# HORSESHOE-SHAPED ESOPHAGEAL LEIOMYOMAS

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## BACKGROUND

Esophageal leiomyomas are benign smooth-muscle tumors. Most are asymptomatic, but larger tumors can cause dysphagia, chest pain, or weight loss — and these may need treatment.

Horseshoe-shaped lesions that partially wrap around the esophagus are difficult to resect endoscopically. The working space is tight, scope movement is limited, and getting the tumor out in one piece is often not possible.

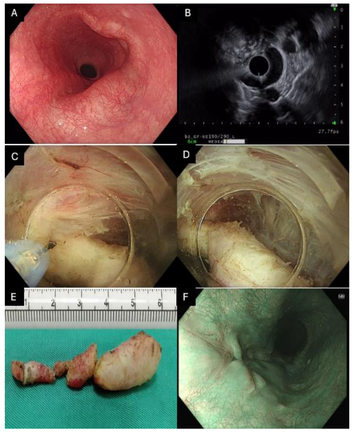


Fig. 1 Case 1: (A) Submucosal tumor at the esophagus. (B) A horseshoe-shaped hypoechoic mass originated in the esophagus' muscularis mucosa. (C), (D) Tumor dissection and exposure. (E) Specimen. (F) Post U-STER scar.

## CASE PRESENTATION

We report three cases of horseshoe-shaped esophageal leiomyomas treated primarily with underwater submucosal tunneling endoscopic resection (U-STER), with selective partial myotomy when needed. $CO_2$ was used only intermittently in Case 1; the procedures were otherwise performed predominantly underwater ($CO_2$ off in Case 3).

## DISCUSSION

STER works well for intramural tumors, but horseshoe-shaped lesions are a different story. They take up a large part of the lumen, leaving little room to work inside the tunnel. In this series, piecemeal resection was required in 2/3 cases, while en bloc resection was achieved in 1/3 case.

Selective partial myotomy was used in 2/3 cases to help free the tumor when it was stuck to muscle.

We do U-STER under general anesthesia in the OR. Our setup is an EGD scope with a transparent cap, connected to an irrigation pump with sterile water. The hybrid knife handles injection, dissection, and hemostasis, which saves time. We use the ERBE VIO 300D set to ENDO CUT Q (Effect 2, Duration 4, Interval 2) for cutting and FORCED COAG (Effect 2, 80W) for hemostasis.

Why underwater? Water clears blood and debris so you can see what you're doing. The tissue layers stand out more, making it easier to stay in the right plane and avoid perforation. Water also acts as a heat sink, absorbing thermal energy from the knife and protecting the mucosa. And unlike gas, water keeps the tunnel open and stable — no collapse, no fogging. All three cases were done primarily underwater. $CO_2$ was minimized and used only intermittently in Case 1, while Case 3 was performed with $CO_2$ turned off.

## DISCUSSION

For preop workup, we used EUS to assess the tumor layer and plan the approach. CT helped check size, location, and rule out invasion or lymphadenopathy.

Case 1 — the largest tumor — had one complication: pneumomediastinum with subcutaneous emphysema. The other two cases had no issues. Recovery was smooth in all patients, with short hospital stays (3.5 days in Cases 2–3). Follow-up ranged from 2 to 9 months with no recurrence. Pathology confirmed leiomyoma in all cases.

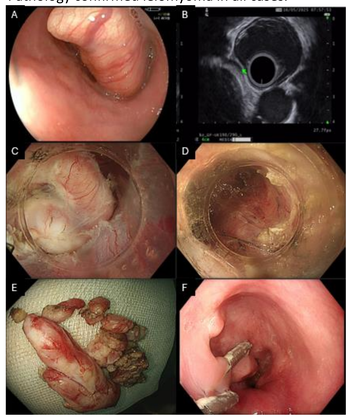


Fig. 2 Case 2: (A) Submucosal tumor at the esophagus. (B) A horseshoe-shaped hypoechoic mass originated in the esophagus' muscularis mucosa. (C) Tumor dissection and exposure. (D) Submucosal tunnel after tumor removal. (E) Specimen. (F) Some retained clips on the U-STER scar.

## CONCLUSION

In this 3-case series of horseshoe-shaped esophageal leiomyomas, U-STER-based submucosal tunneling resection with selective partial myotomy was feasible. Two cases required piecemeal resection, and one case achieved en bloc resection ($CO_2$-off underwater technique). One complication occurred in the largest lesion; the other two cases did well with short hospital stays. More cases and longer follow-up will help clarify which patients benefit most from this approach.

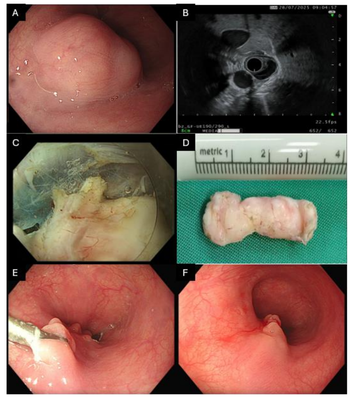


Fig. 3 Case 3: (A) Submucosal tumor at the lower end of the esophagus. (B) A horseshoe-shaped hypoechoic mass originated in the esophagus' muscularis mucosa. (C) Tumor dissection and exposure. (D Specimen. (E) A retained clip on the U-STER scar. (F) The scar after the clip was removed endoscopically.

| Case | Location | Size (cm) | Resection | Partial myotomy | Primary technique | Procedure time | Closure (clips) | Adverse events | LOS | Follow-up | Pathology |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mid | 1.5 × 8 | Piecemeal | Yes | **U-STER predominant; intermittent $CO_2$** | 5h45 | 5 | Pneumomediastinum, subcutaneous, emphysema | 8.5 days | 9 months | Leiomyoma |
| 2 | Distal | 2 × 3 | Piecemeal | Yes | **U-STER (underwater)** | 9h10 | 10 | None | 3.5 days | 8 months | Leiomyoma |
| 3 | Distal | 2.5 × 1 | **En bloc** | No | **U-STER; $CO_2$ off** | 1h30 | 7 | None | 3.5 days | 2 months | Leiomyoma |

## KEY LEARNING POINTS

- Horseshoe-shaped leiomyomas leave little room to work inside the tunnel, making en bloc resection difficult.
- Piecemeal resection may be necessary for large/partially circumferential lesions.
- Selective partial myotomy helps when the tumor is stuck to muscle.
- U-STER (underwater), including $CO_2$-off technique, keeps the field clear and the tunnel stable.

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