Thieme

# Minimal incision-assisted full-thickness sampling with over-the-scope clip targeting intestinal neuronal malformation

Intestinal neuronal malformation (INM) is a rare and refractory pediatric disease [1]. Its definitive diagnosis is generally confirmed by an invasive full-thickness biopsy [2]. This biopsy is required because the nerve plexus is located in the deep submucosal and muscle layers, resulting in poor diagnostic ability with endoscopic suction biopsies [3]. In our experience, even specimens obtained by endoscopic submucosal dissection fail to provide an accurate histological evaluation owing to the burn effects. As a result, full-thickness specimens must be obtained to make a diagnosis of INM.

A new type of over-the-scope clip (OTSC), called a full-thickness resection device (FTRD; Ovesco Endoscopy, Tübingen, Germany), provides a moderate rate (75 %) of histologically complete resection, so indicating a need to modify procedures [4, 5]. In this animal study, we introduced a productive endoscopic full-thickness sampling method with the original OTSC system targeting INM.

A flexible gastrointestinal endoscope was used. First, a 10-mm mucosal pocket was created in the lower rectum using a needle knife (KD-650Q; Olympus, Tokyo, Japan) until the muscle layer was visible (▶ **Fig. 1 a**). Next, after the artificial pocket had been anchored into the application cap with a retraction device (Anchor; Ovesco Endoscopy) that captured the exposed muscle layer, the OTSC was successfully deployed (▶ **Fig. 1 b**). A 10-mm incision was then made with the needle knife in the muscle layer immediately above the clip to prevent slippage of the snaring device. Finally, a full-thickness resection was completed with the snare, without complications, using the Endo Cut Q mode on an electric generator (VIO300D; ERBE, Tübingen, Germany) (▶ **Fig. 1 c, d**; ▶ **Video 1**).

A 10-mm specimen with a sufficient muscle layer was acquired (▶ **Fig. 2**). Histological examination revealed an adequate full-thickness layer including the myenteric plexus and ganglia cells (▶ **Fig. 3**). This study emphasizes that a minimal incision-assisted OTSC procedure can facilitate full-thickness sampling and minimally invasive diagnosis of INM.

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## Competing interests

None

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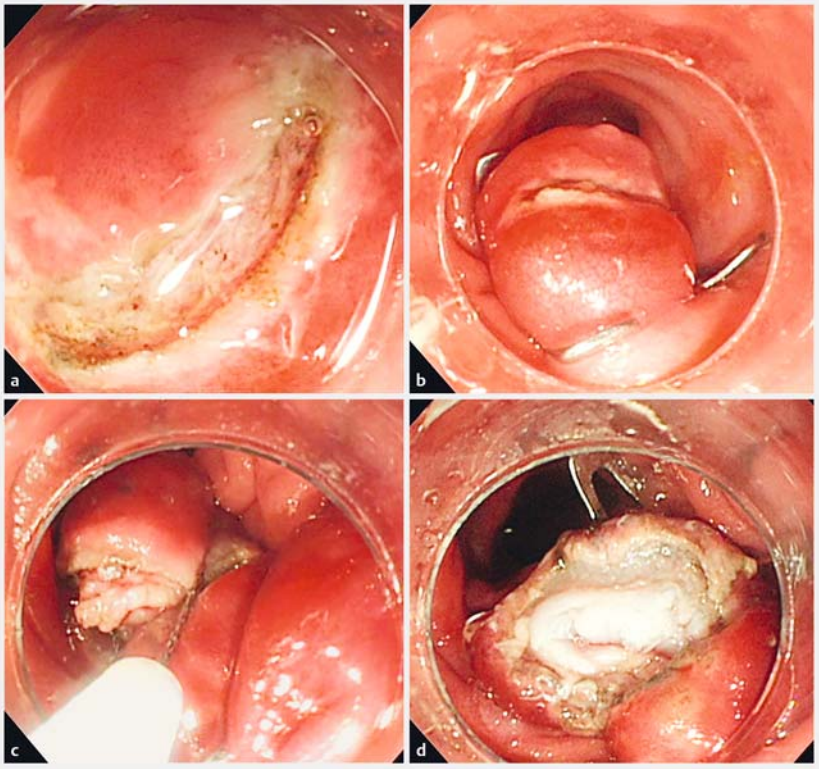
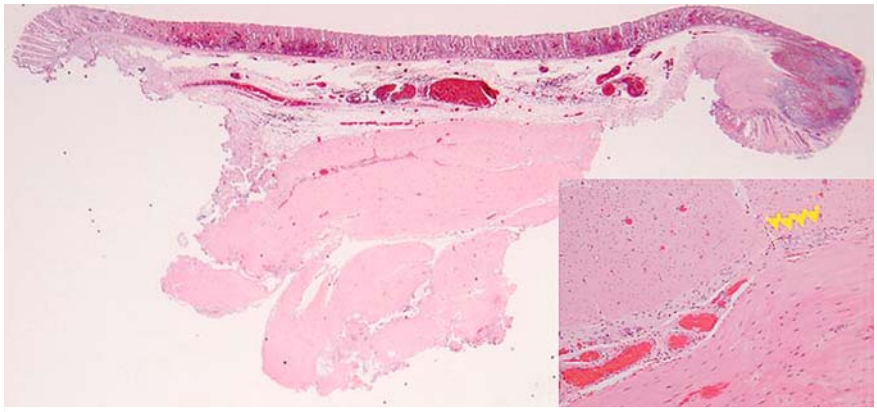
**VIDEO 1**

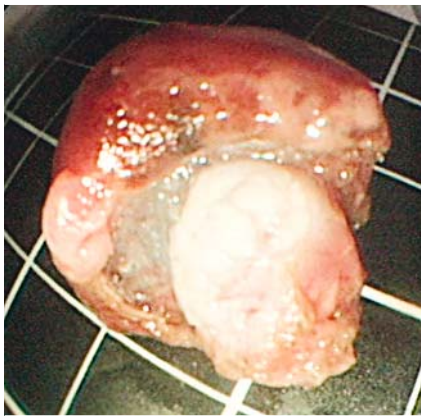

▶ Video 1: A full-thickness specimen is needed for the definitive diagnosis of intestinal neuronal malformation (INM). This video shows that the minimal incision-assisted over-the-scope clip (OTSC) procedure is simple, and is suitable for sampling a sufficient full-thickness specimen to allow a minimally invasive diagnosis of INM.




▶ **Fig. 1** Endoscopic images showing: **a** a 10-mm pocket with the muscle layer exposed that was created with a needle knife; **b** successful over-the-scope clip (OTSC) deployment with an anchor assist that captured the exposed muscle layer of the pocket; **c** complete full-thickness resection using a snare after a 10-mm incision had been made in the muscle layer immediately above the clip to prevent slippage of the snare; **d** a full-thickness defect that was closed by deployment of the OTSC.



▶ **Fig. 3** Histology of the specimen stained with hematoxylin and eosin (H&E) showing the full-thickness layers with the presence of the internal circular and external longitudinal muscle layers, and the neurogenic plexus containing ganglia cells (yellow arrows).



▶ **Fig. 2** Macroscopic view showing the full-thickness resected specimen with a sufficient amount of muscle layer.

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