Trocar-assisted endoscopic retroperitoneal debridement. Non-NOTES salvage therapy for severe necrotizing pancreatitis

Fig. 1 Computed tomography scans. **a, b** Before the first debridement intervention. Note the solid necrotic material with air entrapments, and pigtail drainage in the left lower quadrant (**b**). **c, d** At the third percutaneous endoscopy, significant reduction of the retroperitoneal necroses was seen. (Axial portal-venous contrast, Siemens, 64 multislice.)

A 68-year-old patient with severe biliary pancreatitis developed extensive retroperitoneal necroses, with air collections, extending from the pancreatic compartment to the pelvis (**Fig. 1 a, b**). Percutaneous and transgastric drainage (twice each) did not resolve the solid calcified infected material (vancomycin-resistant enterococci, *Staphylococcus epidermidis*, *Neisseria subflava*, *Haemophilus influenzae*, *Candida albicans*), which could not be adequately accessed transluminally [1]. Laparotomy was deemed too risky for this moribund patient (30-kg loss of body weight), who had persistent sepsis 9 weeks after presentation.

A guidewire (Jagwire, 0.035 inch, 460 mm; Boston-Scientific, Ratingen, Germany) was inserted through the drainage access in the left lower quadrant, and a thin endoscope (outer diameter 6.3 mm; Pentax, Tokyo, Japan) was percutaneously advanced into the retroperitoneal space under fluoroscopy. A 10-mm laparoscopic trocar (Kii Fios First Entry; Applied Medical, Rancho Santa Margarita, California, USA), which was loaded onto the endoscope, was inserted under optical guidance to secure the retroperitoneal access (**Fig. 2**). Debridement was then performed with a standard gastroscope (9.8 mm; Pentax) through the trocar (**Video 1**), with the patient in the supine position under propofol sedation. Debridement was performed from the pelvic space, through the retrosplenic and retrorenal areas and up to the pancreatic area. Craniocaudal trocar movements facilitated the maneuverability of the endoscope. A large bore drainage catheter (Thal-Quick 28 Fr; Cook Medical, Limerick, Ireland) was then placed to secure the access.

Video 1

Debridement procedure for severe necrotizing pancreatitis.

Clinical, radiological, and serological improvement were observed, and the procedure was repeated 8 days later. Lavage with sterile saline was then continued in an outpatient setting. A third percutaneous endoscopy (without trocar) after 4 months demonstrated vital retroperitoneal tissue and closure of most of the pelvic and retrosplenic access routes (**Fig. 3**). These findings were confirmed by computed tomography (**Fig. 1 c, d**). One year later, the patient was well, although still suffering from pancreatic insufficiency.

In trocar-assisted endoscopic retroperitoneal debridement, a stiff trocar stabilizes and guides the endoscope and allows repeated extraction of debris through the abdominal wall, similar to videoscopic-assisted retroperitoneal debridement [2]. At the same time, flexible endoscopic maneuverability and instrumentation is maintained in the retroperitoneal space, similar to transmural procedures, but with more direct access. Such a procedure (with re-interventions "on demand") may be adequate in an interdisciplinary step-up approach [3] for infected pancreatic necroses.

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Martin Goetz[1], Jörg Glatzle[2], Thomas Kratt[2], Benjamin Wiesinger[3], Alfred Königsrainer[2], Nisar Malek[1]

[1] Innere Medizin I, Universitätsklinikum Tübingen, Tübingen, Germany
[2] Allgemeine, Viszeral- und Transplantationsmedizin, Universitätsklinikum Tübingen, Tübingen, Germany
[3] Radiologische Universitätsklinik, Universitätsklinikum Tübingen, Tübingen, Germany

Fig. 2 Preparation for debridement. **a** The drainage catheter in the left lower flank. **b** Through the drainage catheter tract, a trocar secured the access for a standard gastroscope, which was to be used for retroperitoneal debridement.

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Corresponding author

Martin Goetz, MD, PhD
Innere Medizin I
Universitätsklinikum Tübingen
72076 Tübingen
Germany
Fax: +49-7071-2925034
martin.goetz@med.uni-tuebingen.de

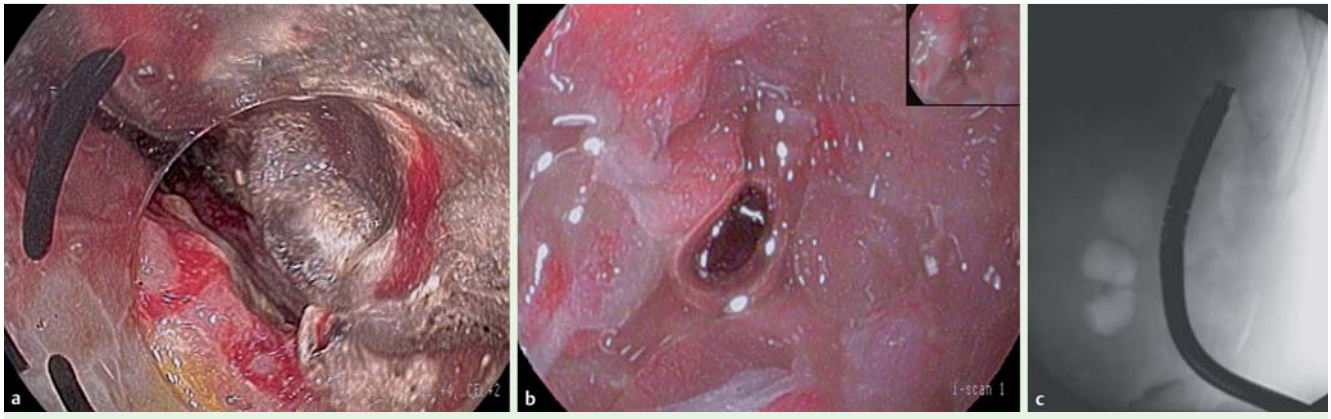

Fig. 3 Images after the first debridement procedure. **a** Access through the trocar at the second debridement session still showed a significant amount of necrotic material. **b** At the third percutaneous endoscopy, the former canal towards the left retrorenal space was vital and almost closed. **c** Fluoroscopic image of left retrorenal space at the third procedure.