Necrotizing soft tissue infection of the upper leg as first presentation of necrotizing pancreatitis: a case report

A. Vervaecke[1], S. van Ierssel[2], G. Vissers[3], E. Macken[1], B. Op de Beeck[4], T. Tondu[3], F. Thiessen[3], S. Francque[1], T. Steinhauser[1]

(1) Department of Gastroenterology and Hepatology, Antwerp University Hospital, Antwerp, Belgium; (2) Department of General Internal Medicine, Infectious Diseases and Tropical Medicine, Antwerp University Hospital, Antwerp, Belgium; (3) Department of Plastic and Reconstructive Surgery, Antwerp University Hospital, Antwerp, Belgium; (4) Department of Radiology, Antwerp University Hospital, Antwerp, Belgium.

Abstract

Acute pancreatitis can be complicated with necrosis of the pancreatic or peripancreatic tissue. This necrosis can become liquified and form a well-defined wall (walled-off necrosis or WON) and can become infected and form abscesses. Necrotizing soft tissue infections are rare infections of the deep tissue and subcutaneous fat and are mostly caused by trauma or perforated visceral organs. They can, however, rarely be caused by infected retroperitoneal collections. To date only 3 case reports have been published of a necrotizing soft tissue infection complicating a necrotizing pancreatitis. Both acute, complicated pancreatitis and necrotizing soft tissue infections carry a high mortality and morbidity rate with surgery being the mainstay therapy for the latter, often leaving the patient disfigured. We report the case of a 62-year-old man presenting to the emergency department with a painful and erythematous rash of the upper leg as complication of an acute necrotizing pancreatitis. (Acta gastroenterol. belg., **2022,** 85, **518-521**).

Keywords: Necrotizing fasciitis, necrotizing soft tissue infection, necrotizing pancreatitis, acute pancreatitis, complications.

Introduction

Necrotizing soft tissue infections (NSTI) are a rare and possibly life-threatening entity with an often-rapid progression and high mortality (about 25%). NSTI's are caused by bacteria infiltrating the subcutaneous tissue and producing endo- or exotoxins that cause tissue ischemia and liquefactive necrosis (1). Most common causes of NTSI's are minor (or major) external trauma (exogenous) or perforated visceral or urogenital organs (endogenous) (2). They can be classified according to their microbial subtype (type 1 being of polymicrobial cause and the most frequent, and type 2 being of monomicrobial cause, most commonly group A streptococcus) (3).

Acute pancreatitis (AP) is an inflammatory state of the exocrine pancreas, characterized by abdominal pain and elevated pancreatic enzymes in the blood. Its most frequent causes are gallstones and excessive alcohol use, which combined account for up to 75% of all AP. In up to 25-30% of cases, however, no obvious etiology is found (4). Most AP resolve after 3-5 days, in 20% of patients however, local or systemic complications arise. Local complications include acute pancreatic fluid or acute necrotic collections, with at a later time pancreatic pseudocysts or walled-off necrosis (WON) formation, where the necrotic collection liquifies and develops a well-defined wall. Both the acute necrotic collection and the WON can become infected, mostly due to bacterial translocation from the gastrointestinal tract (5). AP is hence one of the many possible causes of retroperitoneal abscesses (4). Complicated pancreatitis has, however, been shown to be an exceedingly rare source of NSTI, with only 3 other cases being published so far in the literature (6,7,8).

NSTI of the abdominal wall or upper leg may indeed seldomly be brought forth due to retroperitoneal abscesses or infected collections (9). In this case report we present another case of severe NSTI in relation to AP with complicated course. The case is not only remarkable for the rarity of a NSTI of the leg in relation to retroperitoneal abscesses and in particular AP, but also for the difficulty of diagnosing the AP as cause of the NSTI and the role of the treatment of the AP in controlling the infection.

Case Report

A 62-year-old male patient presented to the emergency department with a painful, erythematous rash localized on the upper right leg, which appeared 5 days prior to presentation. Anamnesis revealed no particularities apart from a self-limiting feverish episode with a single occurrence of vomitus and mild abdominal pain 1 week foregoing the rash.

Medical and family history were blank, the patient had no known allergy and did not take any maintenance medication. There was no active substance use reported.

Clinical examination confirmed the erythematous rash, painful, warm and hard at the touch but without any crepitations indicative of subcutaneous emphysema.

Lab results showed a leukocytosis with an elevated neutrophil count, C-Reactive Protein (CRP) of 96.1 mg/L, lipase of 537 U/L, normal creatinine and electrolytes

Correspondence to: Dr. Andrew Gerard Vervaecke, Department of Gastroenterology and Hepatology, University Hospital Antwerp, Antwerp, Belgium. Fax: +32 3 821 41 17.
Email: gastroenterologie@uza.be

Submission date: 23/02/2021
Acceptance date: 15/03/2021

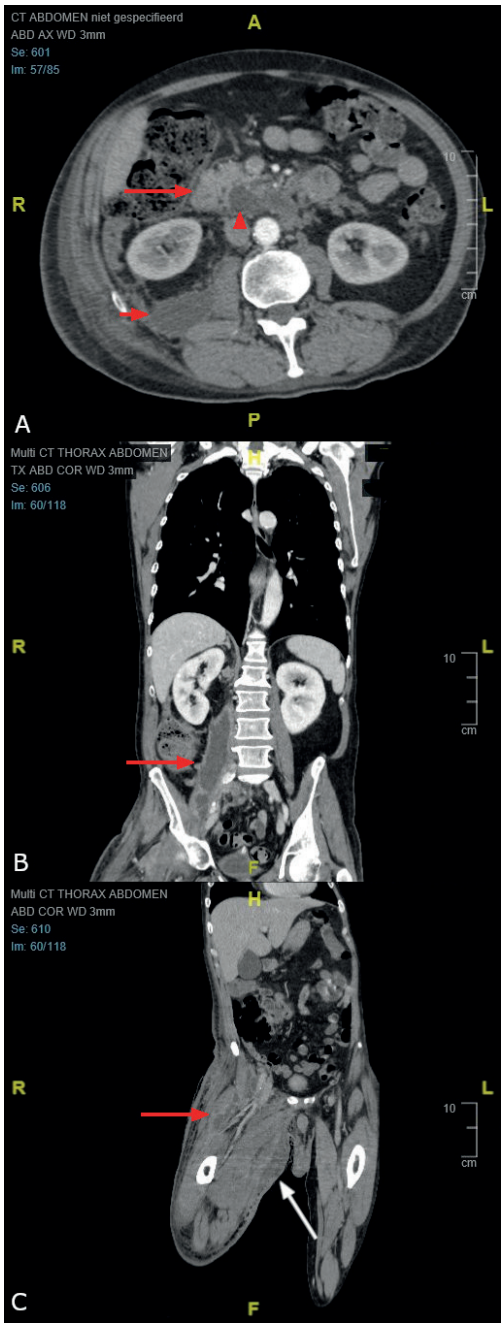

Figure 1. — A. CT scan showing (axial) necrotic fluid collection (arrowhead) next to the head of pancreas (long arrow). B. CT scan (coronal) showing retroperitoneal abscess bulging towards the right iliopsoas muscle (Arrow). C. CT scan (coronal) of right upper leg showing the intramuscular collections below the rectus femoris muscle (red arrow) and the right groin (white arrow).

apart from a slight hypocalcemia, normal liver enzymes and total bilirubin.

Abdominal CT revealed multiple retroperitoneal collections, nodular delineated, localized around the pancreas (Figure 1-A), expanding towards the liver, right kidney, right hemicolon and right iliopsoas muscle (Figure 1-B). The appearance of the pancreatic tissue was normal.

Empiric antibiotic treatment was initiated with amoxicillin-clavulanic acid 1g intravenously four times a day (QID).

Differential diagnosis included an erysipelas or cellulitis of the right thigh secondary to infected retroperitoneal collections (with a prior acute exudative pancreatitis as tentative cause based on the elevated lipase and hypocalcemia, despite normal appearance of the pancreas on imaging) or, due to the nodular delineation of the collections, a malignancy of the right hemicolon.

Due to progression of the rash and persisting high CRP levels anti-microbial therapy was modified to intravenous clindamycin three times per day and oral ciprofloxacin twice daily, however, without clinical or biochemical improvement.

Repeated blood cultures remained negative, after which an antibiotic-free window of 48 hours was introduced to subsequently allow the placement of a CT-guided drain into the peri-iliopsoas collection and the acquisition of samples for microbiologic cultures. Antibiotics were upscaled with the addition of piperacillin-tazobactam QID. The puncture samples appeared purulent of nature with gram negative rods on gram staining, however, cultures remained negative. The next days the patient developed blisters, with the evacuation of pus and purpura-like lesions in the center of the cellulitis of the upper thigh (Figure 2-A) indicative of necrosis. Repeat CT of the right leg showed 2 intramuscular collections in the upper leg (Figure 1-C), which were surgically debrided the same day (Figure 2-B). Once again drainage cultures remained sterile, however biochemistry showed massive amounts of pancreatic enzymes in the samples. Follow-up CT showed a reduction of the retroperitoneal collections, however, drain fluids persistently contained high levels of pancreatic enzymes for which a stent was inserted into the main pancreatic duct on suspicion of a pancreatic duct leak.

Two further debridements and a skin graft were successfully performed (Figure 2-C). Antibiotics were continued for a total duration of 6 weeks and ceased after normalization of inflammatory parameters and stabilization of the intra-abdominal collections. At time of writing the patient had not yet made a complete recovery considering the extent of the surgery and the length of hospital stay, however he had been discharged with ambulatory follow-up and no signs of recurrence were seen. No discernible cause for the pancreatitis had been discovered.

Discussion

Necrotizing soft tissue infections are a rare and possibly lethal necrotizing infection of deep soft tissue that result in the progressive destruction of the muscle fascia and overlying subcutaneous fat (1). AP can be complicated with necrosis of the pancreatic parenchyma in about 20% of patients and can result in the formation of abscesses.

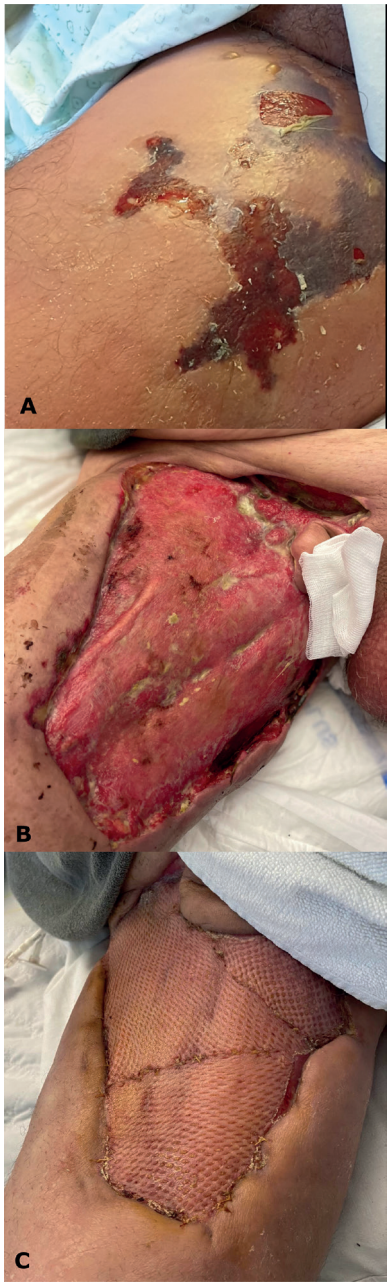

Figure 2. — A. Purpura-like lesions in the center of the cellulitis accompanied by blisters a few days after presentation. B. Upper right leg after extensive debridement. C. Upper right leg after skin graft.

Pancreatic necrosis is best distinguished from interstitial pancreatitis using contrast-enhanced CT-scan (4,5,11). About 30-70% of cases of pancreatic necrosis becomes infected and results in a higher mortality rate (5). NSTI are, however, not a classical complication of AP. Several risk factors for the development of complications of AP, such as age and cardiovascular disease, have been described (12) as well as the development of prognostic indicators such as the Ranson's score (5).

Literature review only revealed 3 published cases of NSTI secondary to an episode of acute pancreatitis (6,7,8).

All 3 cases, as well as our patient, presented to the emergency department with cutaneous erythematous eruptions, secondary to a mild or asymptomatic episode of acute pancreatitis with the development of extra-pancreatic necrosis, that progressed with the development of necrosis of the soft tissue requiring multiple debridements. Although NSTI diagnosis requires the presence of bacteria, all cultures remained negative in our case. The diagnosis can, however, be maintained based on clinical and/or surgical suspicion.

A possible hypothesis for the observed deterioration in these cases is the presence of pancreatic enzymes, such as trypsin and lipase, which induce the release of inflammatory mediators and endothelial damage or even cell tissue death and fat necrosis (10). This facilitates the translocation of bacteria into the tissue. Prompt adequate local, through debridement, and antimicrobial treatment as well as source control is paramount for the survival of the patient, which can only be attained by timely detection of both the NSTI as well as the underlying cause. Necrotizing pancreatitis can be a very uncommon cause with possibly a very mild initial clinical presentation, which makes that the diagnosis can be easily overlooked. Without adequate source control (in this case by stenting of the pancreatic duct) the NSTI can be more difficult to treat due to the ongoing supply of bacteria or lipolytic enzymes. Clinicians and emergency physician should be aware of the possibility of retroperitoneal collections, often formed many weeks prior, being the cause of this rare and lethal disease.

Conflicts of interest

All authors declare: no support from any organization for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

References

1. SARANI B., STRONG M., PASCUAL J., SCHWAB C.W. Necrotizing fasciitis: current concepts and review of the literature. *J Am Coll Surg*. 2009; **208**(2): 279-88.
2. FRANCQUE S.M. *et al*. Perforating oesophageal carcinoma presenting as necrotizing fasciitis of the neck. *Eur J Gastroenterol Hepatol.* 2001 Oct; **13**(10): 1261-4.
3. STEVENS D.L., BRYANT A.E. Necrotizing Soft-Tissue Infections. *N Engl J Med*. 2017 Dec 7; **377**(23): 2253-2265.
4. BANKS P.A., FREEMAN M.L.; Practice Parameters Committee of the American College of Gastroenterology. Practice guidelines in acute pancreatitis. *Am J Gastroenterol.* 2006 Oct; **101**(10): 2379-400.
5. BARON T.H., MORGAN D.E. Acute necrotizing pancreatitis. *N Engl J Med.* 1999; **340**(18): 1412-17.
6. WHITE N.R., FOWLER L.L. Retroperitoneal and cutaneous necrotizing fasciitis secondary to necrotizing pancreatitis. *J Emerg Med.* 2014 Aug; **47**(2): 147-9.
7. SHEEHY S.A., KELLY M.E., FRANCIS E.C., SWEENEY K.J., HUSSEY A. A rare case of Fournier's Gangrene. *J Surg Case Rep.* 2016 May 5; 2016(5): rjw069.

8. KAISTHA S., KUMAR A., RAMAKRISHNAN T.S. Necrotizing Fasciitis: A Rare Complication of Acute Necrotizing Pancreatitis. *J Clin Diagn Res*. 2017 Jun; **11**(6): PD05-PD06.
9. AMITAI A., SINERT R. Necrotizing fasciitis as the clinical presentation of a retroperitoneal abscess. *J Emerg Med*. 2008 Jan; **34**(1): 37-40.
10. WALDO S.W., ROSARIO H.S., PENN A.H., SCHMID-SCHONBEIN G.W. Pancreatic digestive enzymes are potent generators of mediators for leukocyte activation and mortality. *Shock*. 2003 Aug; **20**(2): 138-43.
11. GUPTA *et al*. Variability of contrast enhancement of pancreas on computed tomography in patients with acute pancreatitis and isolated extrapancreatic necrosis. *Acta Gastroenterol Belg*. 2020 Oct-Dec; **83**(4): 593-597.
12. SATIS H., KAYAHAN N., SARGIN Z.G., KARATAS A., ÇELIKER D. Evaluation of the clinical course and prognostic indices of acute pancreatitis in elderly patients: a prospective study. *Acta Gastroenterol Belg*. 2020 Jul-Sep; **83**(3): 413-417.