

of DMD: 2 patients underwent distal pancreatectomy for ongoing pain, 1 patient underwent a gastrojejunostomy for gastric outlet obstruction. There were 4 deaths: 1 patient died of multiple system organ failure (found to have occult pancreatic cancer at autopsy), 2 patients died from persistent hemorrhage from the pancreatic bed, and 1 patient died from a mucous plug while in a rehabilitation facility after discharge.

Eight (7.8%) patients developed recurrent PFCs, and four of these collections were seen in patients with DPDS due to spontaneous migration of the transenteric stents, and 4 were seen in patients with an intact pancreas. Three of the patients were managed conservatively for asymptomatic fluid collections, and cystoduodenostomy with resolution of symptoms was performed in the fourth patient. In 2 of the 4 patients with intact pancreas, the recurrent PCFs were related to high-grade stenosis of the PD and these were initially managed with transpapillary PD stent placement. However, the collections recurred after stent removal but as these were asymptomatic, these collections were managed conservatively. The other 2 patients developed peripancreatic abscesses that were successfully managed with PCD. The authors concluded that DMD for symptomatic and infected WOPN results in favorable clinical outcomes with complete avoidance of PCF, surgical necrosectomy, and major procedure-related adverse events.

## Commentary

With the advent of minimally invasive treatment modalities for WOPN, a number of techniques using endoscopic drainage alone or combination of endoscopic and PCD have been described with varying results. The complete removal of the necrotic tissue is the ultimate goal all the treatment modalities. The advantage of combining endoscopic drainage with PCD is the creation of internal drainage route for pancreatic secretions, and this will be helpful in patients with DPDS by avoiding the formation of PCF. The other advantage of this combination could be decreased frequency of endoscopy-related complications as compared to patients undergoing endoscopic drainage alone or direct endoscopic necrosectomy due to smaller caliber of balloon dilation performed during DMD (only up to 8 mm vs. 15 mm or higher with direct endoscopic necrosectomy), lack of advancement of the endoscope into the cavity and use of PCD catheters for debridement as opposed to endoscopic accessories that may require cautery. However, a major drawback of this approach is the presence of PCD catheter for a median duration of 60 days. Such a long duration of PCD draining protein-rich fluid is a disadvantage and also associated with risk of malnutrition. The results of this study also confirm our earlier results that had shown the safety and efficacy of leaving transmural stents indefinitely in patients with DPDS.<sup>[7]</sup> This study adds on to the data that has shown that minimally invasive approach is safe and effective for the treatment of WOPN.

# Transpapillary dilation of refractory severe biliary stricture or main pancreatic duct by using a wire-guided diathermic dilator (with video)

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Endoscopic transpapillary stent placement has been shown to be an effective therapeutic modality for the treatment of benign and malignant biliary duct (BD) and PD strictures.<sup>[9,10]</sup> The stents are usually placed after bougie or balloon dilatation of these ductal strictures. In some cases, the strictures are very tight, and only guide wire can be taken across these strictures. These refractory strictures have been usually dilated using screw drill like Soehendra extractor that is pushed over the guide wire.<sup>[11]</sup> Other methods that have been reported for treating these tight and refractory biliary strictures include dissection of difficult PD strictures using a needle-knife or wire-guided snare forceps.<sup>[12-14]</sup>

Diathermic dilators that are used in the endoscopic management of pancreatic fluid collections have been used for creating and enlarging the cystoenterostomy tract.<sup>[15]</sup> The authors of the current study had earlier reported a case of where they used this diathermic dilator to treat tight BD strictures.<sup>[16]</sup> In this prospective observational cohort study, the authors evaluated the safety and efficacy of wire-guided diathermic dilator in patients with severe and tight BD and PD strictures.

Twenty-two consecutive patients (12 55%) males; mean age 62 years (range, 32-80; BD stricture 16 patients and PD stricture in 6 patients) who were candidates for BD/PD decompression were treated with a wire-guided diathermic dilator. Patients with <20 years of age, performance status value >3 according to the Eastern Cooperative Oncology Group scale, mental disability, contrast medium allergy, severe heart disease (New York Heart Association class III or IV heart failure), severe pulmonary disease (peripheral oxygen saturation <90%), ampullary neoplasm, infiltration of the papillary area by pancreatic cancer, acute pancreatitis, chronic pancreatitis with acute exacerbation at time of the ERCP, Roux-en-Y surgery, pregnancy, women wishing to become pregnant, nursing mothers, and patients refusing consent were excluded from the study.

During endoscopic ERCP wire-guided 6F diathermic dilator, coaxial with the guide wire, was used as a diathermic dilator (Cysto - Gastro-Set; Endo-Flex GmbH, Voerde, Germany). The BD or PD stricture dilation was performed using an electrosurgical high frequency-generator (ESG-100, Olympus). The diathermy current, in cut mode (30 W in pulse-cut slow mode) was applied until the dilator crossed the stricture. A transpapillary stent or nasopancreatic drain was placed following successful dilatation of the stricture. The technical success was defined as the successful passage of diathermic dilator through a BD or PD stricture and the clinical success was defined as drainage of BD or PD strictures.

The median length of BD strictures was 18.9 mm (interquartile range [IQR], 13.3-26.6 mm), and that of PD strictures was 10.6 mm (IQR, 7.1-13.2 mm). Diathermy was attempted a median of 2 times for BD strictures (IQR, 1-2.8 times) and 1.5 times for PD strictures (IQR, 1-2 times). The biliary strictures were multiple in 2 patients with 13 patients having malignant biliary stricture. The PD stricture were located in the head in all the patients were as BD strictures involved the intra hepatic BD in 5 patients. Hilar BD strictures were seen in 5 patients. The dilation was successful in all 22 cases with a median total dilation time of 5 s (IQR, 2-7.8 s) for BD strictures and 6 s (IQR, 3.5-10.8 s) for PD strictures. Clinical success was also achieved in all cases. Importantly, no mortality or serious life-threatening complication was observed by the authors. One patient with gallbladder cancer had mild hemobilia and 1 patient with chronic pancreatitis developed mild post-ERCP pancreatitis.

## Commentary

The authors of the current study have opened up a new therapeutic armamentarium for the treatment of severe, refractory strictures. Most of the BD and PD strictures can be safely and effectively treated with placement of single or multiple plastic stents. The development of retrievable, fully covered self-expanding metallic stents has further improved the results of endoscopic therapy. However, occasionally one may encounter very difficult and tight strictures through which no accessories other than a guide wire can be negotiated across. In these patients, the cutting current has earlier been used for treating these strictures but due to safety concerns like risk of duct perforation and creating of a false tract as the guide wire system is not coaxial has limited its use in the treatment of refractory BD or PD strictures. The authors of the current study have demonstrated safe and effective use of a 6F diathermic dilator in patients with severe BD or PD strictures. The small sample size, lack of a control group, and lack of long-term outcomes, are important limitations of the current study. We eagerly await the results of further studies with larger sample size and preferably with a control arm on the use of diathermy dilators in treating refractory strictures and then only this novel

technique could become a part of daily therapeutic endoscopic armamentarium.

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