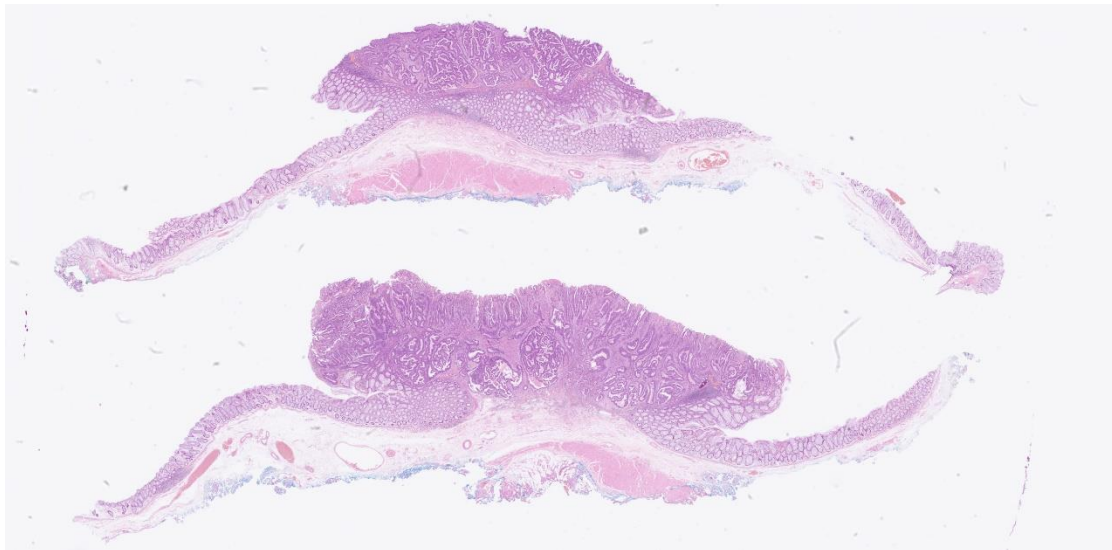
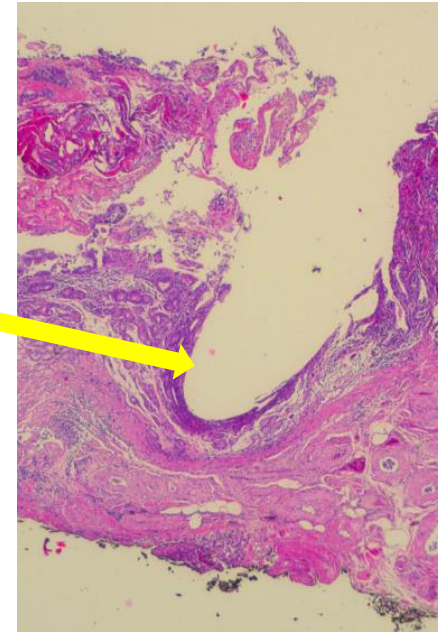




We all love ESD, but how do we choose the right lesion

Arjun D. Koch, MD, PhD, FEBGH

Pathologists love ESD (or rather they dislike piecemeal EMRs)



Endoscopists love ESD (although not always glamorous)



**Long procedures,
no breaks...**

**Living on the edge...
Lots of bleedings
Perforations always imminent**

Why I love ESD

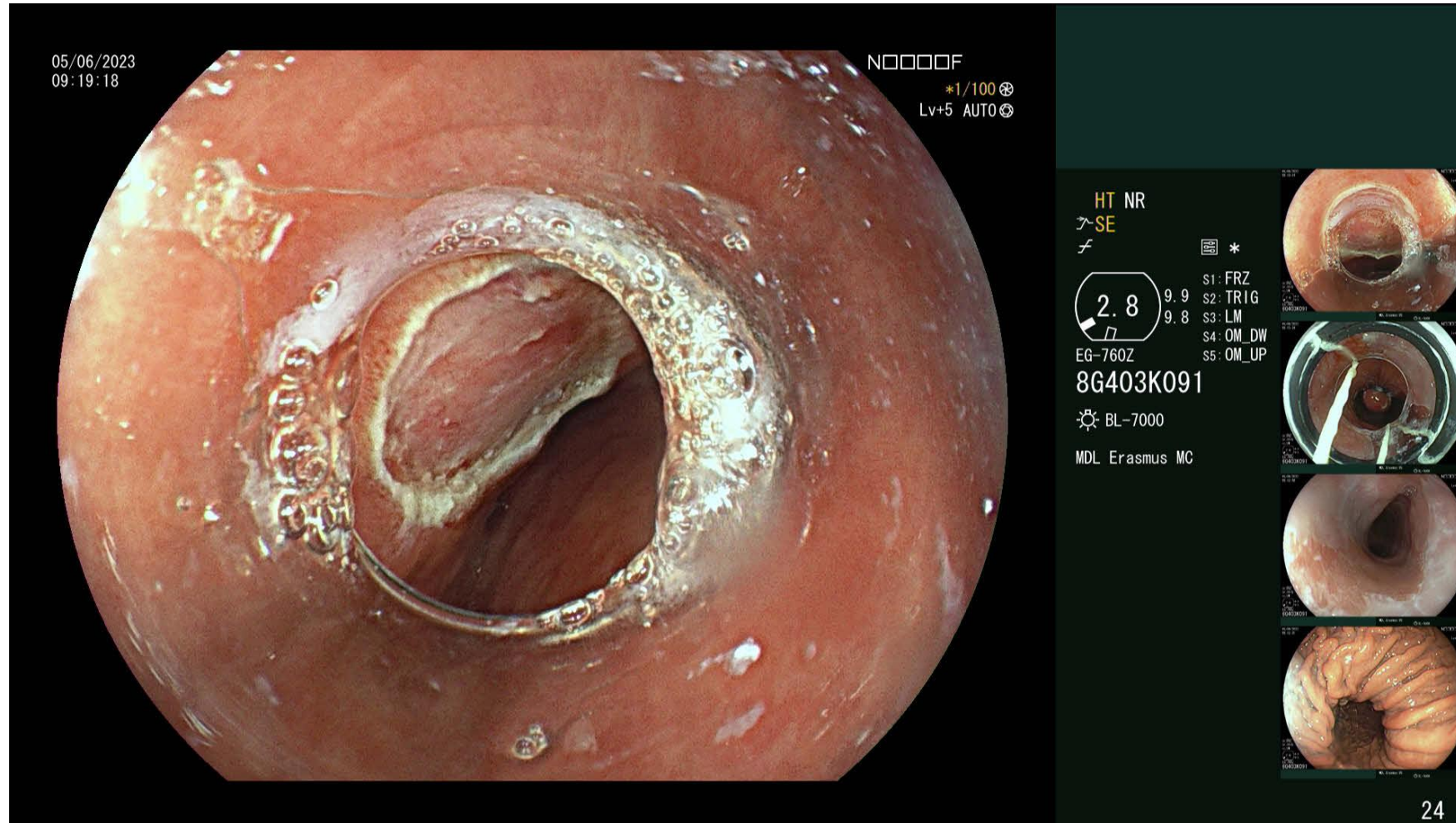
- Offers definitive curative treatment for early GI cancers
- Offers watch-and-wait options for endoscopically removed high risk cases

- Muscle layer is no longer the final frontier in GI endoscopy and ESD is the precursor in many new developments
 - Third space endoscopy: POEM, STER, fistuloplasty
 - Endoscopic intermuscular dissection (EID) in the rectum

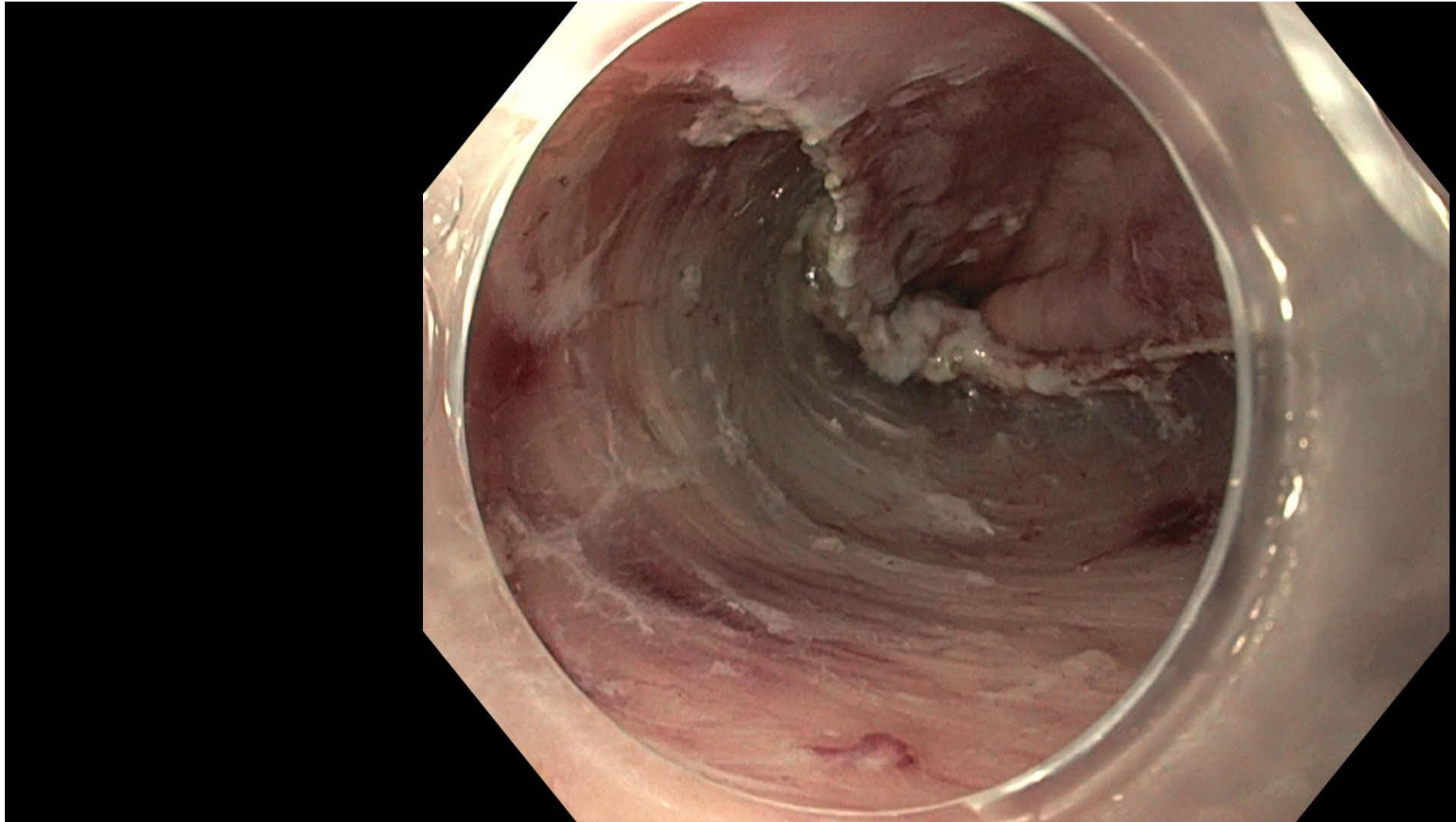
Indications for ESD (compared to pEMR) in general

- When *en bloc* resection matters
 - Too large for *en bloc* EMR
 - Need for more precise histopathological assessment
- ➔ when incomplete (or uncertainty about completeness) resection will influence patient's management.

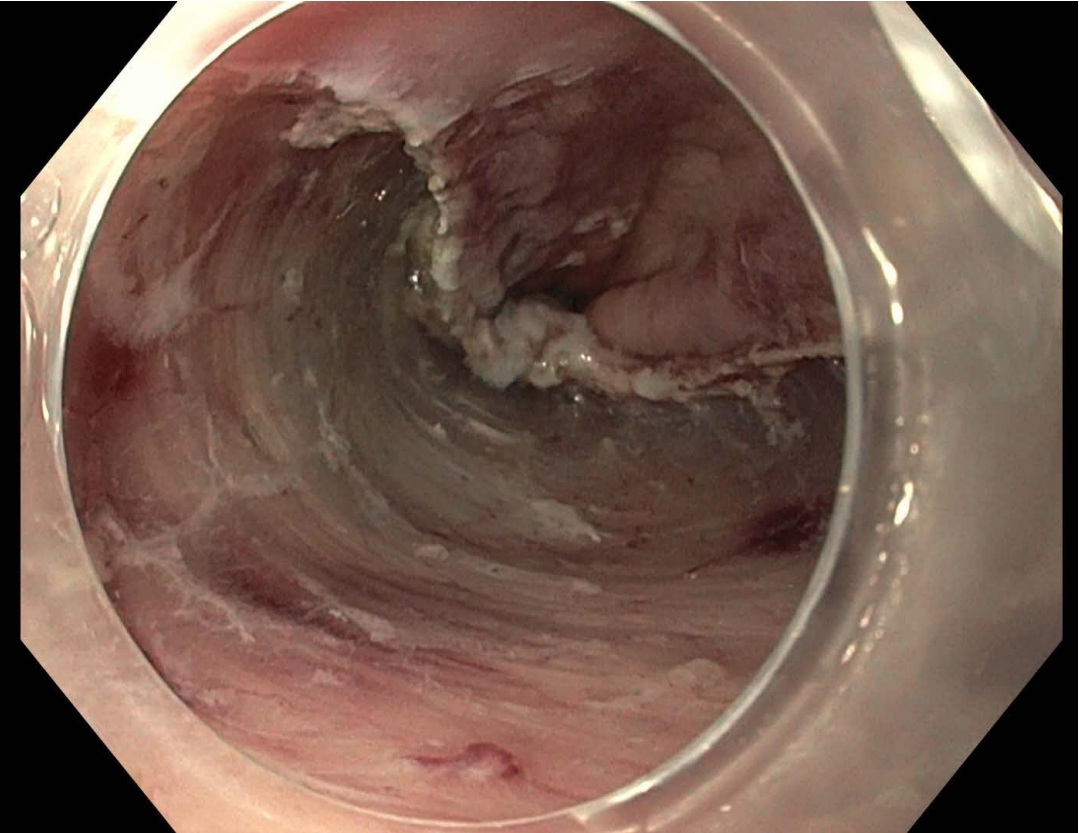
En bloc? What about the vertical margin? Muscle layer view after EMR



Muscle layer view after ESD



Resection planes EMR vs ESD



(Theoretical) advantages of ESD over (piecemeal) EMR

Higher en bloc resection rates

Higher R0 resection rates; both lateral *and* vertical

Less recurrences

Superior histopathological specimen

Superior histopathological assessment

Superior staging and risk analysis

2017: Indications for ESD – *in my book...*

Lesion	Problem	Need for R0	Technique
Esophageal early squamous cancer	Early LN metastasis. 10% local recurrence in piecemeal resections	Yes	ESD
Barrett's early cancer	Aim is complete eradication rather than R0	No	EMR
Early gastric cancer	20% local recurrence in piecemeal resections	Yes	ESD
Duodenal adenoma	Aim is complete eradication rather than R0	No	EMR
Colorectal adenoma	Aim is complete eradication rather than R0	No	E(P)MR
Colorectal early cancer	Uncertainty about radicality will often lead to surgery	Yes	ESD

Expanding indications and therapies

Ever expanding therapeutic options in GI endoscopy. Might prompt the need for en bloc over piecemeal where this was considered “overtreatment” in the past

Some recent developments

- Barrett's
- Colorectal LSTs
- T1 CRCs

Endoscopic resection for adenocarcinoma in Barrett's esophagus

- Not so long ago the debate between surgeons and endoscopists was about how and who should treat HGD...
- ER established as first choice treatment for mucosal adenocarcinoma in Barrett's esophagus
- Gradual shift to sm1 cancers in the absence of high risk features (G3, LVI) because of a low risk for LNM (<2%)
- Can ER be an alternative to esophagectomy in high risk T1b EAC's?

The PREFER trial

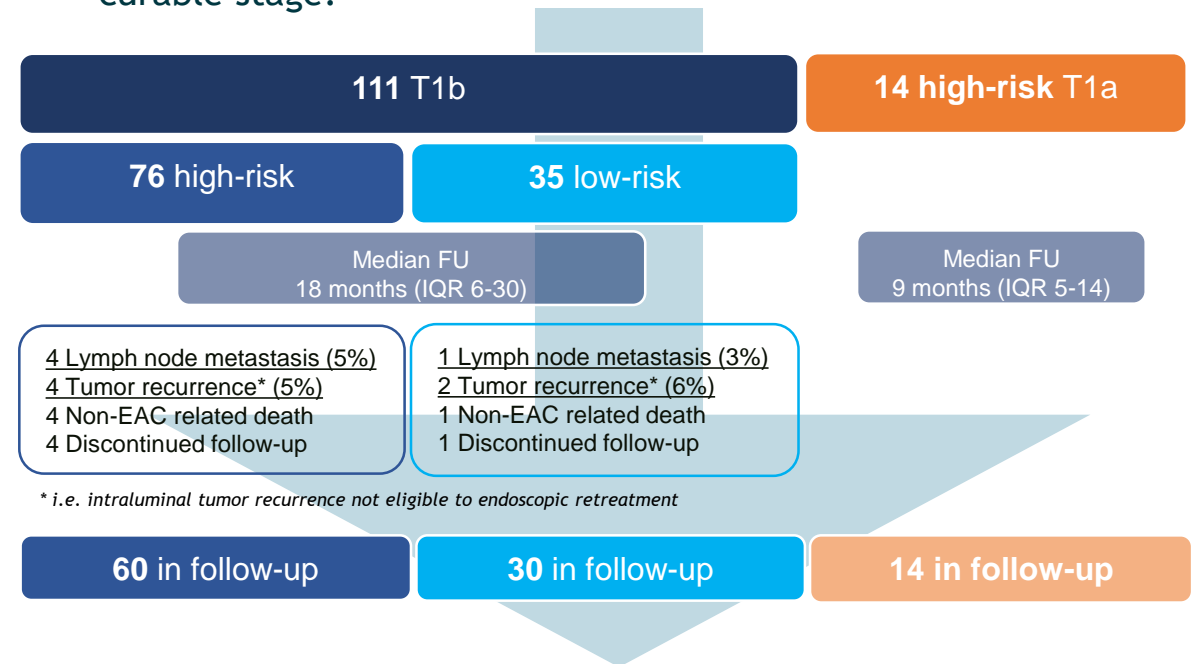
Endoscopic follow-up after ER (R0) of high-risk T1a and T1b adenocarcinoma (N0 M0)

- **Methods:** Baseline re-staging (EGD + EUS + CT/PET) prior to inclusion
- 5yr stringent endoscopic FU (● EGD + EUS)



- **Outcomes:** 5y disease-specific mortality, lymph node and distant metastasis, tumor recurrence, quality of life
- **Multicentre:** 20 centres in Europe and Australia

- **Interim results (July 2017 - July 2022)** all cases of LNM and tumor recurrence were detected in a curable stage.



LNM risk stratification - Quantification of LVI

- No longer dichotomous approach to decide on patient management
 - T1a vs T1b or Sm1 vs sm2/3
 - Low risk vs high risk
- Personalized medicine
 - Individual LNM risk prediction based on combination of all known risk features
 - Watchful waiting after radical ER and no LNM on imaging

Tumor size	Submucosal invasion	LVI -	LVI +
		% (95% CI)	% (95% CI)
<20mm	sm1	5.9 (2.3-11.2)	15.7 (6.0-29.3)
	sm2	7.3 (2.6-13.8)	19.3 (6.3-36.8)
	sm3	14.1 (7.9-21.9)	34.7 (19.7-50.8)
≥20mm	sm1	16.1 (6.2-29.2)	38.8 (17.0-61.4)
	sm2	19.4 (8.6-32.2)	45.6 (20.8-67.9)
	sm3	35.2 (25.8-44.7)	70.1 (60.5-78.7)

Tumor size	Submucosal invasion	LVI -	LVI 1x	LVI 2-3	LVI ≥4
		% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
<20mm	sm1	5.9 (2.3-11.2)	10.9 (3.0-24.4)	19.5 (7.4-37.7)	25.7 (9.7-48.3)
	sm2	7.3 (2.6-13.8)	13.4 (3.8-30.1)	24.1 (8.6-44.2)	31.6 (11.0-55.5)
	sm3	14.1 (7.9-21.9)	26.3 (10.6-45.3)	43.5 (26.6-61.5)	54.4 (33.7-72.8)
≥20mm	sm1	16.1 (6.2-29.2)	22.2 (6.2-45.3)	37.0 (16.0-62.3)	47.1 (21.1-72.9)
	sm2	19.4 (8.6-32.2)	26.3 (8.4-51.0)	44.4 (20.2-66.2)	55.2 (26.4-77.9)
	sm3	35.2 (25.8-44.7)	48.4 (21.5-69.3)	70.2 (56.6-81.4)	80.6 (72.3-88.5)

Retrospective data ESD vs EMR

Table 3 Histological outcomes.

	Overall (n = 85)	ESD group (n = 57)	EMR group (n = 28)	
Histological analysis - n (%)				<i>p</i> < 0.01
- High-grade dysplasia or carcinoma in situ (T1am1)	15 (18)	5 (8.8)	10 (36)	
- Invasive Adenocarcinoma	70 (82)	52 (91.2)	18 (64)	
Infiltration depth \square - n (%)				<i>p</i> = 0.81
- Mucosa	51 (76)	36 (73)	15 (83)	
- Sm1	6 (9)	5 (10)	1 (6)	
- Sm2	10 (15)	8 (16)	2 (11)	
Differentiation grade \square - n (%)				<i>p</i> = 0.62
- Well differentiated	48 (73)	36 (71)	12 (80)	
- Moderately differentiated	7 (11)	5 (10)	2 (13)	
- Poorly differentiated	11 (17)	10 (20)	1 (7)	
Signet ring cells - n (%)	7 (8.2)	6 (11)	1 (3.6)	<i>p</i> = 0.42
Lymphovascular invasion - n (%)	4 (4.7)	3 (5.3)	1 (3.6)	<i>p</i> = 1
R0 resection rate - n (%)	47 (55)	43 (75)	4 (14)	<i>p</i> < 0.001
Curative resection rate - n (%)	34 (40)	32 (56)	2 (7)	<i>p</i> < 0.001
R0 resection rate for invasive adenocarcinoma - n (%)	56 (66)	50 (88)	6 (21)	<i>p</i> < 0.001
Curative resection rate for invasive adenocarcinoma - n (%)	41 (48)	38 (67)	3 (11)	<i>p</i> < 0.001

\square : determined for the 70 invasive adenocarcinomas (52 ESD, 18 EMR), T1am2 and deeper.

Recurrence even before RFA is initiated

► **Table 3** Comparison of follow-up characteristics between the groups that underwent endoscopic mucosal resection (EMR) or endoscopic submucosal dissection (ESD).

Characteristic	EMR (n = 140)	ESD (n = 85)	P value	n
Radiofrequency ablation after resection, n (%)	85 (62.5 %)	50 (69.4 %)	0.40	208
Recurrent disease, n (%)	44 (31.4 %)	3 (3.5 %)	<0.001	225
Time of first recurrent/residual disease, median (IQR), months	4.0 (3.0–7.0)	14.0 (8.5–14.5)	0.23	47
Recurrent/residual disease on first follow-up endoscopy	26 (59.1 %)	1 (33.3 %)	0.57	47
Patients with additional resection procedures, n (%)	34 (24.2 %)	3 (3.5 %)	<0.001	225
Number of additional resection procedures, median (range)	1 (0–7)	1 (1–1)	0.94	47
Metachronous disease, n (%)	5 (3.57 %)	1 (1.18 %)	0.41	225
Overall follow-up time, median (IQR), months	15.5 (6.75–30.0)	8.0 (2.0–18.0)	<0.001	225
Follow-up time to recurrence, median (IQR), months	9.0 (3.0–25.0)	8.0 (2.0–18.0)	0.16	225

IQR = interquartile range.

ESD for colorectal LSTs

Endoscopic mucosal resection (EMR) versus endoscopic submucosal dissection (ESD) for resection of large distal non-pedunculated colorectal adenomas (MATILDA-trial): rationale and design of a multicenter randomized clinical trial



Y. Backes¹, L. M. G. Moons^{1*}, J. D. van Bergeijk², L. Berk³, F. ter Borg⁴, P. C. J. ter Borg⁵, S. G. Elias⁶, J. M. J. Geesing⁷, J. N. Groen⁸, M. Hadithi⁹, J. C. H. Hardwick¹⁰, M. Kerkhof¹¹, M. J. J. Mangen⁶, J. W. A. Straathof¹², R. Schröder¹³, M. P. Schwartz¹⁴, B. W. M. Spanier¹⁵, W. H. de Vos tot Nederveen Cappel¹⁶, F. H. J. Wolfhagen¹⁷ and A. D. Koch¹⁸

As-treated analysis	6 months follow-up			36 months follow-up		
	EMR (n=115)	ESD (n=97)	95%CI	EMR (n=96)	ESD (n=82)	95%CI
Follow-up in months (IQR)	6.3 (5.9-6.9)	6.4 (5.9-7.1)		37.7 (35-41)	37.4 (36-39)	
Recurrence	12 (10.4%)	0 (0%)	5.52-16.3	5 (5.2%)	1 (1.2%)	-1.1-9.2

T1 rectal cancers

Deep Submucosal Invasion Is Not an Independent Risk Factor for Lymph Node Metastasis in T1 Colorectal Cancer: A Meta-Analysis

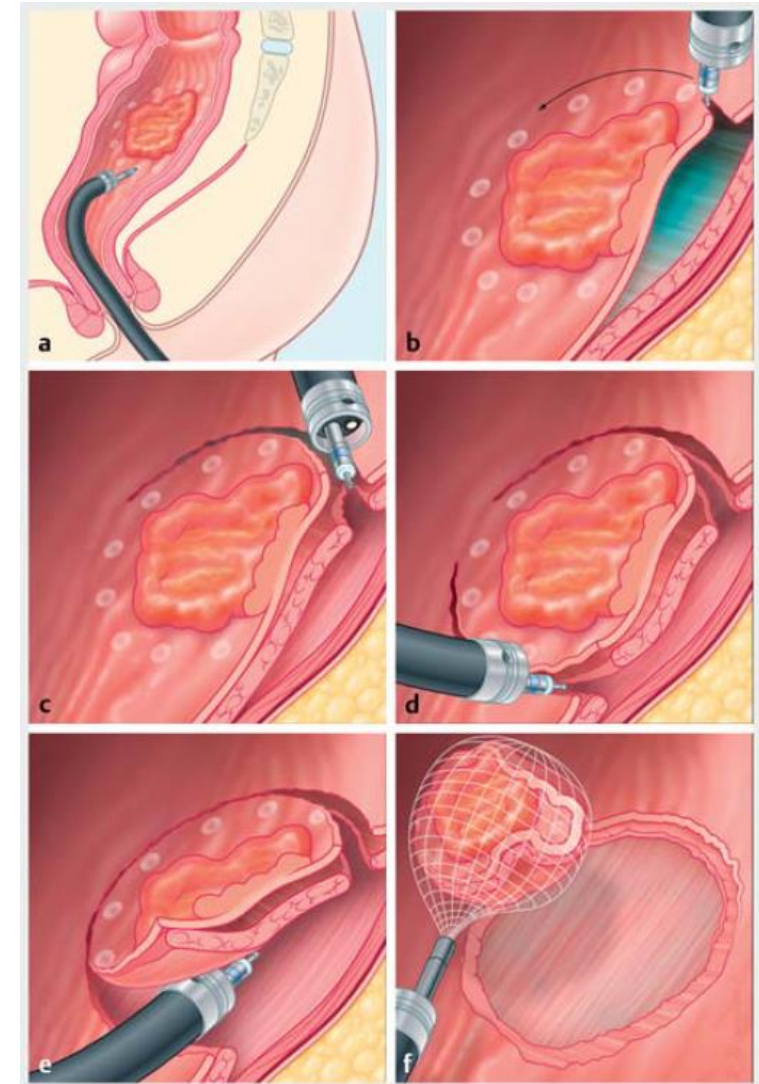
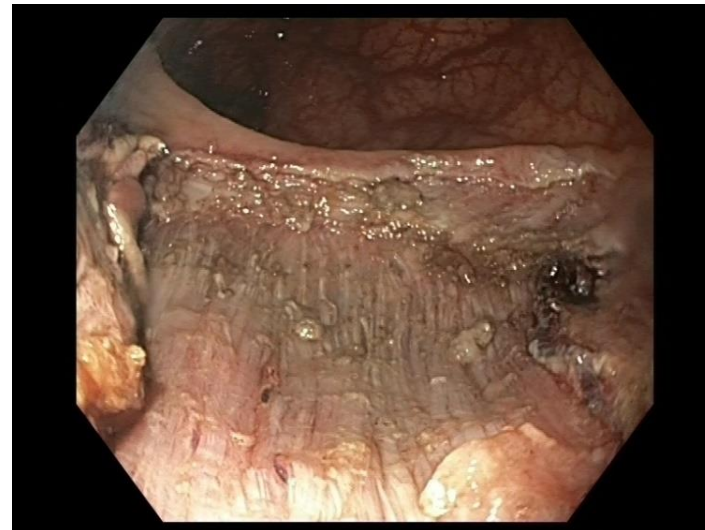


Liselotte W. Zwager,^{1,2,3} Barbara A. J. Bastiaansen,^{1,2,3} Nahid S. M. Montazeri,⁴ Roel Hompes,⁵ Valeria Barresi,⁶ Katsuro Ichimasa,⁷ Hiroshi Kawachi,⁸ Isidro Machado,⁹ Tadahiko Masaki,¹⁰ Weiqi Sheng,¹¹ Shinji Tanaka,¹² Kazutomo Togashi,¹³ Chihiro Yasue,¹⁴ Paul Fockens,^{1,2,3} Leon M. G. Moons,¹⁵ and Evelien Dekker^{1,2,3}

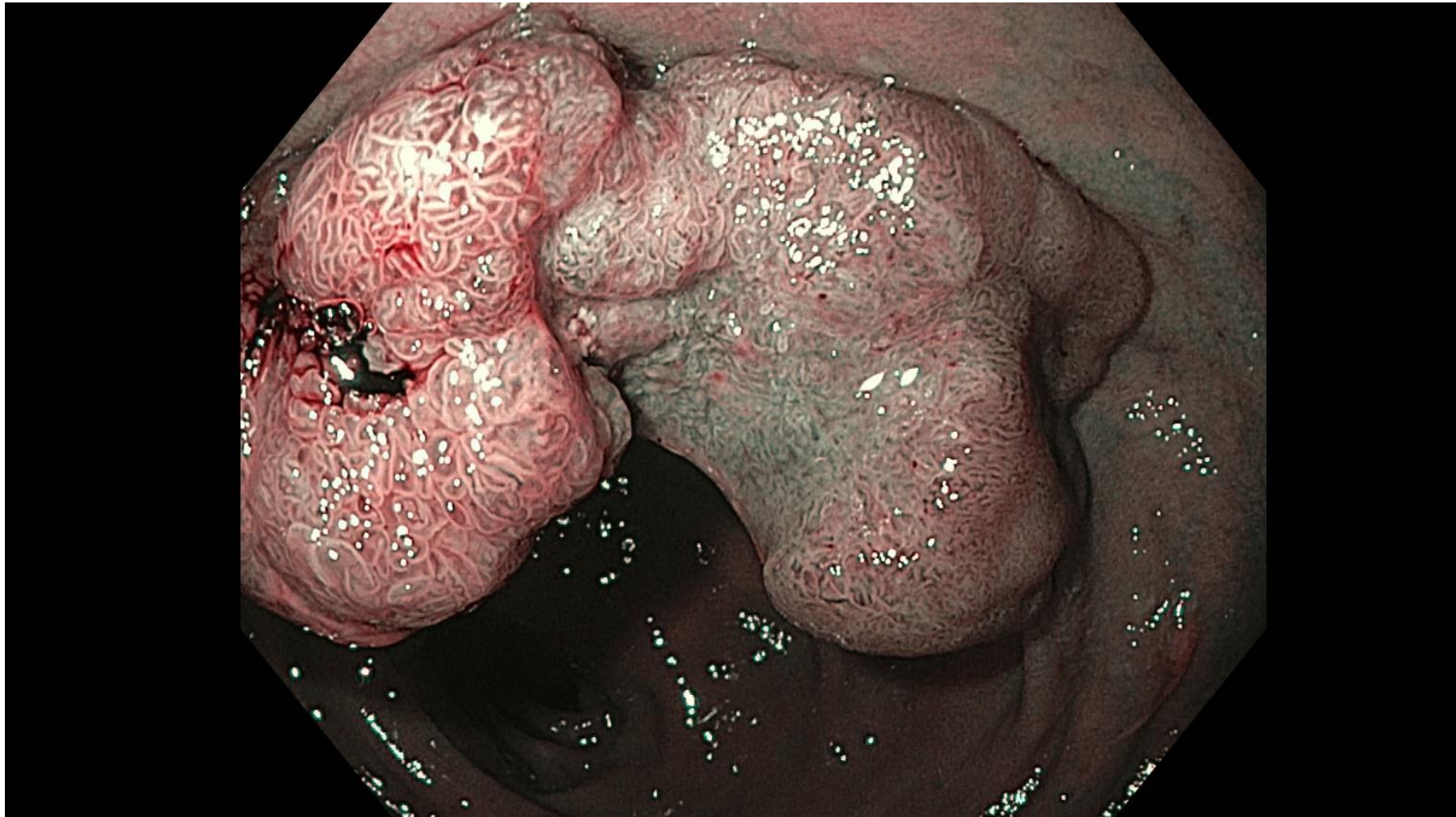
- Endoscopic resection feasible for sm3 lesions in the absence of high risk features
- High percentage of vertical R1 resections in ESD for T1sm3 rectal cancers
- Full thickness resections influences outcome of completion TME
- Endoscopic intermuscular dissection (EID) to replace ESD and to achieve R0 resections
 - ICON trial; Long term outcomes of Endoscopic Intermuscular Dissection (EID) for suspected deep submucosal invasive rectal cancers - A national prospective registry

Endoscopic intermuscular dissection (EID)

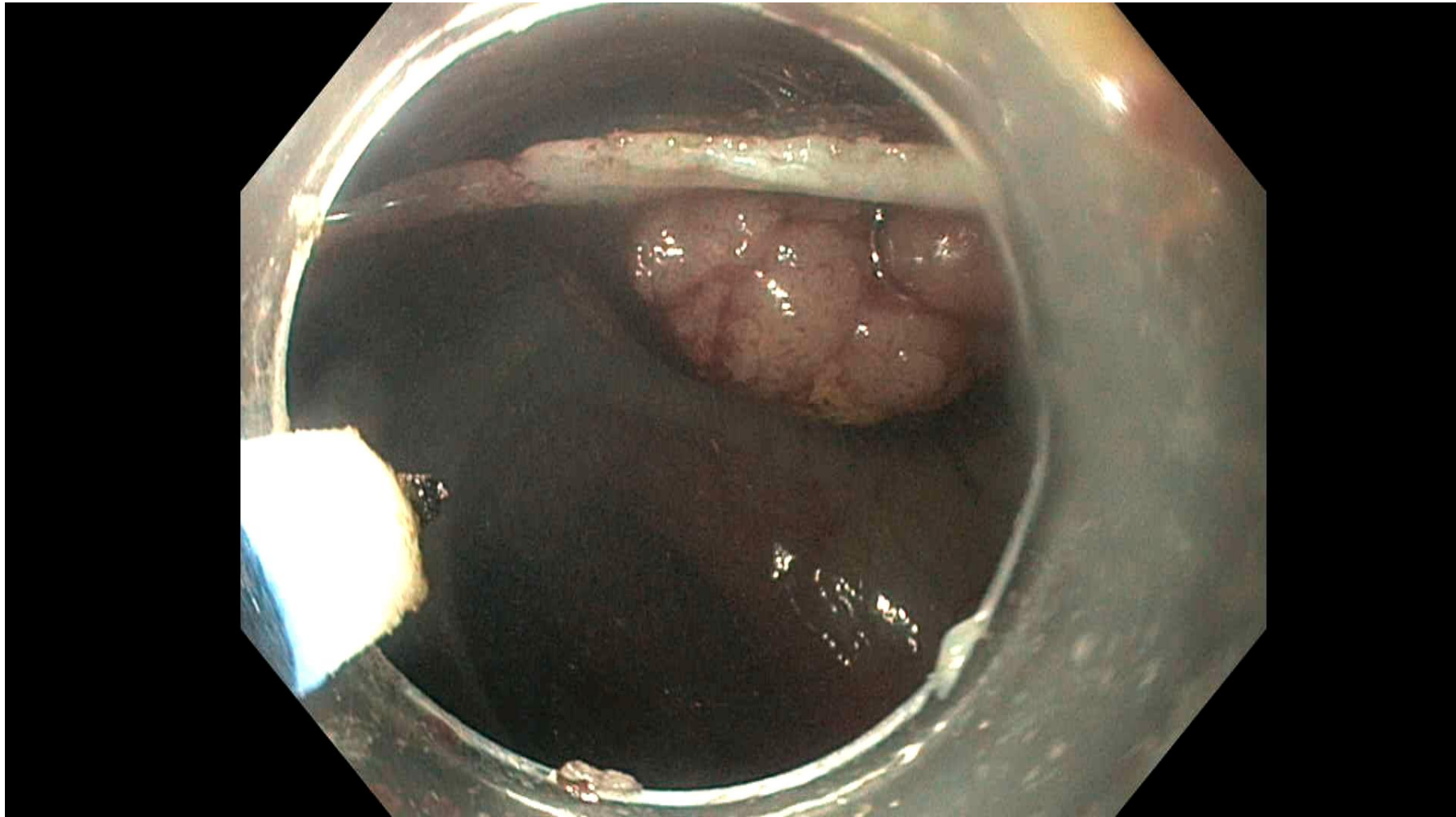
- First described by Toyonaga as PAEM for fibrosis in rectal lesions
- EID modification to allow for resection of a larger area of circular muscle bundles in the rectum underneath an invasive lesion to achieve an R0 resection



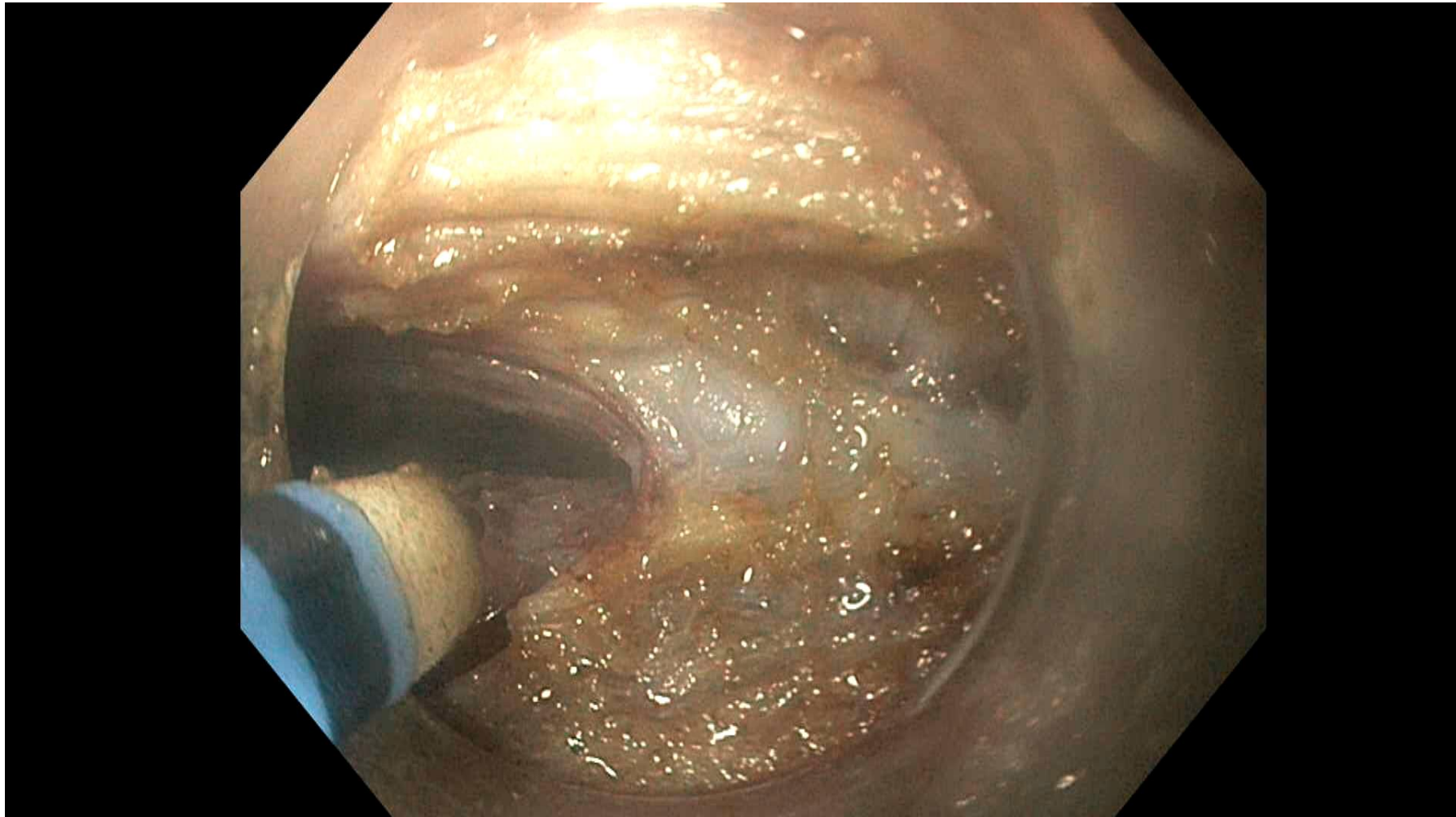
EID step-by-step – the lesion in the rectum



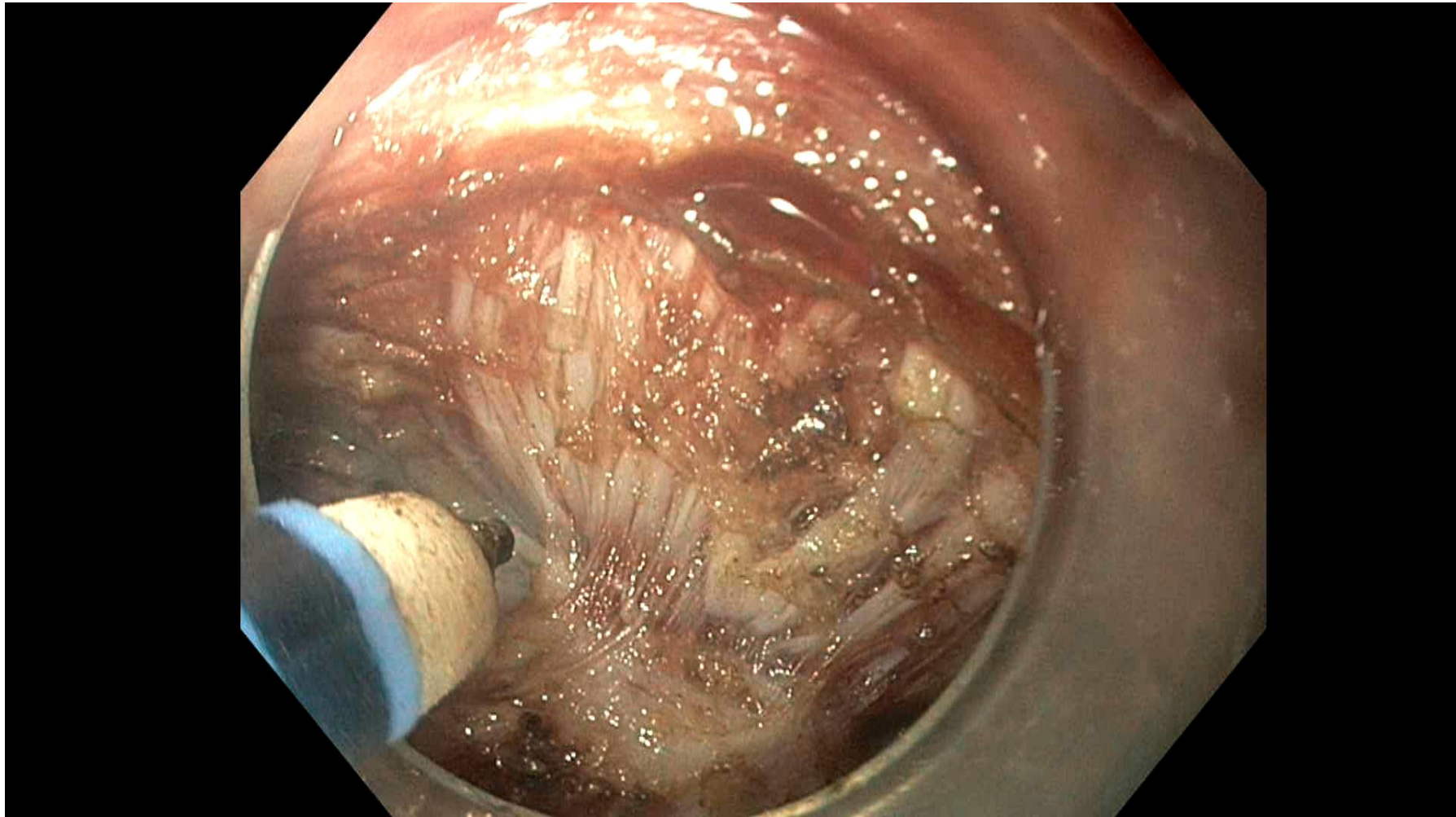
EID step-by-step – left-sided lateral tunnel



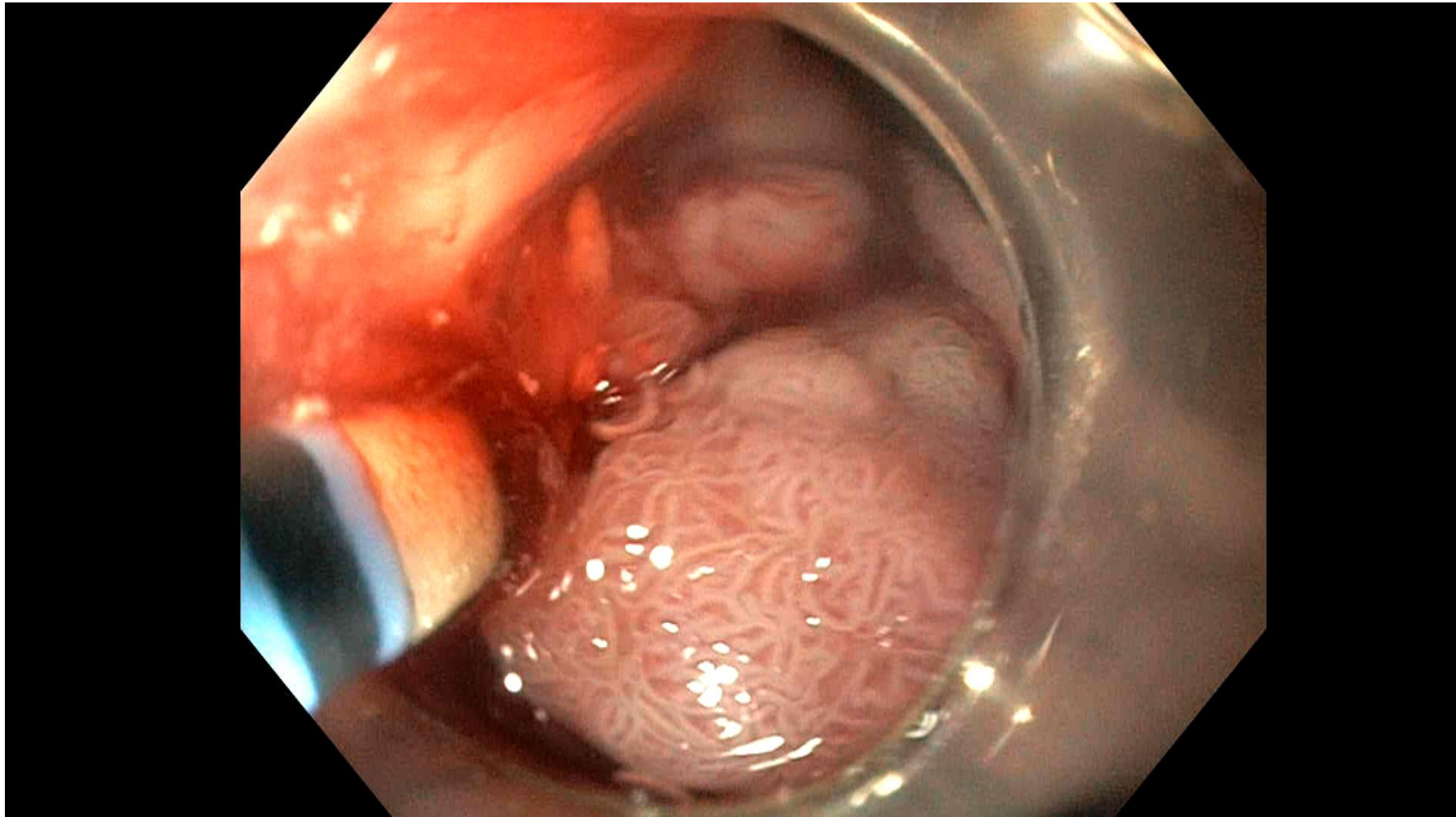
EID step-by-step – start intermuscular dissection



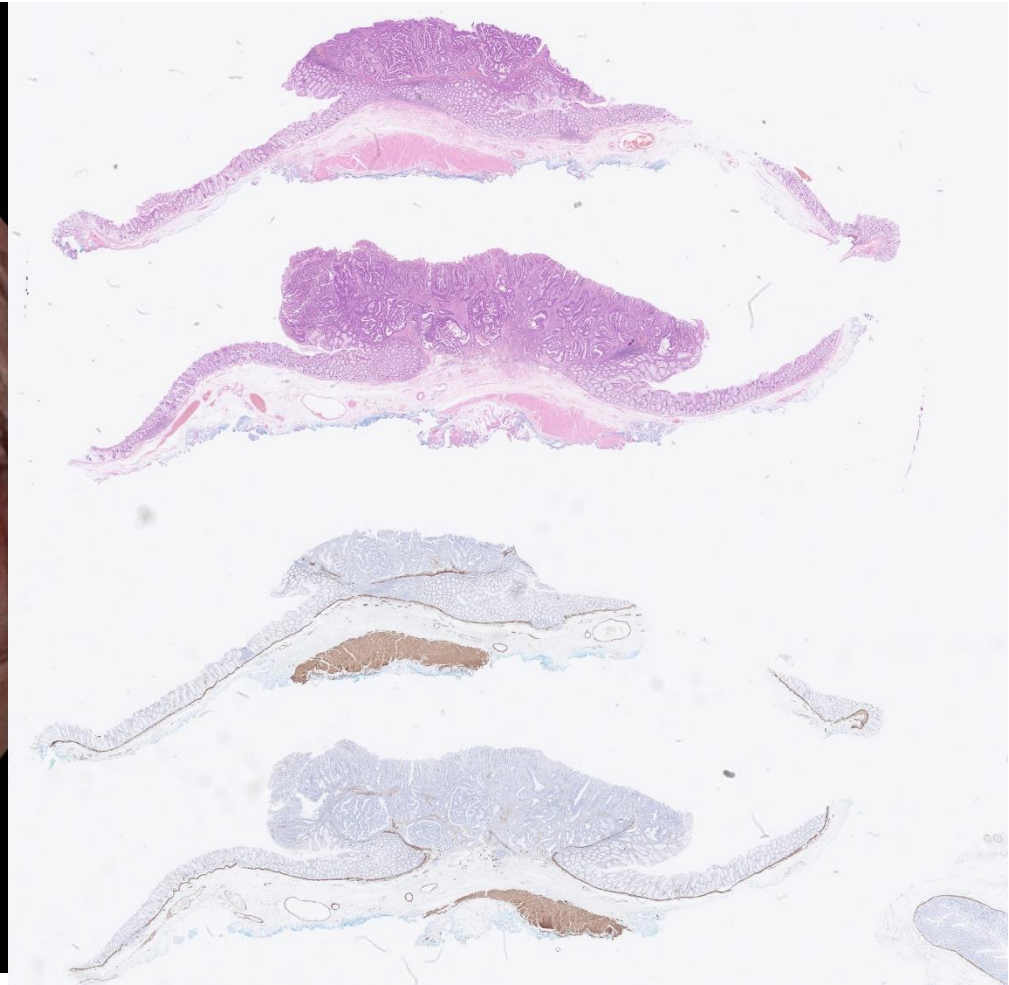
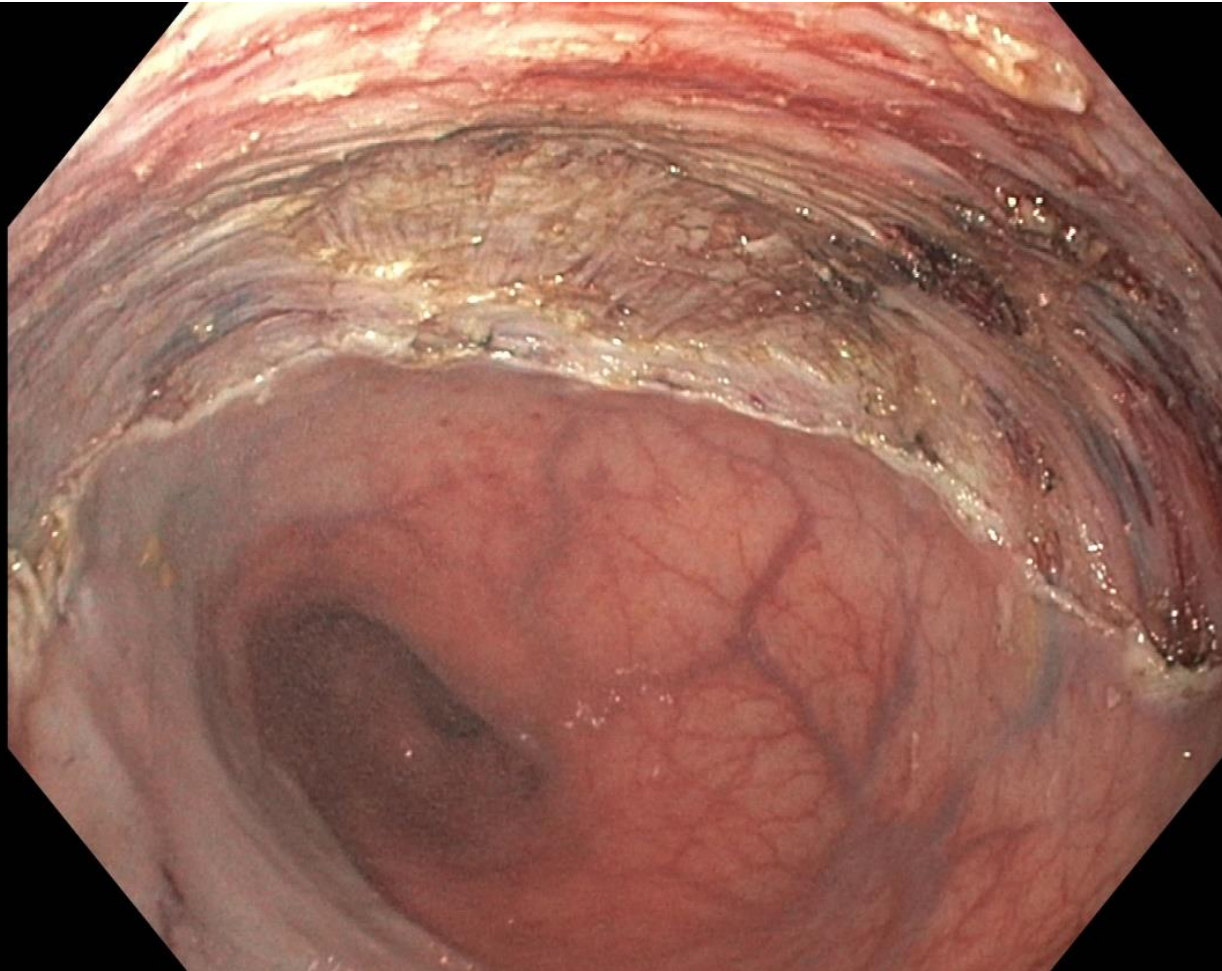
EID step-by-step – continued intermuscular dissection



EID step-by-step – two tissue bridges left



Final result



Histology: pT1sm2G2LVI-Bd1R0 adenocarcinoma

2023: Indications for ESD – *in my book...*

Lesion	Problem	Need for R0	Technique
Esophageal early squamous cancer	Early LN metastasis. 10% local recurrence in piecemeal resections	Yes	ESD
Barrett's early cancer	For high risk T1b cases	Yes	EMR and ESD
Early gastric cancer	20% local recurrence in piecemeal resections	Yes	ESD
Duodenal adenoma	Aim is complete eradication rather than R0	No	EMR
Colorectal adenoma	Aim is complete eradication rather than R0	No	pEMR or ESD
T1 rectal cancer	Uncertainty about radicality will often lead to surgery	Yes	ESD or EID

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Thank you!

