



# Risk Factors for Bleeding during Endoscopic Necrosectomy: Are We Wiser Now?

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## Abstract

### Keywords

- ▶ necrosectomy
- ▶ bleeding
- ▶ surgery
- ▶ endoscopy

Endoscopic necrosectomy (EN) in acute necrotizing pancreatitis has mortality benefits and may avert the requirement for surgery. However, bleeding is a common adverse event during EN. There is limited knowledge about the risk factors predicting this adverse event and the measures for its management. In this news and views, we discuss recently published studies that evaluated the risk factors for bleeding during EN.

Over the last decade, there has been a paradigm shift in the management of infected/symptomatic pancreatic necrosis with endoscopic and minimally invasive “step up” management approach like endoscopic necrosectomy (EN) or video-assisted retroperitoneal debridement replacing open surgical necrosectomy.<sup>1–3</sup> Despite advances in EN including the development of larger diameter lumen apposing metal stents (LAMS), bleeding continues to be a common and serious adverse event noted with EN.<sup>4,5</sup> Use of adjunct techniques for EN like hydrogen peroxide as well as streptokinase irrigation has also been associated with increased risk of bleeding.<sup>6,7</sup> There is scant literature available on the risk factors and predictors of bleeding in patients with acute necrotizing pancreatitis (ANP) undergoing EN. Better management of any procedural complication requires an in-depth understanding of the risk factors and predictors so as to devise a proper preventive strategy. In this news and views, we discuss two recently published single-center, retrospective studies from China and the United States that have attempted to elucidate the risk factors for EN.<sup>8,9</sup>

Zheng et al studied 145 patients with ANP who underwent EN and reported that 39 (26.9%) patients experienced postprocedure bleeding.<sup>8</sup> Majority of enrolled patients underwent EN >30 days after the onset of ANP and devices used for EN included basket, snare, and grasping forceps. The majority of patients underwent percutaneous endoscopic

necrosectomy, and there was no significant difference between the patients who bled versus those who did not bleed during EN in terms of the necrosectomy approach, timing, or device used. However, the number of EN procedures was significantly higher in the bleeding group with the number of patients who underwent two or more debridement procedures being 71.8% in the bleeding group and 53.8% in the nonbleeding group ( $p = 0.004$ ). The mortality rate (20.5 vs. 8.5%,  $p = 0.046$ ) as well as the hospitalization costs were significantly higher in the bleeding group. On multivariate analysis, renal failure (odds ratio [OR] = 3.77), culture-confirmed infected pancreatic necrosis (OR = 3.19), and three or more debridement procedures (OR = 12.92) were associated with increased bleeding risk. They also reported that most of the episodes of bleeding were successfully stopped by endoscopic hemostatic methods (94.1%) including spraying with adrenaline, hot biopsy forceps, argon plasma coagulation, and titanium clip clamping.

Holmes et al retrospectively studied 151 patients with ANP who underwent 536 EN's and reported intraprocedural bleeding during 28 procedures (5.2%) in 18 patients (11.9%).<sup>9</sup> There was no significant difference in age, sex, etiology of ANP, size of necrotic collection, concurrent aspirin, heparin, clopidogrel, warfarin, or direct-acting oral anticoagulant use as well as the use of plastic stents or the size of LAMS used between patients with and without intraprocedural bleeding. However, authors reported that thrombocytopenia (5.6

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and 0%,  $p=0.006$ ), cirrhosis (11.1 and 2.3%,  $p=0.049$ ), and the presence of a vessel seen in the cavity during EN (27.8 and 1.5%,  $p<0.01$ ) were significantly associated with intraprocedural bleeding. After multivariate analysis, only an identifiable vessel seen endoscopically during EN ( $p\leq 0.01$ ) was a predictor of bleeding with an OR of 23.3 (4.0–135.1). Also, unlike the results of the study by Zheng et al, renal failure and the number of debridement procedures were not associated with an increased risk of bleeding.

Endoscopic hemostasis was attempted in eight patients (five were treated with clips, one with bipolar coagulation, six with epinephrine injection, and one with coagulation grasper) and eight patients (ten procedures) in total were treated by interventional radiology (IR). Endoscopic hemostasis failed in three patients and two of these underwent embolization. Patients who required IR for hemostasis were transfused with significantly more blood before the procedure than patients who did not (3.4 units vs. 0.67 units,  $p=0.002$ ), and there was no significant difference in transfusion requirements after the procedure. The authors concluded that patients with thrombocytopenia, cirrhosis, and vessel within the walled-off necrosis cavity visualized during endoscopy are at an increased risk of post-EN bleeding and should be approached with caution.

## Commentary

The use of step-up approach in ANP with endoscopic ultrasound (EUS)-guided transmural drainage and direct endoscopic necrosectomy has been established as a safe and effective therapy for patients with infected necrotic collections.<sup>10</sup> The risk of bleeding is high with necrosectomy and even higher, if early necrosectomy (<4 weeks) is attempted.<sup>3,11</sup> Although the use of EUS is associated with better visualization of collaterals and blood vessels,<sup>12</sup> its use does not completely obviate the risk of bleeding and bleeding can occur either at the time of the procedure because of puncture of blood vessel/collateral/missed pseudoaneurysm or later, as a result of the development of a pseudoaneurysm or at the time of stent removal, especially LAMS, because of tissue overgrowth.

The above-discussed two studies have shown that renal failure, culture-confirmed infected pancreatic necrosis, three or more debridement procedures, cirrhosis, thrombocytopenia, and visualization of the blood vessel during EN are associated with an increased risk of bleeding following EN, and therefore, increased caution is required in the patients with these risk factors. A better understanding of these risk factors may help us devise better preventive strategies for postprocedural bleeding, and future studies may assess the

efficacy of prophylactic platelet or recombinant factor transfusions as well as prophylactic embolization of visible vessels during EN for prevention of post-EN bleeding.

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### Conflict of Interest

None declared.

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