ORIGINAL ARTICLE

Direct endoscopic necrosectomy using the novel 5-mm powered endoscopic debridement device: The larger winner?

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INTRODUCTION

Endoscopic drainage of walled-off necrosis (WON) and subsequent direct endoscopic necrosectomy (DEN) has shown to be an effective step-up management strategy in patients with symptomatic WON.[1,2] Accessories such as snares, forceps, baskets, and Roth Nets have been used traditionally for DEN. As such, these devices are not designed for DEN and often necessitate a prolonged hospital stay, increased costs, and multiple procedures to clear the necrotic cavity.[3] The concept of powered endoscopic debridement (PED) has now come into play where a single device performs multiple functions of debridement, including high performance suction, irrigation, and tissue dissection, for symptomatic WON. The novel 5-mm PED has additional technical and clinical advantages compared to the previous version with the smaller 3-mm PED. We present 2 cases of DEN performed in patients with symptomatic WON using a novel 5-mm PED device (Video 1, available online at www.videogie.org).

CASE PRESENTATION

Both patients presented with severe necrotizing pancreatitis from biliary etiology. Their CT scans noted a mean necrotic collection size of 12 cm. Both patients had undergone prior endoscopic cystogastrostomy with a 20-mm lumen-apposing metal stent (LAMS), following which there was minimal clinical improvement (Fig. 1A and B). On endoscopy, the cavity was partially occluded with necrotic debris (Fig. 2A). Therefore, DEN using the novel 5-mm PED was performed.

Abbreviations: DEN, direct endoscopic necrosectomy; LAMS, lumen-apposing metal stent; PED, powered endoscopic debridement; WON, walled-off necrosis.

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PROCEDURAL DETAILS

The PED device (Interscope Medical, Inc, Worcester, Mass, USA) consists of a motorized catheter and a system console. The catheter has been upgraded to a larger 5-mm diameter that was previously 3 mm and is commercially available. The catheter is inserted into a dedicated 6-mm working channel therapeutic gastroscope (Fig. 3A).

The catheter attaches to a system console that allows the endoscopist to control the catheter via foot pedals to control catheter suction and cutting as well as containers for continuous purging and vacuum functions (Fig. 3B).

During each procedure, after insertion through the endoscope, the device is purged. Following this, the endoscope is advanced through the cystogastrostomy tract and into the WON cavity. The catheter tip is placed directly in the center of the necrotic cavity and debridement is only initiated when the aspiration pedal is activated. During catheter insertion via LAMS, care is taken to avoid touching the LAMS. The hollow inner cannula of the catheter, which contains the cutter, is positioned within the center of the necrotic tissue such that it remains in constant direct contact. Once activated, the same device performs multiple functions of suction, cutting, and aspiration of necrotic tissue away from the working field. The catheter's high rotation speed (1700 revolutions per minute) and suction (620 mm of Hg negative pressure) allows for effective debridement. Throughout this process, the catheter tip remains within the cavity and necrosectomy continues until the cavity has a significant reduction in necrosis with visible surrounding healthy granulation tissue (Fig. 2B).

RESULTS

Optimal debridement was achieved with a median of 2 DEN sessions and a mean procedure time of 33 minutes in both patients. No immediate or postprocedural adverse events occurred and both patients had symptomatic relief and near complete resolution of the necrosis on CT imaging at the 4-week follow-ups (Fig. 1C).

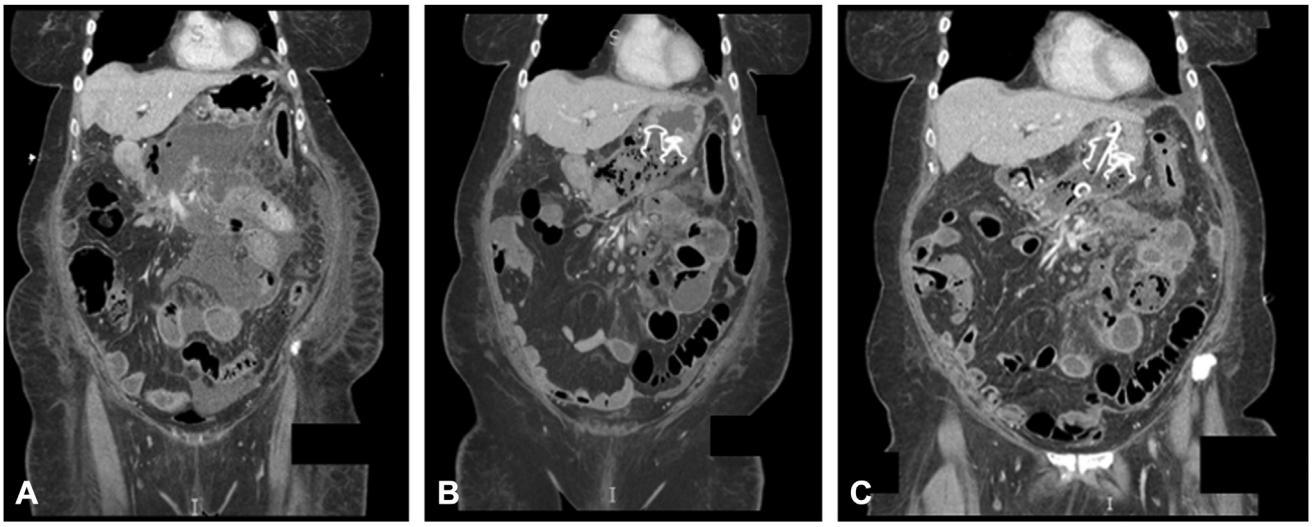

Figure 1. Series of CT scans showing walled-off necrosis. **A**, Prior to endoscopic necrosectomy. **B**, Following multigated lumen-apposing metal stent placement. **C**, Two weeks after direct endoscopic debridement using the 5-mm powered endoscopic debridement device showing a significant interval decrease in the size of the collection.

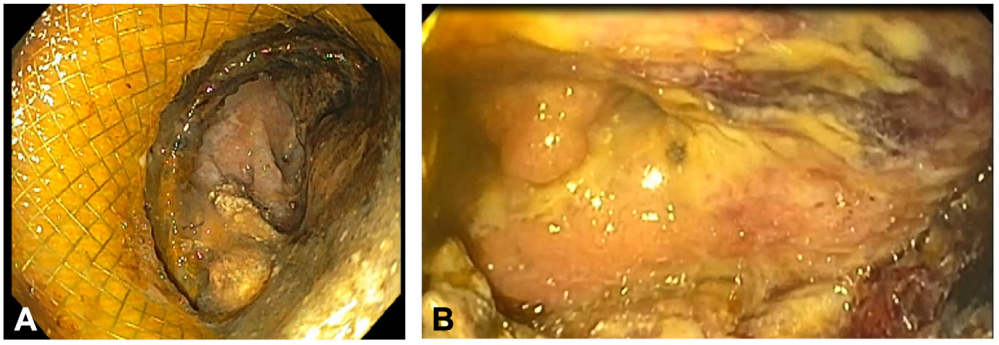

Figure 2. A, Endoscopic view of partially occluded lumen-apposing metal stent with necrotic debris and walled-off necrosis. **B,** Cavity with healthy granulation tissue, following single session with larger 5-mm powered endoscopic debridement device.

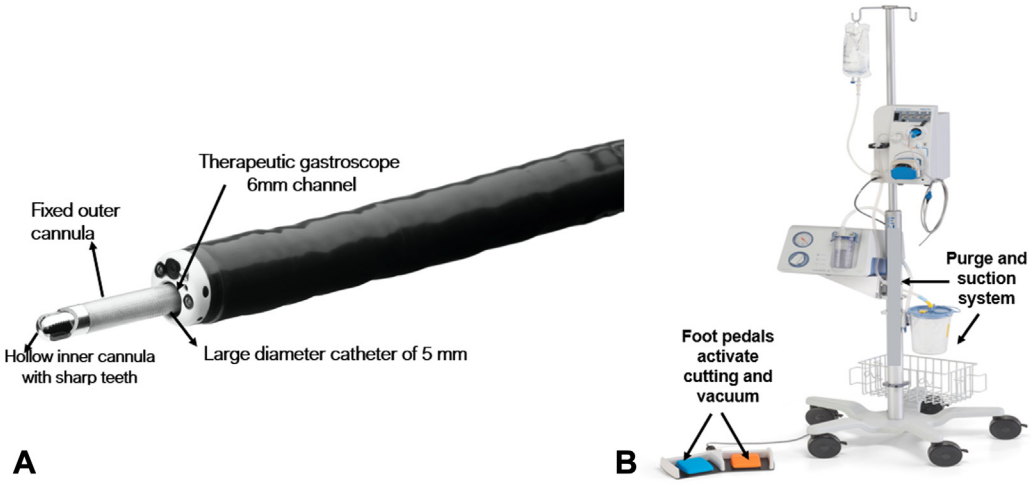

Figure 3. Components of the novel 5-mm powered endoscopic debridement device: **A,** motorized catheter and **B,** system console.

TABLE 1. Comparison of the new 5-mm PED device with the old 3-mm PED device for DEN in patients with refractory walled-off necrosis

New 5-mm PED device	Old 3-mm PED device
Near complete reduction in necrosis at the end of necrosectomy	Persistent necrosis at the end of necrosectomy
Optimal necrosectomy with a median of 2 DEN sessions	Suboptimal necrosectomy despite 3 DEN sessions
Mean procedure time of 33 minutes	Mean procedure time of 55 minutes
Near complete resolution of necrosis at 4-week follow-up imaging	Persistent necrosis on follow-up imaging requiring the use of conventional tools

DEN, Direct endoscopic necrosectomy; *PED*, powered endoscopic debridement.

DISCUSSION

Our cases highlight the myriad of technical and clinical advantages of the 5-mm PED device over the older 3-mm version in achieving effective necrosectomy with a significant decrease in necrosis (Table 1). This device improves ergonomic performance, reduces the risk of bleeding, and obviates the need to change devices during the procedure. This in turn reduces stent related adverse events, shortens procedure times, and decreases the number of necrosectomy sessions required to clear the necrosis. While significant bleeding and healthy tissue or organ injuries were major concerns with conventional instruments, the PED device works under direct visualization, which may potentially overcome these limitations. An important device limitation, however, is the lack of easily available larger-channeled gastroscopes across endoscopy units worldwide. Further studies are warranted to validate our findings and evaluate the device safety and efficacy.

In conclusion, the novel 5-mm PED device is a unique tool that overcomes some of the inherent problems associated with conventional instruments currently used for DEN, making it a favorable device to use in this armamentarium.

DISCLOSURE

Dr Khashab is a consultant for Boston Scientific, Olympus America, Pentax, Apollo Endosurgery, Medtronic, GI Supply, and Triton and receives royalties from UpToDate and Elsevier. All other authors disclosed no financial relationships.

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