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Title: The Pocket-Creation Procedure of Endoscopic Submucosal Dissection for Large Rectal Laterally Spreading Tumors

Authors and Affiliations:

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Author Questionnaire

1. We have marked your project as author-provided footage, meaning you film the video yourself and provide JoVE with the footage to edit. JoVE will not send the videographer. Please confirm that this is correct.

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2. Interview statements: Which interview statement filming option is the most appropriate for your group? **Please select one.**



Interview Statements are read by JoVE's voiceover talent.

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Current Protocol Length

Number of Steps: 09

Number of Shots: 15

Introduction

NOTE TO VO: Please record the VO for this section

INTRODUCTION:

REQUIRED: Summarize your research focus and the main questions it aims to answer.

- 1.1. This pocket-creation method can be used to safely resect large rectal tumors endoscopically.

- 1.1.1. *Suggested B.roll: 2.7.1*

~~Describe the research contexts or systems in which this protocol can be applied.~~

- 1.2. The method works for large rectal laterally spreading tumors, even near the anal line.

- 1.2.1. *Suggested B.roll:2.7.2*

CONCLUSION:

~~Describe the most important consideration or challenge when performing this protocol.~~

- 1.3. An important consideration to make while performing this protocol is to maintain a clear fluid cushion and avoid muscularis propria injury.

- 1.3.1. *Suggested B.roll:2.1*

~~Are there any additional methods or analyses that can be performed following this procedure?~~

- 1.4. Following this protocol, specimens can be used in histopathology for R0 margin assessment and cancer staging.

- 1.4.1. *Suggested B.roll:2.9.1*

~~How can future studies build on this work? Describe the questions or research directions that can be investigated next.~~

- 1.5. Future work may apply this protocol to duodenal lesions and integrate AI guidance.

- 1.5.1. *Suggested B.roll:2.4.1*

Ethics Title Card

This research has been approved by the Institutional Review Board (IRB) at the First Affiliated Hospital of Jinan University

Protocol

2. Submucosal Tunneling Endoscopic Submucosal Dissection for Anorectal Lesions

Demonstrator: Jinying Li

2.1. To begin, inject the indigo carmine–saline solution immediately outside the planned resection margin to create a sustained fluid cushion [1]. Select the anal-side marking point as the entry site [2].

2.1.1. LAB MEDIA: 6933-1.mp4 01:16 – 01:50

2.1.2. LAB MEDIA: 6933-1.mp4 02:58 – 03:15

2.2. Make an arc-shaped incision at the anorectal margin of the lesion using a disposable mucosal knife to create a mucosal flap and establish the tunnel entry point [1-TXT].

2.2.1. LAB MEDIA: 6933-1.mp4 03:33 – 03:58

TXT: Apply appropriate force against mucosal surface ensuring that the incision is made in 1 stroke

2.3. Advance the endoscope into the submucosal space [1]. Then dissect the submucosal fibers horizontally using ESD knife [2]

2.3.1. LAB MEDIA: 6933-1.mp4 23:18 – 23:31

2.3.2. LAB MEDIA: 6933-1.mp4 25:20 – 25:30

2.4. Maintain dissection plane immediately above the muscularis propria to avoid the more vascular superficial submucosa [1]. Continue dissecting from the submucosal pocket toward the oral side until the tunnel extends beyond the oral tumor margin [2].

2.4.1. LAB MEDIA: 6933-1.mp4 32:35 – 32:55

2.4.2. LAB MEDIA: 6933-1.mp4 02:08:33 – 02:09:03

2.5. Inject additional indigo carmine–saline solution as needed to maintain lift [1].

2.5.1. LAB MEDIA: 6933-1.mp4 2:18:48 – 2:18:58

2.6. Complete the submucosal incision on the oral side to clearly define the resection endpoint and achieve full communication between the anal-side and oral-side tunnels [1].

2.6.1. LAB MEDIA: 6933-1.mp4 2:20:22 – 2:20:35, 2:34:28 – 2:34:38, 2:35:45 – 2:35:57

2.7. Under direct vision, incise the mucosa along the pre-marked margin on the gravity-dependent side first [1], then proceed to the non-gravity side [2], advancing stepwise

until the entire lesion is circumferentially freed [3].

2.7.1. LAB MEDIA: 6933-1.mp4 2:49:00 – 2:49:18

2.7.2. LAB MEDIA: 6933-1.mp4 3:08:54 – 3:09:07

2.7.3. LAB MEDIA: 6933-1.mp4 3:13:20 – 3:13:32

2.8. Throughout the dissection, pre-coagulate any visible vessels with the ESD knife in **SOFT COAG** mode [1-TXT].

2.8.1. LAB MEDIA: 6933-1.mp4 31:18 – 31:27

TXT: Maintain visualization and ensure muscularis propria remains intact

2.9. Engage the freed lesion with a snare or apply continuous endoscopic suction to extract the intact specimen en bloc [1]. Inspect the post-resection bed and thermally coagulate it with hemostatic forceps [2].

2.9.1. LAB MEDIA: 6933-1.mp4 3:15:13 – 3:15:25

2.9.2. LAB MEDIA: 6933-1.mp4 3:17:45 – 3:17:53

Results

3. Results

3.1. The key demographic and clinical characteristics of 2 representative patients are summarised in the table [1].

3.1.1. LAB MEDIA: Table 1.

3.2. Preoperative evaluation revealed mild-to-moderate anaemia in two patients [1].

3.2.1. LAB MEDIA: Table 1 *Video Editor: Please highlight the row: Comorbidity*

3.3. The mean dissection speed was 0.414 square centimeters per minute [1].

3.3.1. LAB MEDIA: Table 1 *Video Editor: Please highlight the row: Dissection speed*

3.4. The procedures did not result in any intra-operative perforation [1]. One patient experienced self-limiting hematochezia that was managed conservatively [2]. The mean post-operative hospital stay was approximately 5 days [3].

3.4.1. LAB MEDIA: Table 1. *Video editor: Highlight the row "Complication" showing "None" under "Case 1."*

3.4.2. LAB MEDIA: Table 1. *Video editor: Highlight the row "Complication" under "Case 2" showing "Self-limiting hematochezia."*

3.4.3. LAB MEDIA: Table 1. *Video editor: Highlight the row "Hospital Stay"*

3.5. Histopathological examination revealed high-grade dysplasia in both cases [1].

3.5.1. LAB MEDIA: Table 1. *Video editor: Highlight the row "Final Histopathological Diagnosis" under both "Case 1" and "Case 2" showing "Serrated dysplasia, high grade."*

Pronunciation Guide:

1. Endoscopic
Pronunciation link: <https://www.merriam-webster.com/dictionary/endoscopic>
IPA: /ˌɛn.dəˈskɑː.pɪk/
Phonetic Spelling: en·duh·skaap·ik
2. Submucosal
Pronunciation link: <https://www.merriam-webster.com/dictionary/submucosal>
IPA: /ˌsʌb.mjuːˈkoʊ.səl/
Phonetic Spelling: sub·myoo·koh·suhl
3. Dissection
Pronunciation link: <https://www.merriam-webster.com/dictionary/dissection>
IPA: /dɪˈsek.jən/
Phonetic Spelling: dih·sek·shuhn
4. Rectal
Pronunciation link: <https://www.merriam-webster.com/dictionary/rectal>
IPA: /ˈrɛk.təl/
Phonetic Spelling: rek·tuhl
5. Laterally
Pronunciation link: <https://www.merriam-webster.com/dictionary/laterally>
IPA: /ˈlæʧ.ə.ə.li/
Phonetic Spelling: lat·uh·ruh·lee
6. Tumors
Pronunciation link: <https://www.merriam-webster.com/dictionary/tumor>
IPA: /ˈtuː.mə/
Phonetic Spelling: too·mer
7. Gastrointestinal
Pronunciation link: <https://www.merriam-webster.com/dictionary/gastrointestinal>
IPA: /ˌɡæs.troʊ.ɪnˈtɛs.tə.nəl/, /ˌɡæs.troʊ.aɪnˈtɛs.tə.nəl/
Phonetic Spelling: gas·troh·in·tes·tuh·nuhl; gas·troh·eye·in·tes·tuh·nuhl
8. Pathophysiology
Pronunciation link: <https://www.merriam-webster.com/dictionary/pathophysiology>
IPA: /ˌpæθ.oʊˈfɪz.iˈɑː.lə.dʒi/
Phonetic Spelling: path·oh·fiz·ee·aa·luh·jee
9. Anorectal
Pronunciation link: <https://www.merriam-webster.com/dictionary/anorectal>
IPA: /ˌeɪ.noʊˈrɛk.təl/
Phonetic Spelling: ay·noh·rek·tuhl

10. Muscularis

Pronunciation link: <https://www.merriam-webster.com/dictionary/muscularis>

IPA: /ˌmʌs.kjəˈler.ɪs/

Phonetic Spelling: mus·kyuh·lair·is

11. Propria

Pronunciation link: <https://www.merriam-webster.com/dictionary/propria>

IPA: /ˈproʊ.pri.ə/

Phonetic Spelling: proh·pree·uh

12. Histopathology

Pronunciation link: <https://www.merriam-webster.com/dictionary/histopathology>

IPA: /ˌhɪs.təʊ.pəˈθɔː.lə.dʒi/

Phonetic Spelling: his·toh·puh·thaa·luh·jee

13. Duodenal

Pronunciation link: <https://www.merriam-webster.com/dictionary/duodenal>

IPA: /ˌduː.əˈdiː.nəl/, /ˌdjuː.əˈdiː.nəl/

Phonetic Spelling: doo·uh·dee·nuhl; dyoo·uh·dee·nuhl

14. Lesions

Pronunciation link: <https://www.merriam-webster.com/dictionary/lesion>

IPA: /ˈliː.ʒən/

Phonetic Spelling: lee·zhuhn

15. Indigo

Pronunciation link: <https://www.merriam-webster.com/dictionary/indigo>

IPA: /ˈɪn.dəˌɡoʊ/

Phonetic Spelling: in·duh·goh

16. Saline

Pronunciation link: <https://www.merriam-webster.com/dictionary/saline>

IPA: /ˈseɪ.laɪn/, /ˈseɪ.liːn/

Phonetic Spelling: say·line; say·leen

17. Mucosal

Pronunciation link: <https://www.merriam-webster.com/dictionary/mucosal>

IPA: /mjuːˈkoʊ.səl/

Phonetic Spelling: myoo·koh·suhl

18. Endoscope

Pronunciation link: <https://www.merriam-webster.com/dictionary/endoscope>

IPA: /ˈɛn.dəˌskoʊp/

Phonetic Spelling: en·duh·skohp

19. Hemostatic

Pronunciation link: <https://www.merriam-webster.com/dictionary/hemostatic>

IPA: /ˌhiː.məˈstæt.ɪk/

Phonetic Spelling: hee·muh·stat·ik

20. Hematochezia

Pronunciation link: <https://www.merriam-webster.com/dictionary/hematochezia>

IPA: /ˌhiː.mæt.ʊʊˈkiː.zi.ə/

Phonetic Spelling: hee·mat·oh·kee·zee·uh

21. Anaemia

Pronunciation link: <https://www.merriam-webster.com/dictionary/anemia>

IPA: /əˈniː.mi.ə/

Phonetic Spelling: uh·nee·mee·uh

22. Perforation

Pronunciation link: <https://www.merriam-webster.com/dictionary/perforation>

IPA: /ˌpɜː.fəˈreɪ.jən/

Phonetic Spelling: per·fuh·ray·shuhn

23. Histopathological

Pronunciation link: <https://www.merriam-webster.com/dictionary/histopathological>

IPA: /ˌhɪs.tʊʊ.pæθ.əˈlɑː.dʒɪ.kəl/

Phonetic Spelling: his·toh·path·uh·laa·ji·kuhl

24. Dysplasia

Pronunciation link: <https://www.merriam-webster.com/dictionary/dysplasia>

IPA: /dɪsˈpleɪ.ʒə/

Phonetic Spelling: dis·play·zhuh

25. Serrated

Pronunciation link: <https://www.merriam-webster.com/dictionary/serrated>

IPA: /ˈsɛr.eɪ.tɪd/

Phonetic Spelling: ser·ray·tid