreatic necrosis (ANC), necrosectomy

## Case Presentation

The two male patients in their fifties presented to the emergency department with severe, generalised abdominal pain associated with vomiting and pyrexia. Patient A was a previously fit and healthy individual with a normal body habitus. Patient B was a morbidly obese non-insulin dependent diabetic gentleman with a history of sleep apnoea and depression. Their admission serum levels were more than 2000U/l. Liver function tests were deranged with a cholestatic picture. CT confirmed the diagnosis of severe necrotising acute pancreatitis in both patients, with ultrasound scan confirming gall bladder stones. The patients were admitted for

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## Case Report

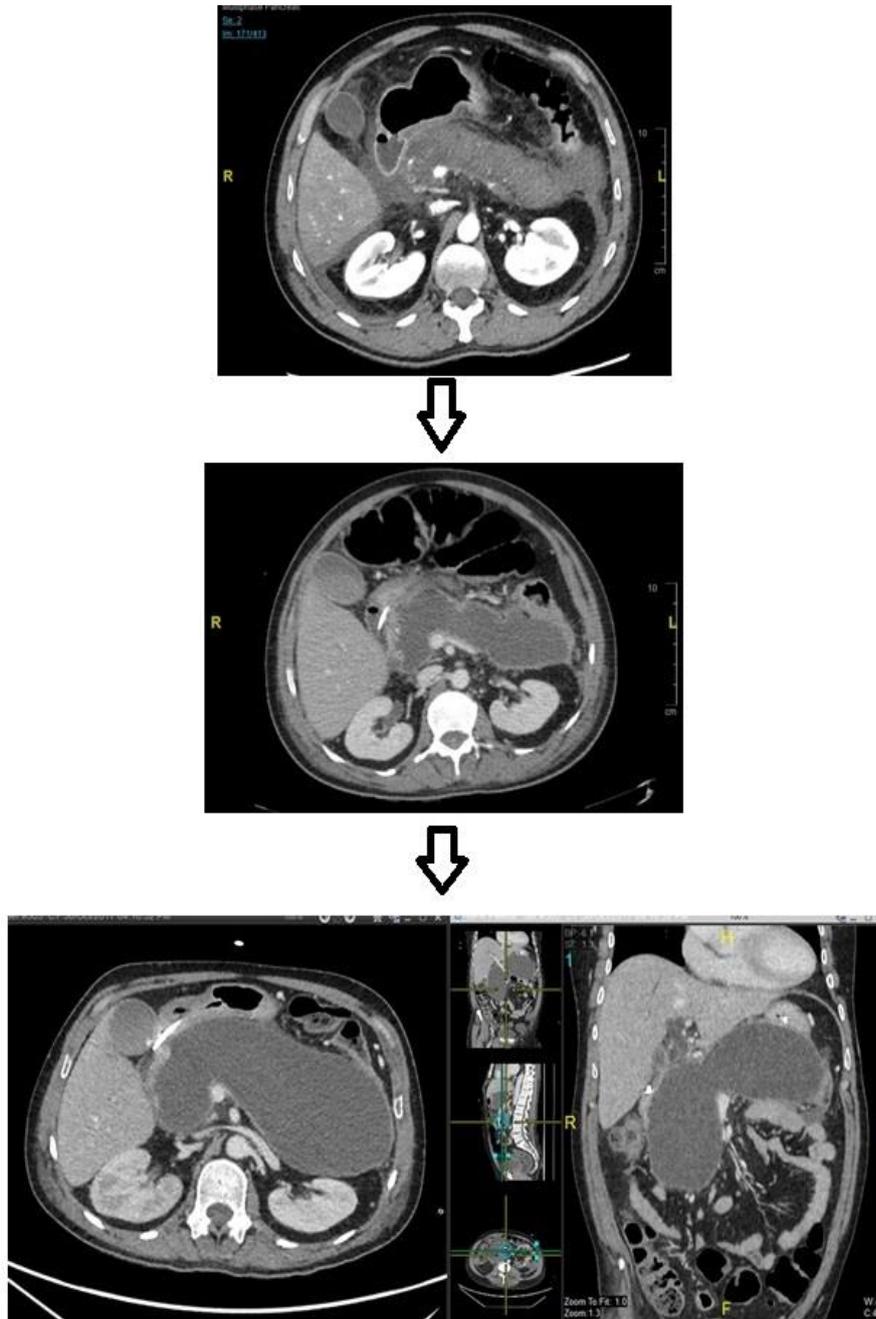
supplemental oxygen, intravenous fluids and analgesia.

Two days post-admission, with a serum lactate level of 6.2mmol/L and a C-reactive protein of 442mh/L, patient A was transferred to the intensive care unit with multi-organ failure. He was suffering from hypoxia, hypotension, uncontrolled hyperglycaemia and renal failure. Total parenteral

nutrition was instituted as there was failure of naso-gastric and naso-jejunal feeding.

Repeat serial CT scans performed during his 6 weeks of ITU admission confirmed that the pancreatitis was necrotising in nature with no enhancing parenchyma and revealed an evolving WOPN. (*Figure 1*).

**Figure 1:** Serial CT scans of patient A, showing progression of SAP to a large, sausage-like WOPN, measuring 19cm by 8cm in size, effacing the splenic vein



## Case Report

At 6 weeks, despite making a remarkable recovery in terms of his ventilatory and cardiovascular status, his septic markers deteriorated rapidly indicating the need for intervention.

Patient B had a more benign course and did not require intensive support until the 4<sup>th</sup> week post-admission. At this time his 20cm diameter WOPN caused gastric outlet obstruction, worsening jaundice with a bilirubin level peaking at 250mg/l, hypoxia, hypotension and renal failure. An intervention was performed at this time.

The procedures were performed under general anaesthesia, with antibiotic cover. With a linear EUS probe, the WOPN was delineated,

punctured and a guide-wire passed into it. A side-viewing endoscope was passed, and the posterior gastric wall was punctured with a pre-cut knife and the tip of a diathermy snare. A sphincterotome was then passed into the WOPN and the cyst-gastrostomy widened to 1cm. A forward viewing gastroscope was then exchanged and the cyst-gastrostomy was dilated to 20mm with an oesophageal balloon. The gastroscope was then inserted into the necrosis and debridement performed with biopsy forceps and a polyp-retrieval net. The cavity was washed out and pig-tail stents left in-situ (*Figures 2 and 3*).

**Figure 2:** Image taken during cyst gastrostomy and necrosectomy of patient A. Image show pig-tail stents in situ

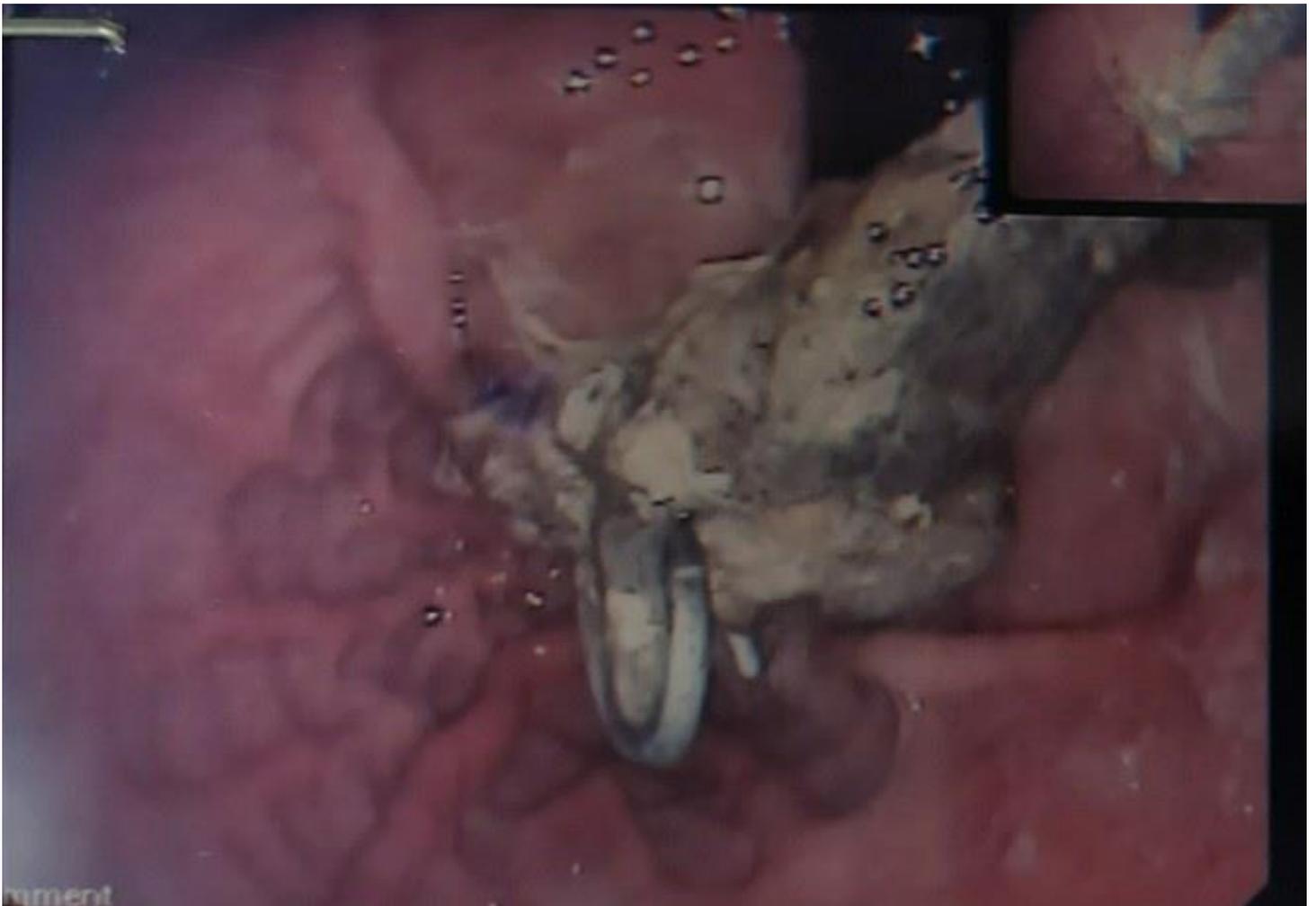


## Case Report

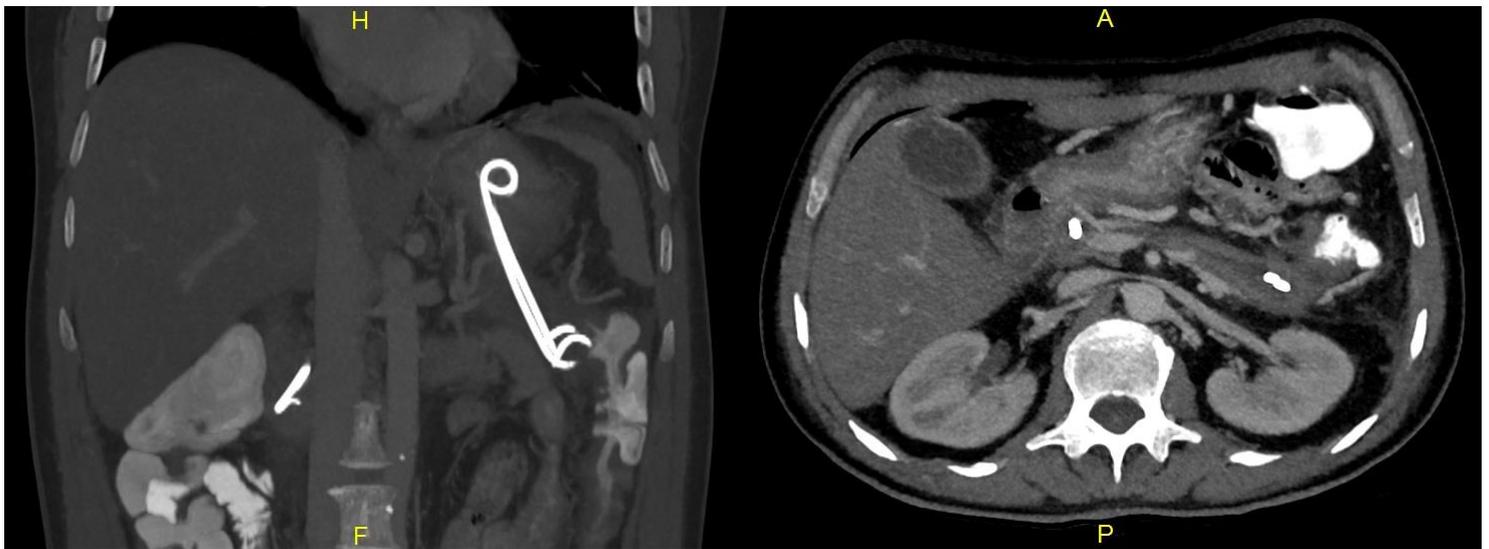
Both patients were observed in ITU for 48 hours. Their parameters improved steadily. Patient A developed insulin-dependent diabetes and was started on an insulin regimen. He required a further two necrosectomies and ERCP with stenting for biliary inflammatory stricture before his WOPN resolved (*Figure 4*) and an elective laparoscopic

cholecystectomy and stent retrieval was then performed as definitive management. Patient B remained well and is due to have a cholecystectomy.

**Figure 3:** Patient A; Gastroscopic view of necrotic material issuing from cyst-gastrostomy alongside pig-tail stent



**Figure 4:** Patient A; CT images in coronal and axial views showing an ERCP stent in place, as well as the pig-tails in position between the stomach and a shrunken WOPN



### Discussion

Acute pancreatitis has a reported annual incidence of 13-45 cases per 100,000, making it one of the most common gastrointestinal disorders requiring acute hospitalisation<sup>4</sup>. The incidence is increasing globally and is a major burden on health care worldwide. Pancreatic fluid collections occur in about 10% of patients with acute pancreatitis<sup>2</sup>.

Within the first 4 weeks of presentation, fluid and necrotic material may collect within the lesser sac and retroperitoneum creating an acute necrotic collection (ANC). WOPN develops after 4 weeks have elapsed from presentation of acute NP and the collection persists by becoming encapsulated (*Atlanta Classification, revised in 2012 and 2016*). WOPN can remain sterile but infection rapidly causes organ dysfunction. In the cases we present, the patients developed this complication in addition to causing gastric outlet obstruction and obstructive jaundice.

The International Association of Pancreatology and American Pancreatic Association (IAP and APA respectively) guidelines for the management of acute pancreatitis were published in 2013 and described indications for intervention in NP. These include; suspicion of, or documented, infected pancreatic necrosis with clinical deterioration, gastric outlet obstruction, biliary obstruction, organ failure,

persistent pain and disconnected duct syndrome. Intervention in infected NP is generally delayed until it has become WOPN.<sup>4</sup>

Conventionally, techniques including open necrosectomy were performed for WOPN and other pancreatic collections. However, in the past two decades, there has been a move towards minimally invasive techniques and step-up techniques. Step up techniques involve first the drainage of the collection, followed by necrosectomy. Minimally invasive techniques involve percutaneous (retroperitoneal or transabdominal) or endoscopic approaches.<sup>5,7</sup>

In the case of endoscopic interventions, an endoscopic ultrasound or conventional endoscope is used and a cystgastrostomy tract is formed and dilated with large diameter (10–20 mm) balloon. Multiple double-pig-tails stents or metallic biliary stents are then inserted, allowing drainage into the gastrointestinal tract. This is generally followed by entering the collection using a forward viewing endoscope, performing a washout of the WOPN cavity with saline or/and hydrogen peroxide and followed by a necrosectomy using endoscopic equipment such as large forceps, baskets, Roth nets and balloons.<sup>1,6,7</sup>

There have been various studies carried out showing the benefits of endoscopic techniques as

compared to open surgical techniques. A few benefits include decreased new onset diabetes, decreased pancreatic fistula formation, decreased pro-inflammatory response, and essentially, decreased morbidity and mortality.<sup>5</sup>

Pancreatic necrosectomy can be performed safely and effectively with readily available ERCP and gastroscopic equipment, under EUS localisation. This procedure should be considered as treatment of choice for patients developing WOPN.

### List of Abbreviations

A&E	Accident and Emergency
ANC	Acute necrotic collection
CT	Computed tomography
ERCP	Endoscopic retrograde cholangio-pancreatography
ITU	Intensive therapy unit
NP	Necrotising pancreatitis
NIV	Non-invasive ventilation
SAP	Severe acute pancreatitis
TPN	Total parenteral nutrition
WOPN	Walled-off pancreatic necrosis

### References

1. Abela JE and Carter CR. Acute pancreatitis -a review. *Surgery (Oxford)* 2010;**28** (5):205-211
2. Banks PA, Bollen TL, Dervenis C et-al. Classification of acute pancreatitis-2012: revision of the Atlanta classification and definitions by international consensus. *Gut* 2012;**62** (1): 102-11
3. Bryan R. Foster, Kyle K. Jensen, Gene Bakis, Akram M. Shaaban, Fergus V. Coakley. Revised Atlanta Classification for Acute Pancreatitis: A Pictorial Essay. *RadioGraphics* 2016;**36** (3):675-87
4. Working Group IAP/APA Acute Pancreatitis Guidelines. IAP/APA evidence-based guidelines for the management of acute pancreatitis. *Pancreatology* 2013;**13**(4 Suppl 2):e1–15
5. Bakker O.J., van Santvoort H.C., van Brunschot S. et al. Endoscopic transgastric vs surgical necrosectomy for infected necrotizing pancreatitis: a randomized trial. *JAMA* 2012;**307**: 1053–1061
6. Trikudanathan G, Attam R, Arain MA, et al. Endoscopic interventions for necrotizing pancreatitis. *Am J Gastroenterol* 2014;**109**: 969–81.
7. 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**(16),1491–1502