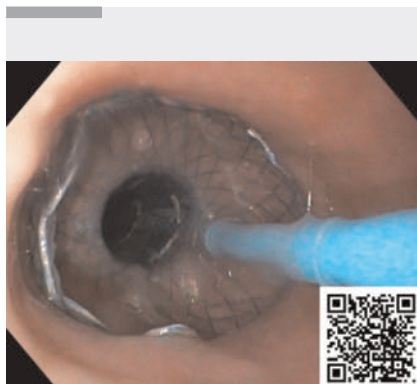


Endoscopic vacuum therapy of a refractory esophagopleural fistula in a patient with Boerhaave syndrome, using an innovative hybrid stent

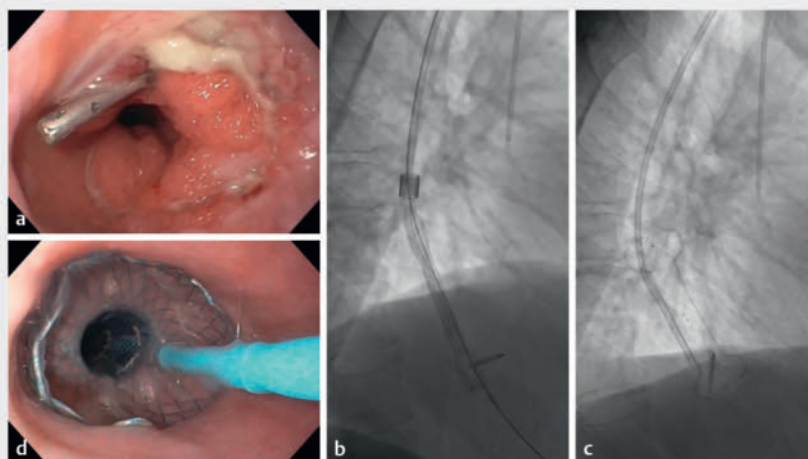
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▶ Video 1 Successful treatment, using an innovative hybrid vacuum stent, of a refractory esophagopleural fistula in a patient with Boerhaave syndrome.

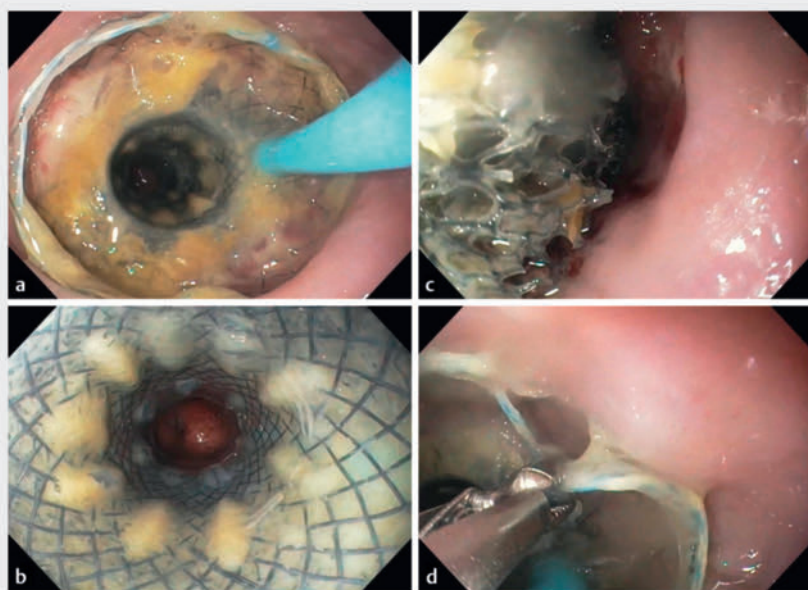
Esophageal perforation has a high morbidity and mortality [1]. Endoscopic treatments include the use of self-expanding metal stents (SEMSs) and endoscopic vacuum therapy (EVT). Recently, an innovative hybrid stent combining both approaches, the VAC Stent (Micro-Tech), has been approved [2].

A 45-year-old man was admitted with Boerhaave syndrome. Thoracic CT showed acute mediastinitis with bilateral pleural effusion. Upper endoscopy confirmed a 6-mm transmural defect in the distal esophagus that was treated using a 12×23-mm fully covered self-expanding metal stent (FCSEMS). Although the stent stayed in place the patient remained septic after 2 weeks. Oral contrast-enhanced computed tomography (CT) and methylene blue drainage into the right chest tube suggested persistent esophagopleural fistula. A stent-in-stent approach using a 155×23-mm FCSEMS to improve coaptation also failed to resolve the fistula after 6 weeks.

Placement of a VAC Stent was proposed (▶ **Video 1**). During the procedure both FCSEMS were removed displaying purulent granulation tissue over the previous esophageal laceration (▶ **Fig. 1 a**). A marking clip was placed 3 cm below at



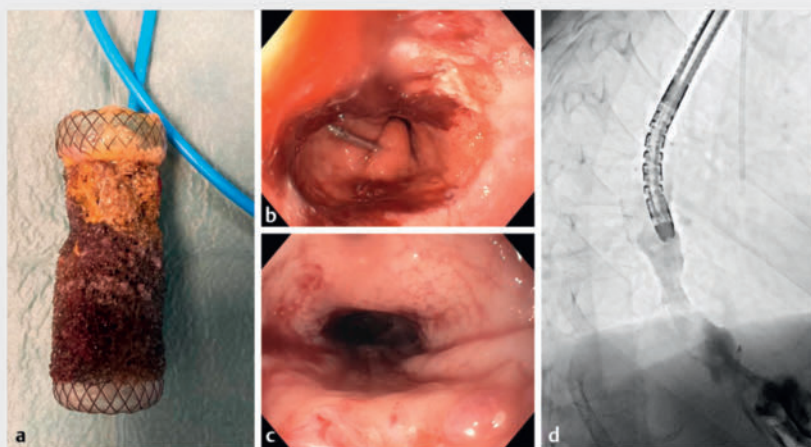
▶ Fig. 1 a Purulent granulation tissue over the previous esophageal laceration in a patient with Boerhaave syndrome. **b, c** Deployment of the innovative hybrid VAC Stent under fluoroscopic view. **d** Endoscopic view of the deployed stent.



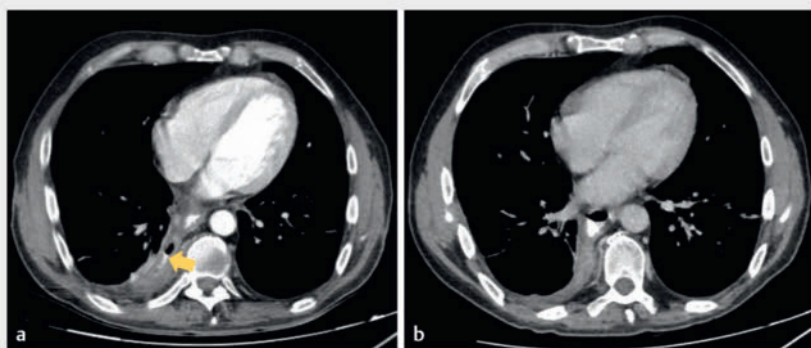
▶ Fig. 2 a, b The novel hybrid stent in situ. **c** The stent is detached by gently insinuating the endoscope between the stent and the esophageal wall while irrigating profusely with saline. **d** Removal of the stent by grasping the wire at the proximal end.

the gastric body and a metallic guidewire passed into the antrum. After saline irrigation, the introducer system was inserted transorally over-the-wire. The stent

was successfully deployed under fluoroscopy (▶ **Fig. 1 b–d**). The suction catheter was switched to the nose and connected to a vacuum pump at –120 mmHg during



► **Fig. 3** a The vacuum therapy stent after removal. b, c Endoscopic inspection after stent removal revealed extensive and friable granulation tissue. d Fluoroscopic control revealed no extravasation of contrast.



► **Fig. 4** Computed tomography (CT) images. a Before therapy, the persistent esophago-pleural fistula (arrow) can be seen. b Successful closure of the fistula is confirmed after therapy with the novel vacuum stent.

the first 24 h and then adjusted to -80 mmHg. Irrigation with 40 mL saline 3 times per day and starting on liquid diet after 72 h were advised. Stent removal was scheduled after 7 days with the pump being switched off the day before. The stent was detached by gently insinuating the endoscope between the stent and esophageal wall while irrigating profusely with saline. It was then removed by grasping the wire at the proximal end (► **Fig. 2**). Esophageal inspection revealed extensive granulation without extravasation of contrast (► **Fig. 3**). Control CT confirmed successful closure of the fistula (► **Fig. 4**) and the now asymptomatic patient was discharged. The VAC Stent combines the functions of a SEMS with EVT, avoiding migration

while maintaining luminal patency [2–4]. This case demonstrates its effectiveness for treating esophageal perforation.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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