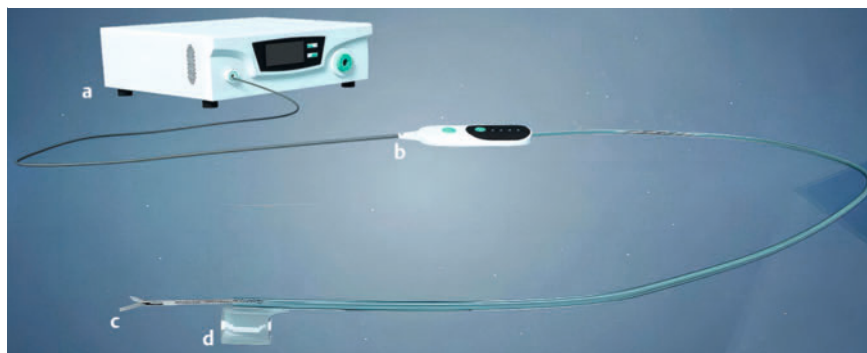


## Endoscopic submucosal dissection-assistance robot: a miniature surgical manipulator for endoscopic submucosal dissection

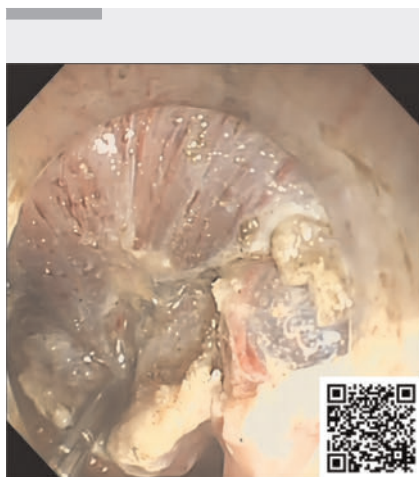
OPEN  
ACCESS

One-handed operation and gravity-induced blind dissection are technical difficulties in endoscopic submucosal dissection (ESD) procedures [1]. In order to reduce the difficulty of the procedure and minimize the risk of perforation and bleeding, we have developed a microsurgical manipulator, the ESD-assistance robot, which provides a “second hand” with auxiliary traction, clamping, and fixation functions during procedures.

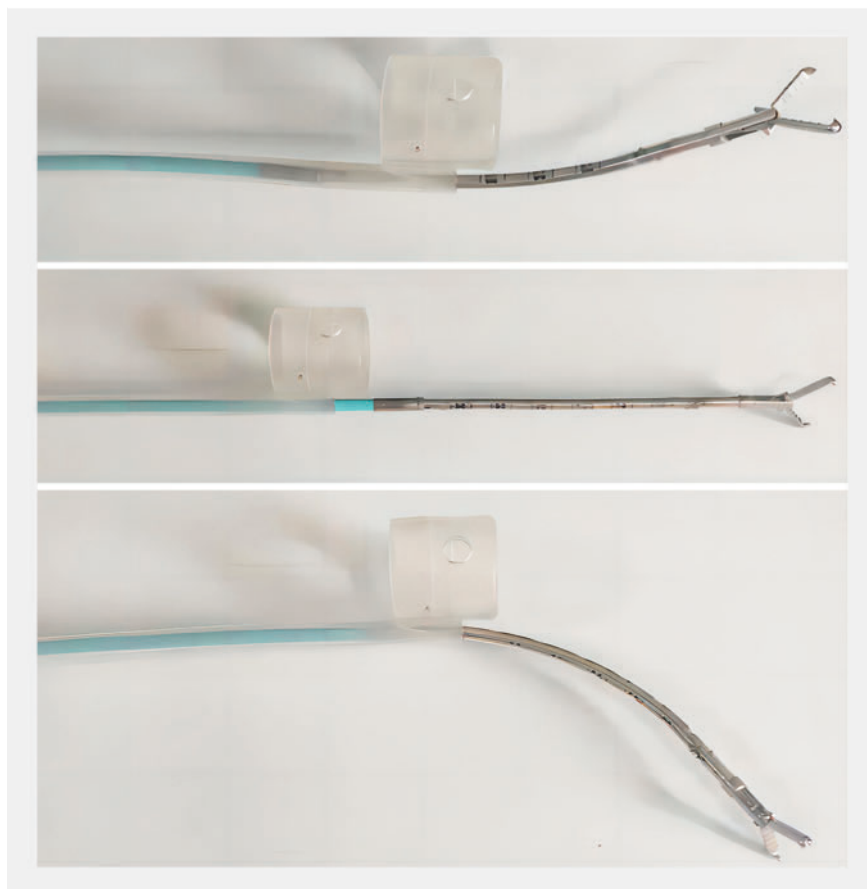
The ESD-assistance robot is composed of four main components: an end cap sheath tube, manipulator, servo driver, and command controller (► Fig. 1). When in use, the end cap sheath tube is fitted at the front end of the endoscope, and the endoscope is extended to extend the sheath tube. When performing dissection, the micromanipulator is voice controlled to move in forward/backward and clockwise/counterclockwise rotational directions, to bend forward/backward, and to open/close the mouth of the clamp (► Fig. 2); auxiliary traction is



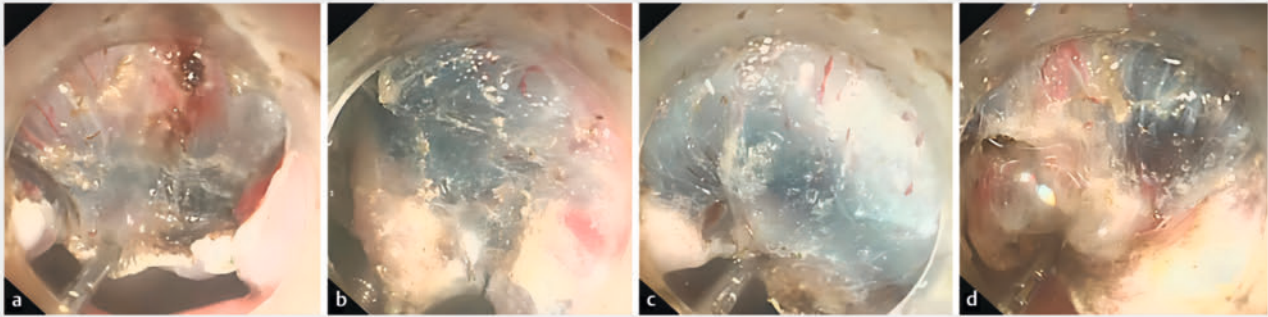
► Fig. 1 Endoscopic submucosal dissection-assistance robot consists of: a a command controller; b a servo driver; c a manipulator; d an end cap sheath tube.



► Video 1 Application of the endoscopic submucosal dissection (ESD)-assistance robot in gastric ESD.



► Fig. 2 Photographs illustrating the movements of the manipulator.



**► Fig. 3** Endoscopic views of the endoscopic submucosal dissection (ESD)-assistance robot being used to assist with the application of traction, and with clamping and fixation.


applied to the pathologic tissue, maintaining the surgical field of view, thereby improving the dissection speed and reducing the difficulty of the procedure. A 60-year-old man was admitted to hospital with gastric cardia mucosal lesions and underwent diagnostic excision by ESD. During the procedure, traction from the ESD-assistance robot was used to obtain a clear submucosal field of vision, and to facilitate dissection, hemostasis, and submucosal injection (► **Fig. 3**), which together improved surgical efficiency (► **Video 1**).

Endoscopy\_UCTN\_Code\_TTT\_1AO\_2AC

### Conflict of Interest

The authors declare that they have no conflict of interest.

### The authors

Yaxian Kuai<sup>1</sup>, Jie Peng<sup>2</sup>, Jing Jin<sup>1</sup>, Aijiu Wu<sup>2</sup>, Derun Kong<sup>1</sup> 

- 1 Key Laboratory of Digestive Diseases of Anhui Province, Department of Gastroenterology, First Affiliated Hospital of Anhui Medical University, Hefei, China
- 2 Research and Development Department, Hefei Zhongna Medical Instrument Co. Ltd., Hefei, China

### Funding Information

2022 Key Research and Development Plan Project of the Science and Technology Department of Anhui Province 9021240206

### Clinical trial

Chinese Clinical Trial Registry  
ChiCTR2300077031

### Corresponding author

**Derun Kong, MD**

Department of Gastroenterology, The First Affiliated Hospital of Anhui Medical University, No.81 Jixi Road, Shushan District, Hefei City, 230031 Anhui Province, China  
kongderun168@163.com

### References

- [1] Yang X, Fu S, Ji R et al. A novel flexible auxiliary single-arm transluminal endoscopic robot facilitates endoscopic submucosal dissection of gastric lesions (with video). *Surg Endosc* 2022; 36: 5510–5517

### Bibliography

*Endoscopy* 2024; 56: E67–E68  
DOI 10.1055/a-2234-4160  
ISSN 0013-726X  
© 2024. The Author(s).

This is an open access article published by Thieme under the terms of the Creative Commons Attribution License, permitting unrestricted use, distribution, and reproduction so long as the original work is properly cited.  
(<https://creativecommons.org/licenses/by/4.0/>)  
Georg Thieme Verlag KG, Rüdigerstraße 14,  
70469 Stuttgart, Germany



### ENDOSCOPY E-VIDEOS

<https://eref.thieme.de/e-videos>



*E-Videos* is an open access online section of the journal *Endoscopy*, reporting on interesting cases

and new techniques in gastroenterological endoscopy. All papers include a high-quality video and are published with a Creative Commons CC-BY license. *Endoscopy E-Videos* qualify for HINARI discounts and waivers and eligibility is automatically checked during the submission process. We grant 100% waivers to articles whose corresponding authors are based in Group A countries and 50% waivers to those who are based in Group B countries as classified by Research4Life (see: <https://www.research4life.org/access/eligibility/>).

This section has its own submission website at  
<https://mc.manuscriptcentral.com/e-videos>