Successful endoscopic closure of a refractory button-battery tracheoesophageal fistula in a 3-year child using endoscopic submucosal dissection of the surrounding mucosa



► Fig.1 Appearance of the tracheoesophageal fistula in a 3-year-old girl after ingestion of a button battery.

Most serious button-battery ingestions are not witnessed and they can cause life threatening complications.

We present here the case of a 3-year-old girl who swallowed a button battery in January 2016 with a delayed diagnosis being made after 10 days. A 5-mm tracheoesophageal fistula was endoscopically diagnosed (**Fig.1**). The first attempts at closure involved the deployment of two successive esophageal covered stents between January and May (> Fig. 2). The fistula decreased in size but persisted, so we then attempted controlled wound healing with a nasogastric tube, but the fistula still remained. Next, we tried a side fistula abrasion with argon plasma coagulation. Unfortunately, these techniques did not allow full recovery, even though the fistula reduced notably. After 1 year, we tried endoscopic submucosal dissection (ESD) of the mucosa surrounding the fistula, resecting a 1-cm mucosal patch centered on the fistula. After injecting the submucosa and making the mucosal incision, we used a Dual-Knife (Olympus) to dissect the fibrotic area. After the dissection, the fistula was closed with three clips anchored into the submucosa of the resected area (**Fig.3**; **Video1**). We arranged a radiologic check with contrast, which



▶ Fig. 2 Radiographic images showing: a the fistula on a barium swallow; b the first attempted closure procedure with a stent positioned in the esophagus.





Video 1 Views of the fistula and previous attempts to close it. The endoscopic submucosal dissection procedure is performed to resect the surrounding mucosa, which is subsequently clipped to close the fistula.



Fig.3 Endoscopic images showing the endoscopic submucosal dissection procedure: **a** the submucosal injection being performed; **b** the incision and dissection of the fibrosis; **c** clips placed in the submucosa.



▶ Fig. 4 Follow-up imaging. a Chest radiograph 2 weeks later. b Barium swallow 3 months later.

showed no sign of a fistula in the tracheal tract, and the girl made good and rapid progress without pain. A barium swallow 5 days later showed no signs of the fistula, and she was able to eat again. At 3 months after the procedure, a barium swallow and laryngoscopy confirmed complete healing of the fistula (**> Fig. 4**). The current management of tracheoesophageal fistula after button-battery ingestion is not well defined and, although some studies have demonstrated the role of conservative treatment [1], the place of endoscopy is not known. In

all kind of fistulas, stent placement only permits healing in 53% [2]. ESD can be key in non-surgical treatment to achieve complete closure of such chronic fistulas, as was previously also shown by Rodriguez-Lago et al. [3].

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Competing interests

None

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Bibliography

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