부산경남내과학회

# 대장 용종절제술, A to Z

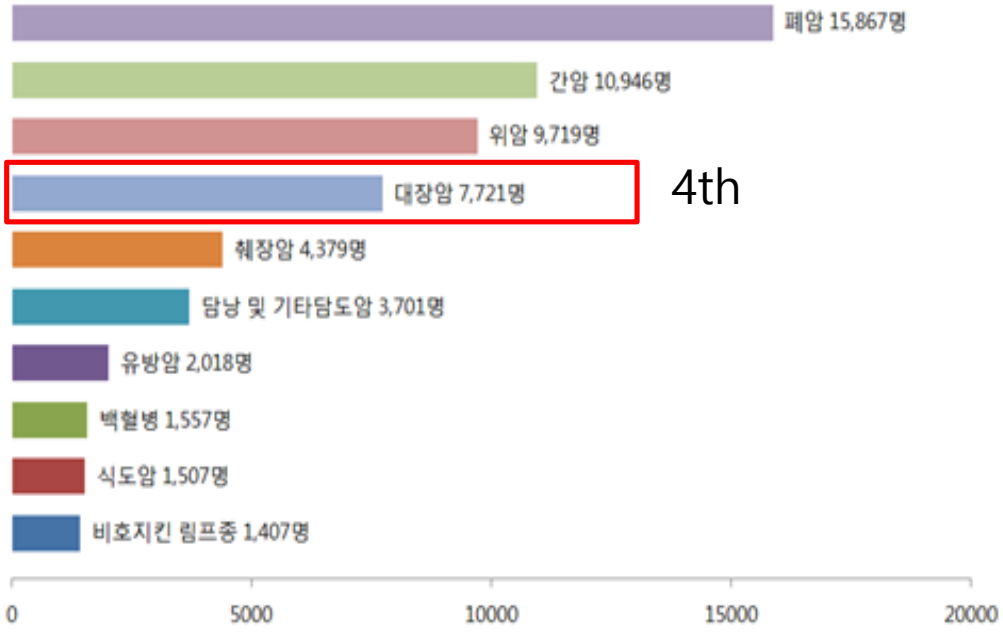

인제대학교 부산백병원

이 상 헌

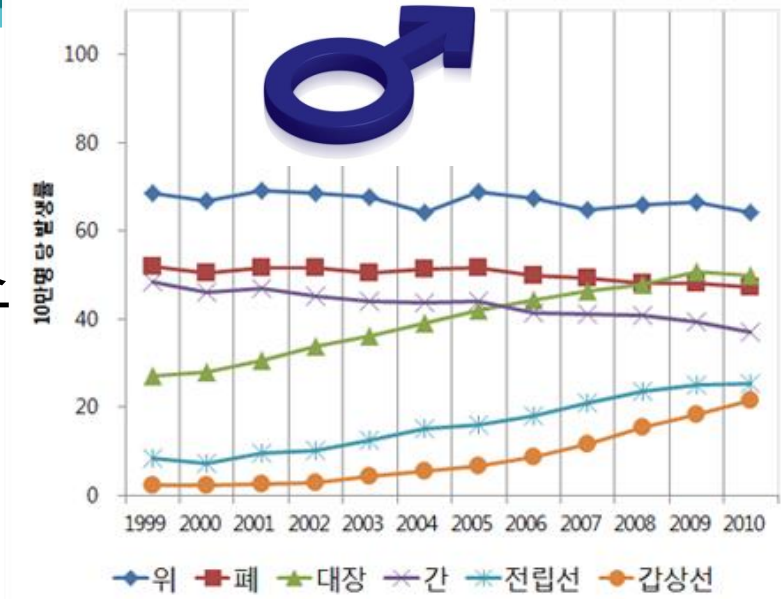
인제대학교부산백병원
INJE UNIVERSITY BUSAN PAIK HOSPITAL

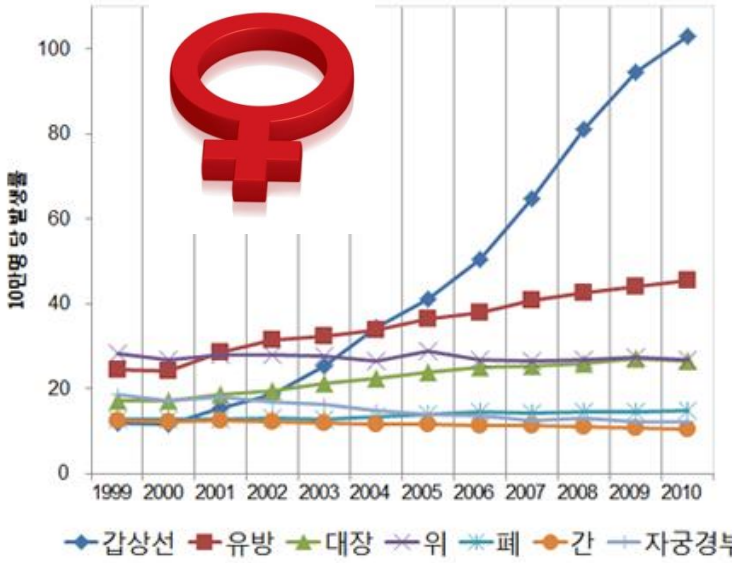
# 대장내시경

- 대장암 발생률 76~90% 감소
- 대장암 사망률 65% 감소



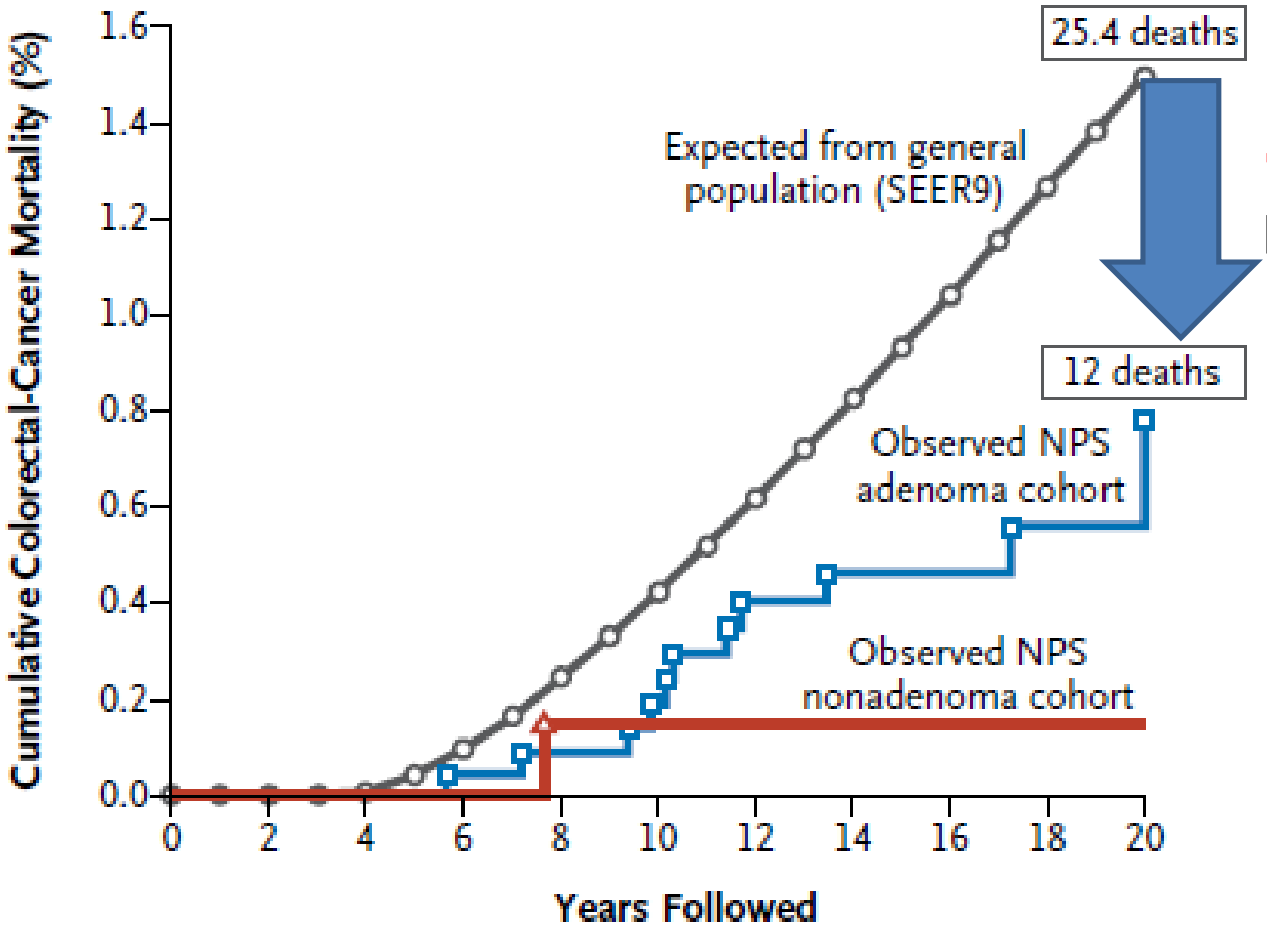

4th




Winawer SJ, et al. N Engl J Med. 1993;329:1977-1981
Jung GW, et al. Cancer Res Treat. 2013;45:1-14

# Colon polypectomy



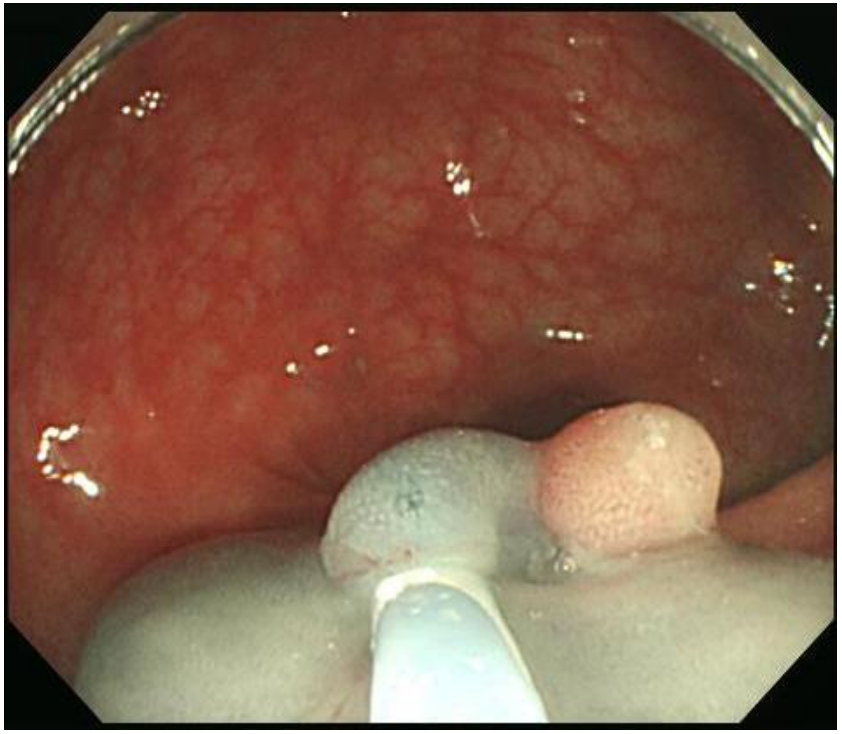

**53% reduction**

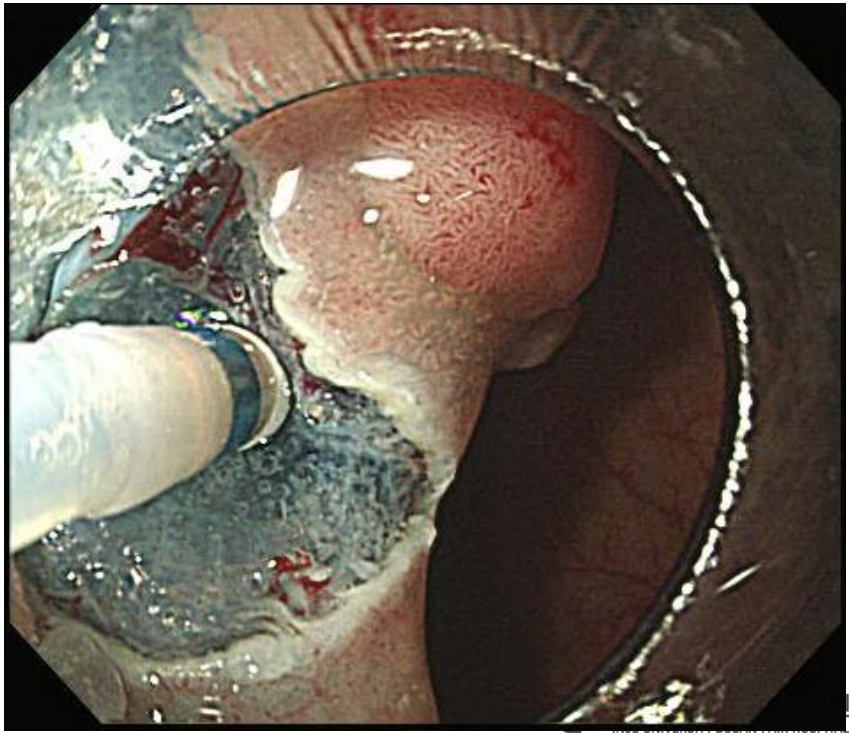
| No. at Risk | | | | | | |
|---|---|---|---|---|---|---|
| Adenoma | 2602 | 2358 | 2100 | 1808 | 1246 | 461 |
| Nonadenoma | 773 | 733 | 678 | 632 | 420 | 164 |

Zauber AG et al N Engl J Med 2012;366(8):687-696

# 대장내시경 - Polyp

- Gold standard – polyp detection
- 진단과 동시 치료도 가능



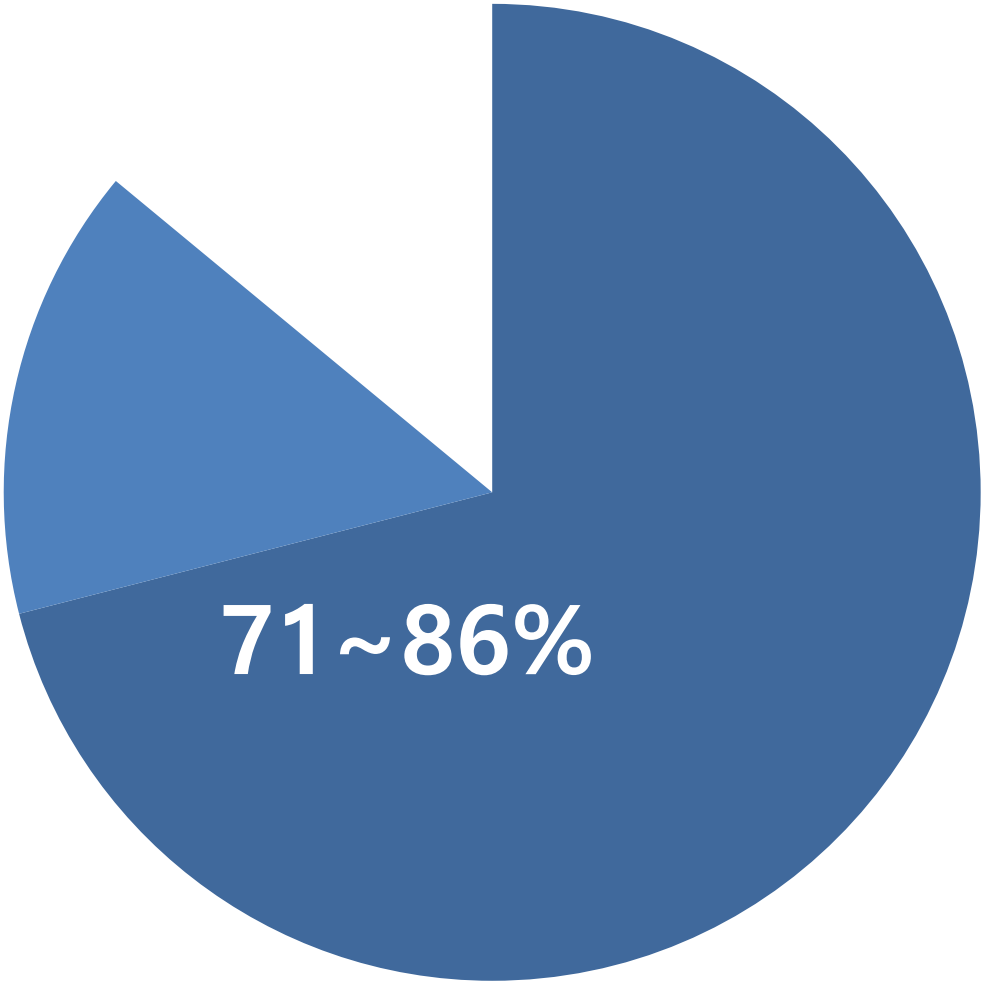


# Interval cancer

- **Incidence 2.2~7.7%**
- Poor bowel preparation
- Low adenoma detection rate Endoscopist
- Non-Gastroenterologist
- Incomplete polyp resection
- Multiple colon polyp
- Serrated adenoma

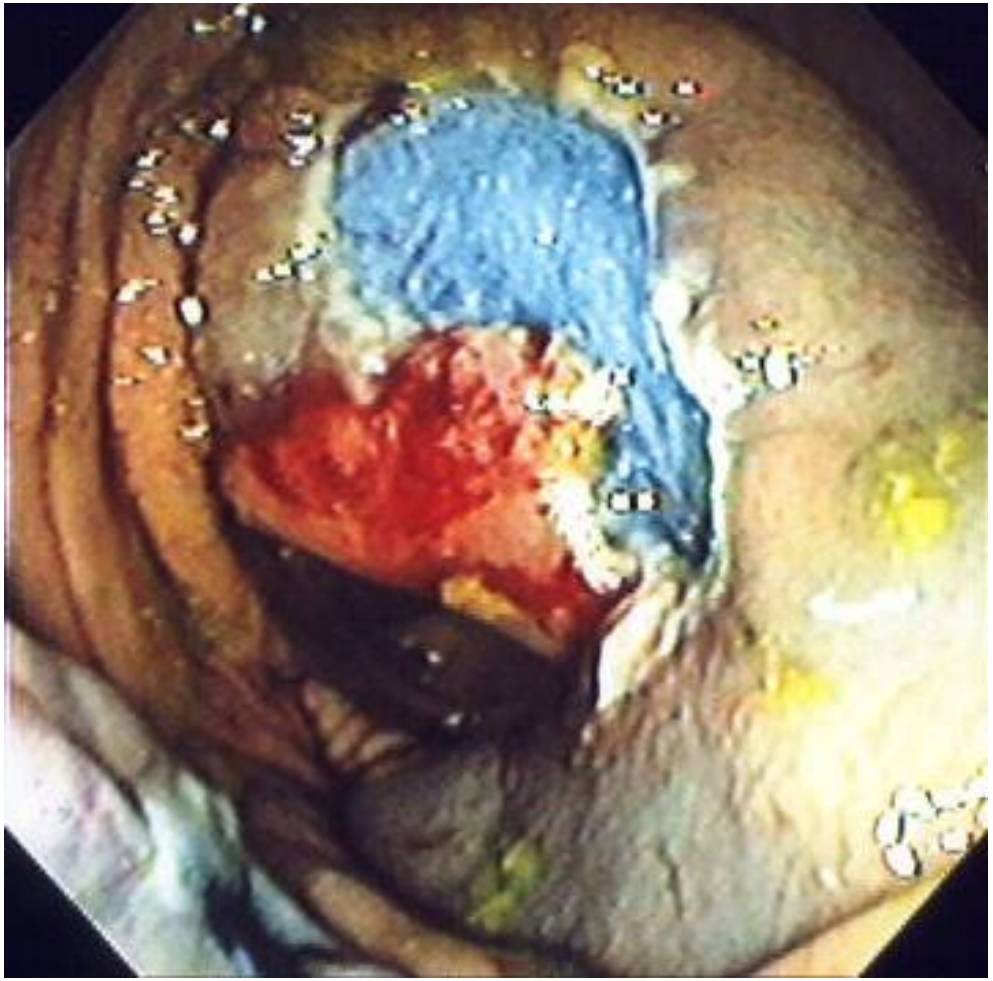
**Singh H, et al. Am J Gastroenterol 2010;105:2588-2596.**
**Robertson DJ, et al. Gastroenterology 2005;129:34-41.**
**Baxter NN, et al. Gastroenterology 2011;140:65-72.**
**Robertson DJ, et al. Gut 2013 Jun 21. [Epub]**
**Sawhney MS, et al. Gastroenterology 2006;131:1700-1705.**
**Arain MA, et al. Am J Gastroenterol 2010;105:1189-1195.**

# Endoscopist-related factors

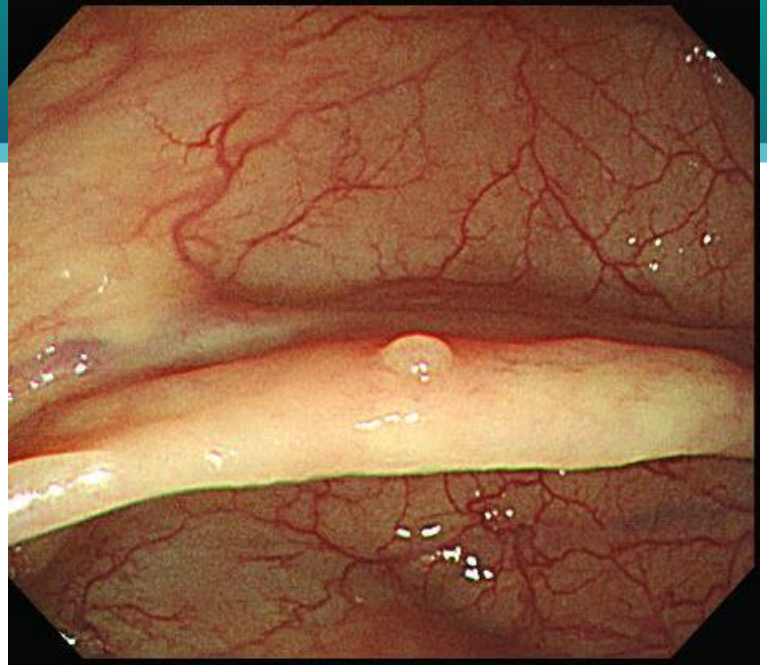


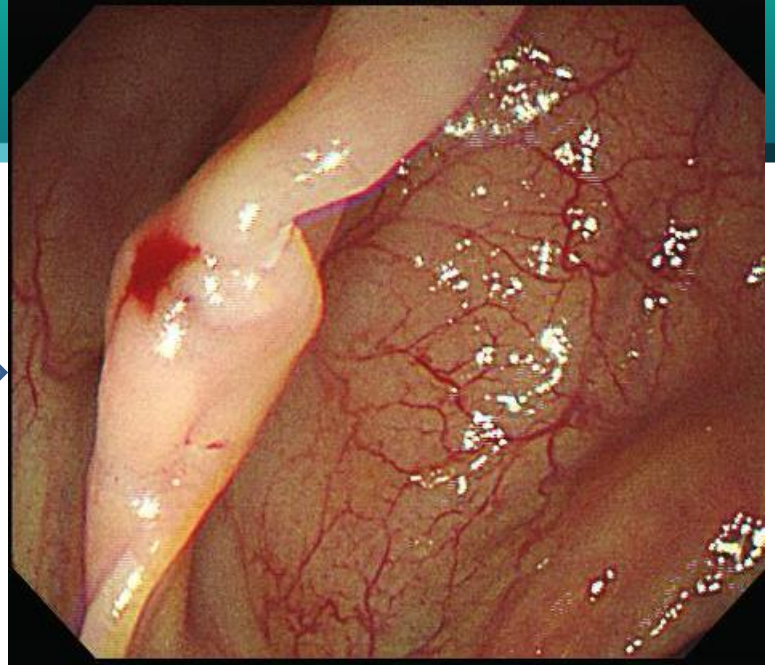
# Interval cancer

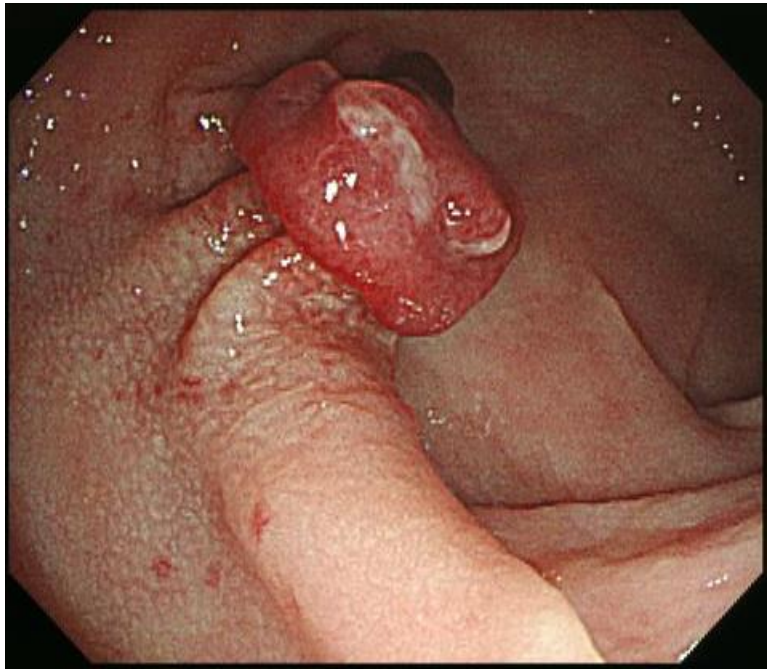
- Incomplete polyp resection

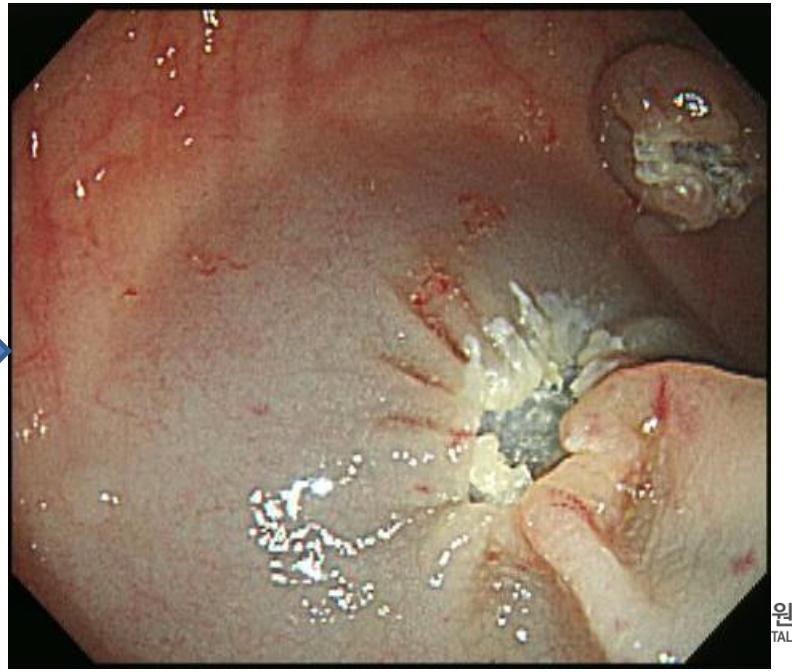



**Singh H, et al. Am J Gastroenterol 2010;105:2588-2596.**
**Robertson DJ, et al. Gastroenterology 2005;129:34-41.**
**Baxter NN, et al. Gastroenterology 2011;140:65-72.**
**Robertson DJ, et al. Gut 2013**
**Sawhney MS, et al. Gastroenterology 2006;131:1700-1705.**
**Arain MA, et al. Am J Gastroenterol 2010;105:1189-1195.**







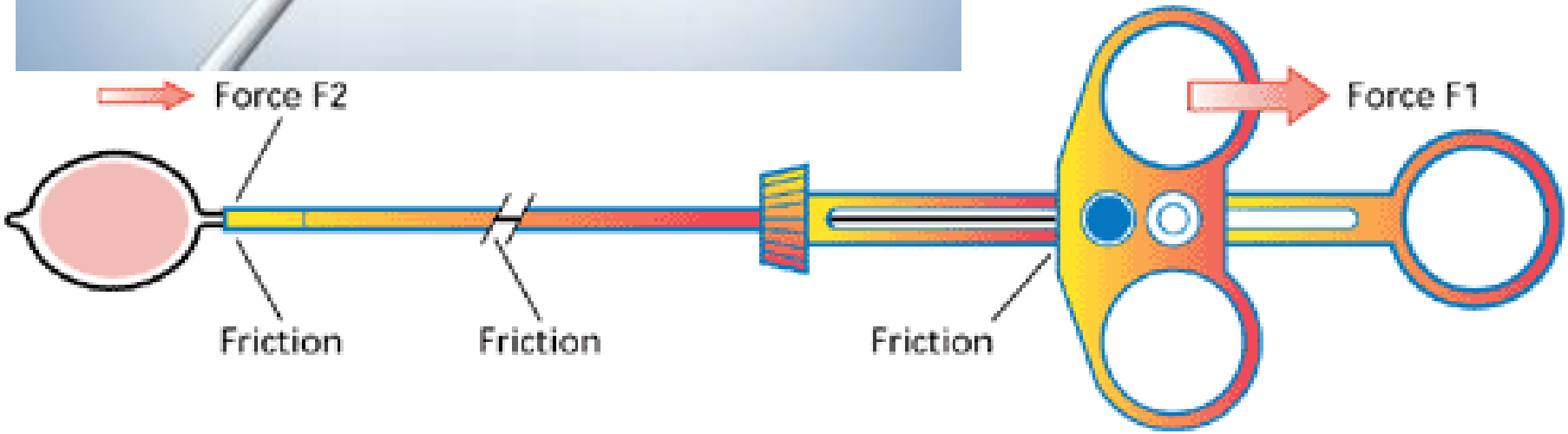


# Tools

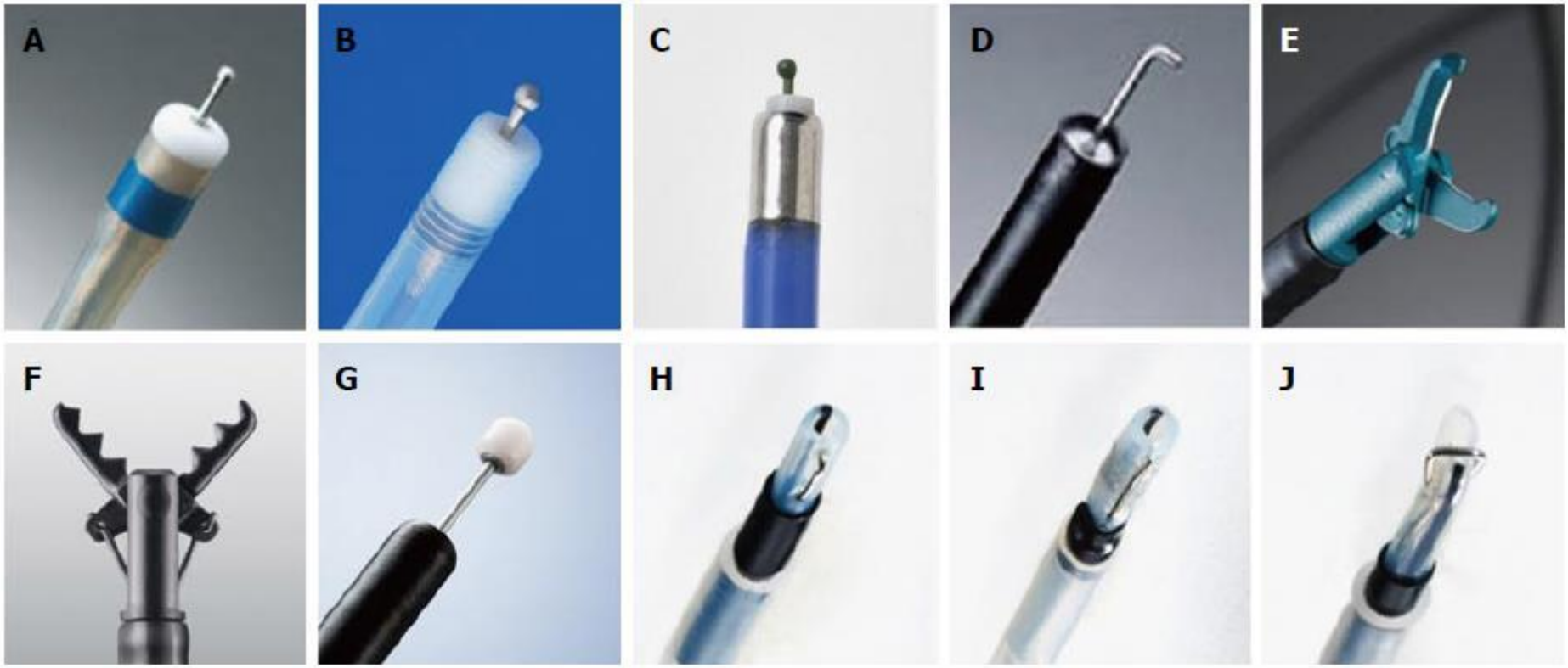
- Biopsy forceps
- Snares
- Endoscopic knives

# Forceps

# Snares



# Knives



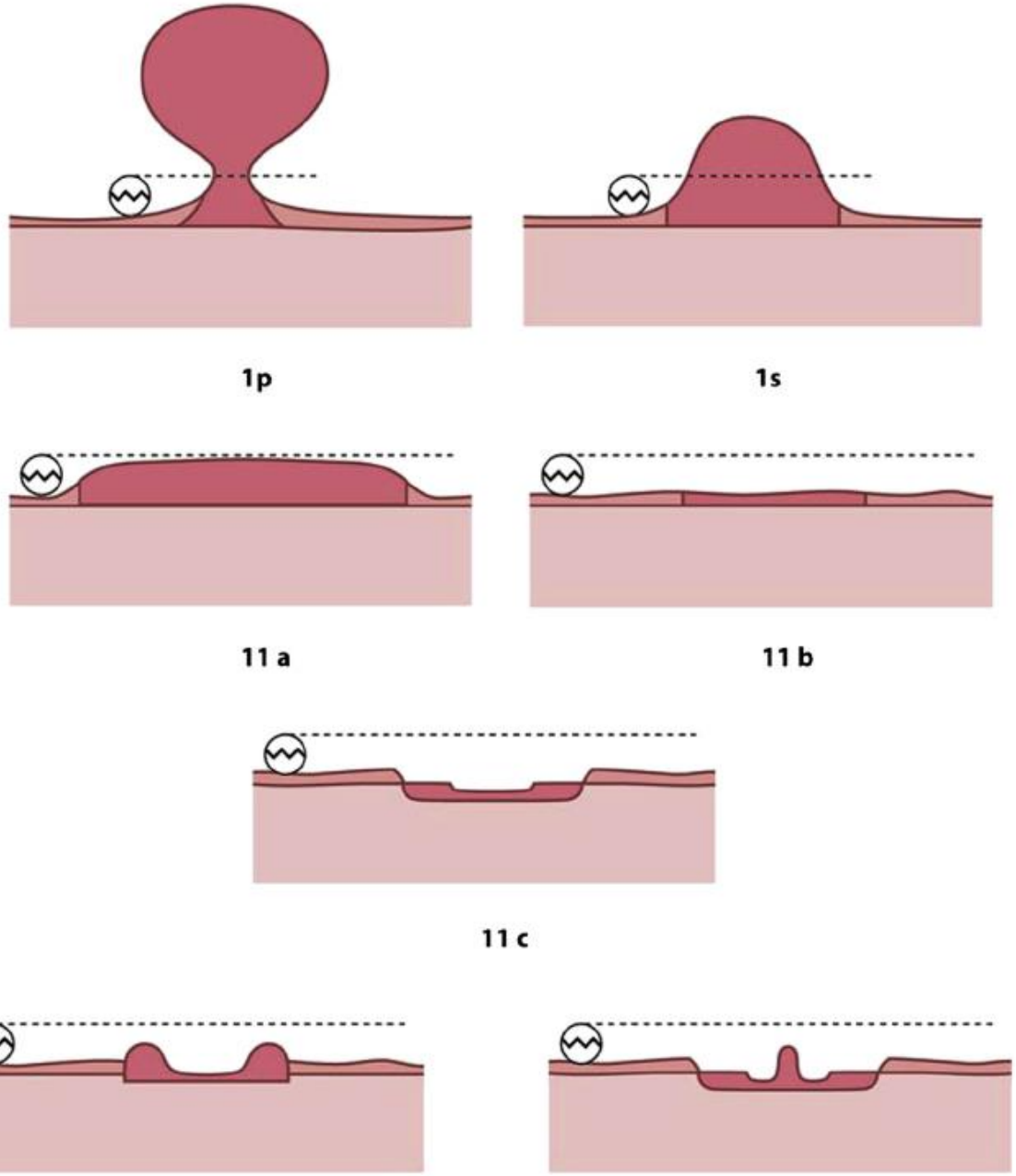



Fig. 1. Paris classification.

| Subtypes of LST | Classification in type 0 |
|---|---|
| LST granular | |
| Homogenous type | 0-IIa |
| Nodular mixed type | 0-IIa, 0-Is þ IIa, 0-IIa þ Is |
| LST nongranular | |
| Elevated type | 0-IIa |
| Pseudodepressed type | 0-IIa þ IIc, 0-IIc þ IIa |

**LST-G (granular)**

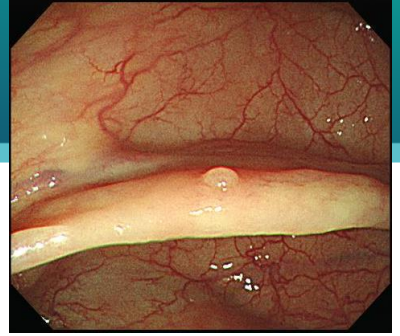
Kudo: LST-G-H (homogeneous)
Paris: IIa

LST-G-M (nodular Mixed)
IIa + Is

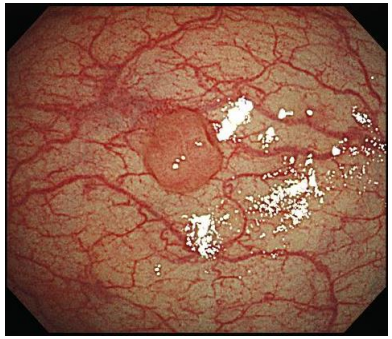
**LST-NG (non-granular)**

Kudo: LST-NG-F (flat elevated)
Paris: IIa

LST-NG-PD (pseudodepressed)
IIc + IIa

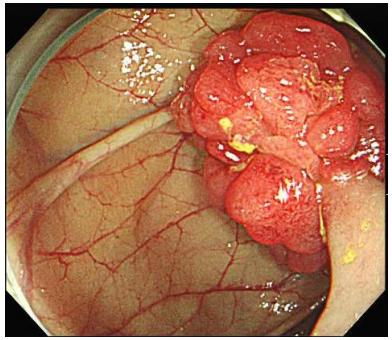


Diminutive polyp
(≤ 5mm)

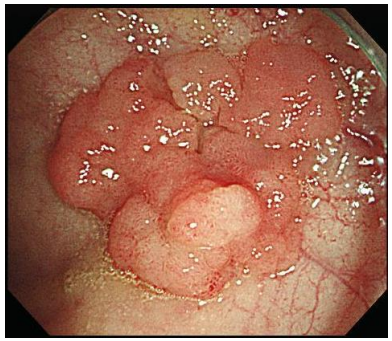


Small polyp
(6~9mm)

70~
90%



Large polyp (≥ 10mm)



Laterally spreading tumor
(≥ 10mm)

Malignant risk

# Relation of Adenoma, Histology, and Degree of Dysplasia to the incidence of Invasive Carcinoma, by Adenoma Size

| Adenoma size (cm) | Histology (% with invasive cancer) | | | Degree of Dysplasia (% with invasive cancer) | | |
|---|---|---|---|---|---|---|
| | Tubular | Tubuloviollous | Villous | Mild | Moderate | Severe |
| <1 | 1 | 4 | 10 | 0.3 | 2 | 27 |
| 1~2 | 10 | 7 | 10 | 3 | 14 | 24 |
| >2 | 35 | 46 | 53 | 42 | 50 | 48 |

**Muto T, et al. Cancer 1975;36:2251**
**Shinya H, et al. Ann Surg 1979;190:679**

# Laterally spreading tumor

| | Tumor depth | Total(%) | <2cm(%) | >2cm(%) |
|---|---|---|---|---|
| **LST-G** | | | | |
| Homogenous | Mucosa | 22.9 | 13.5 | 39.5 |
| | Submucosa | 1.8 | 1.0 | 3.4 |
| Nodular mixed | Mucosa | 33.5 | 25.4 | 38.0 |
| | Submucosa | 18.0 | 5.1 | **25.0** |
| **LST-NG** | | | | |
| Flat-elevated | Mucosa | 12.7 | 11.3 | 17.9 |
| | Submucosa | 4.1 | 1.9 | **11.9** |
| Pseudo-depressed | Mucosa | 23.5 | 19.6 | 31.8 |
| | Submucosa | 25.0 | **15.2** | **45.5** |

Yamano H et al Stomach Intest 2007;42:645-651

# Polyp removal techniques

- Cold biopsy
- Hot biopsy

→ Diminutive polyp

- Cold snaring
- Hot snaring

→ Small polyp

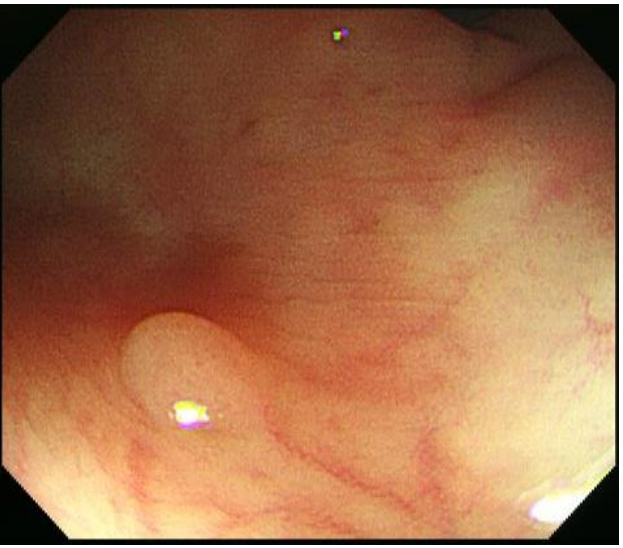
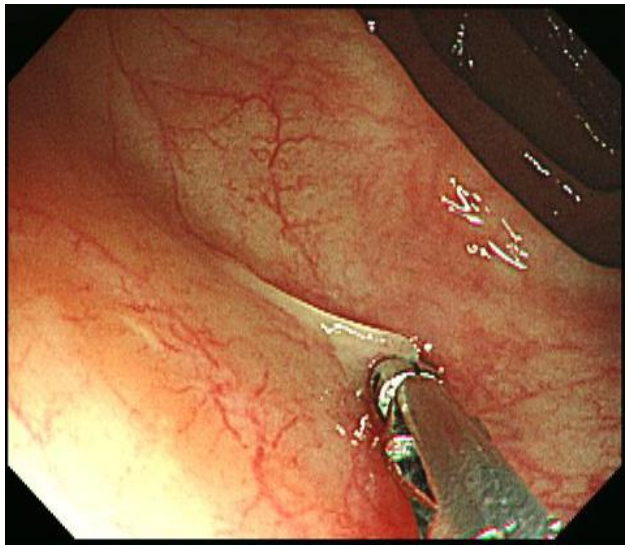
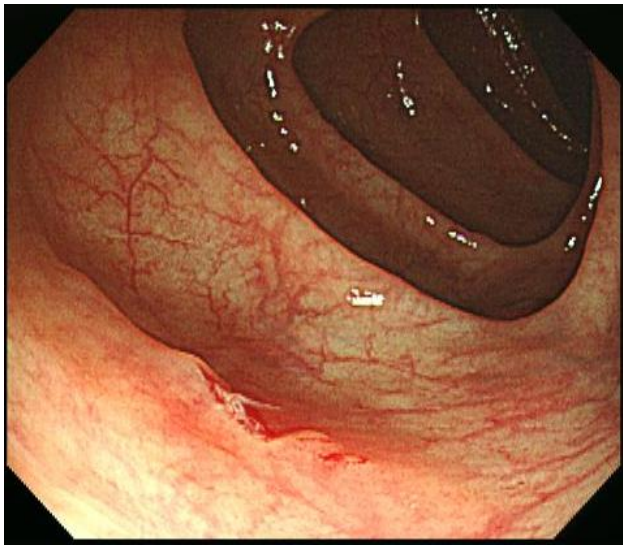
- EMR

→ Small to large polyp

- EPMR
- ESD

→ Large polyp

# Cold biopsy

- Diminutive polyp
- Most simple and Safe

# Incomplete resection rate

**Figure 1** Radial Jaw™ 4 Jumbo Biopsy Forceps (Boston Scientific, Marlborough, MA, USA).

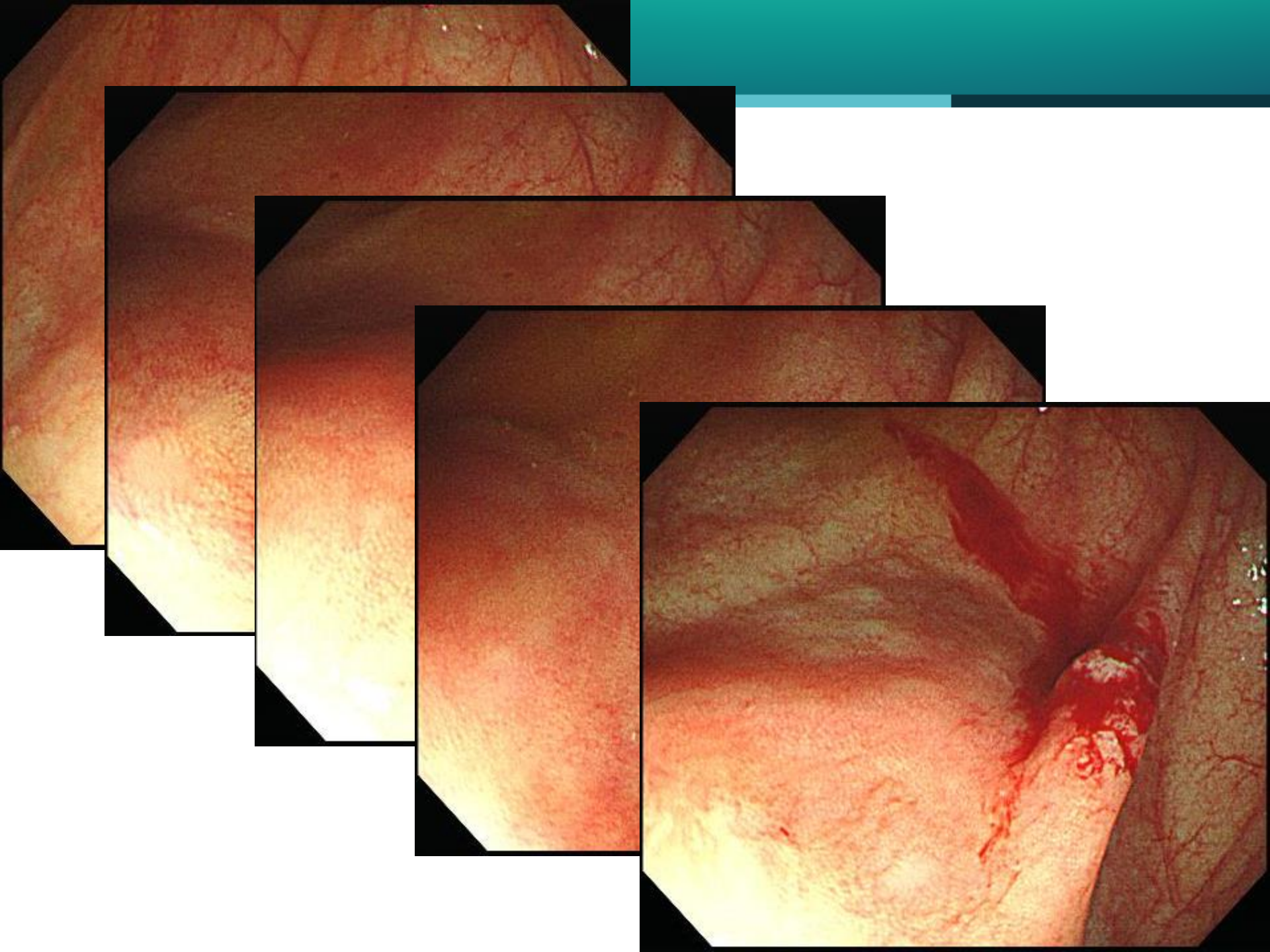
| Lesion size (mm) | Rate of one-bite polypectomy |
|---|---|
| 1 | 100% (4/4) |
| 2 | 100% (31/31) |
| 3 | 96% (103/107) |
| 4 | 88% (45/51) |
| 5 | 70%(21/30) |
| Overall rate | 91% (204/223) |

Uraoka T et al Digestive Endoscopy 2014;26:98-103

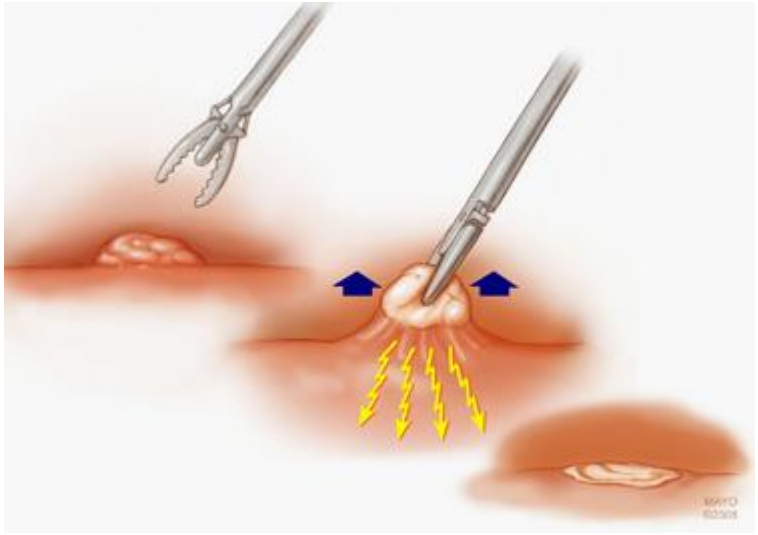
# Incomplete resection rate

| Study | Polyp size (mm) | Cold forcep (%) |
|---|---|---|
| Draganov 2012 | ≤ 6mm | 22.6 |
| Lee 2013 | ≤ 5mm | 24.1 |
| Jung 2013 | ≤3mm | 4.5 |
| | 3-5mm | 10.9 |
| Kim 2015 | **≤4mm** | **3.1** |
| | **5-7mm** | **29.7** |

Raad D et al Gastrointest Endosc 2016;83:508-515



# Hot biopsy



- Diminutive polyp
- Biopsy+Electrocautery

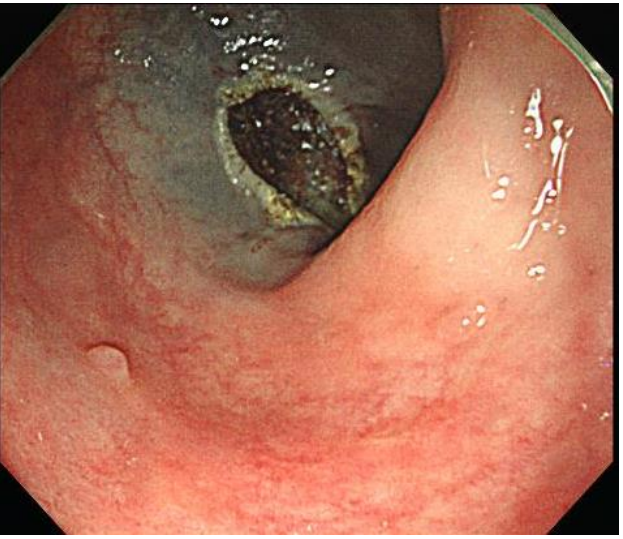
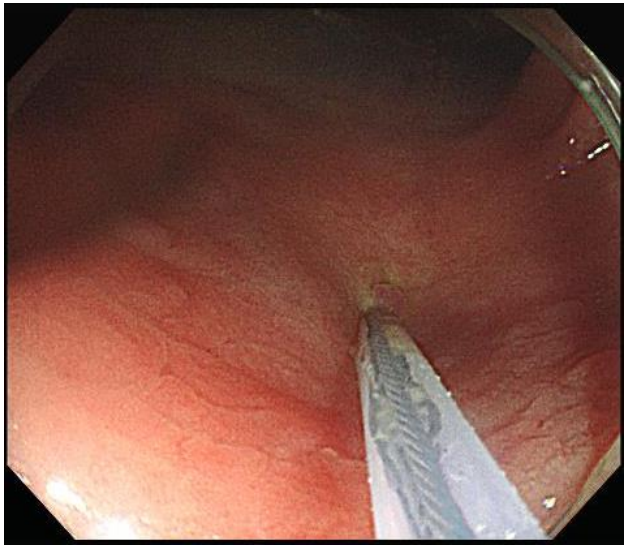
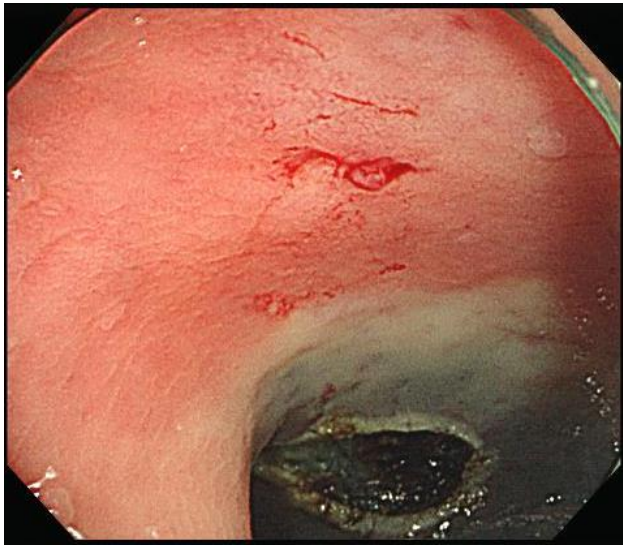
# Hot biopsy

- Risk of delayed bleeding and perforation
- Incomplete resection rate 13-17%
- Impossible histologic evaluation – cautery effect

| | CSP | HBF | |
|---|---|---|---|
| Injury, No. (%) | N=41 | **N=41** | P value |
| Partial MP necrosis | 1(2) | **14(34)** | <0.001 |
| Full-thickness MP necrosis | 1(2) | **9(22)** | 0.14 |
| Full-thickness MP inflammation | 5(12) | **13(32)** | 0.6 |
| Histologic serositis | | **13(32)** | 0.27 |

Andrew J et al Gastrointest Endosc 2013;77:484-490

# Cold snaring

- Diminutive and small polyp
- Simple and safe technique
- Risk of loss of resected tissue (84~100%)

# Complete resection rates of adenomatous polyps

| Parameter | CSP (n=59) | CFP (n=69) | P value |
|---|---|---|---|
| Complete resection rate | 57/59 (96.6) | 57/69 (82.6) | 0.011 |
| Sized of adenomatous polyp, mm | | | |
| ≤4 | 27/27 (100) | 31/32 (96.9) | 1.000 |
| 5-7 | **30/32 (93.8)** | **26/37 (70.3)** | **0.013** |
| Tissue retrieval failure | **4.3%** | 0% | |

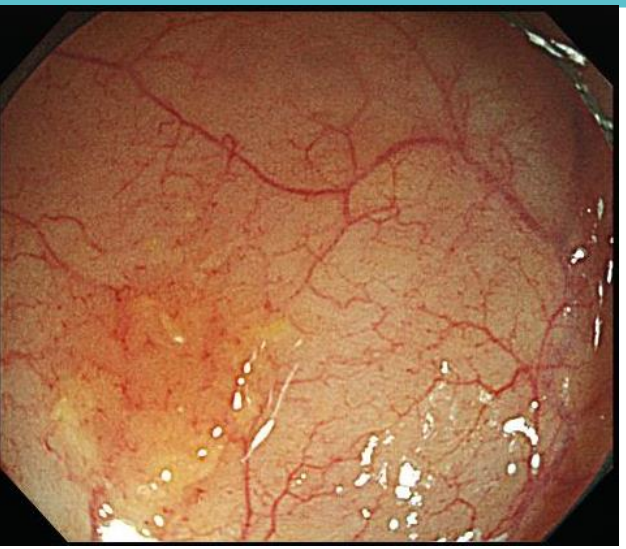
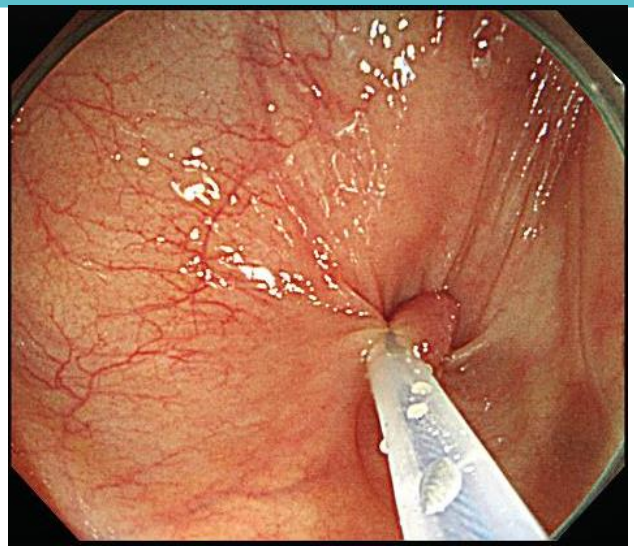
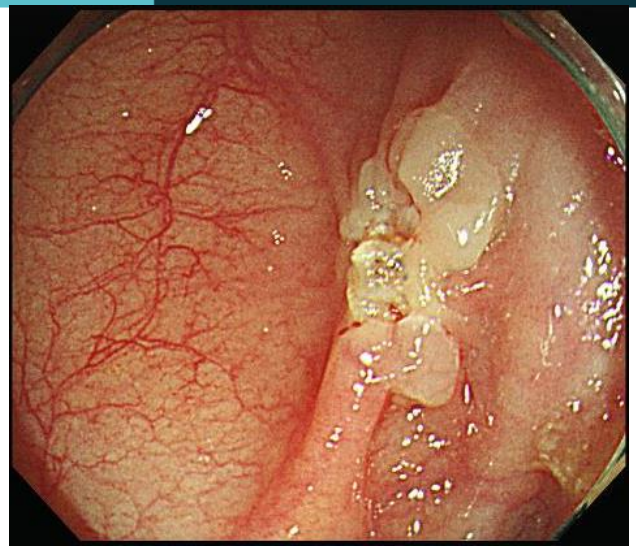
Kim JS et al Gastrointest Endosc 2015;81:741-747

# Incomplete resection rate

| Study | Polyp size (mm) | Cold snare (%) |
|---|---|---|
| Lee 2013 | ≤ 5mm | 6.8 |
| Aslan 2014 | 5-9mm | **5.1** |
| Kim 2014 | 5-9mm | 21 |
| Din 2015 | 3-7mm | **26.7** |
| Kim 2015 | ≤ 4mm | 0 |
| | 5-7mm | 6.2 |

Raad D et al Gastrointest Endosc 2016;83:508-515

# Hot snaring

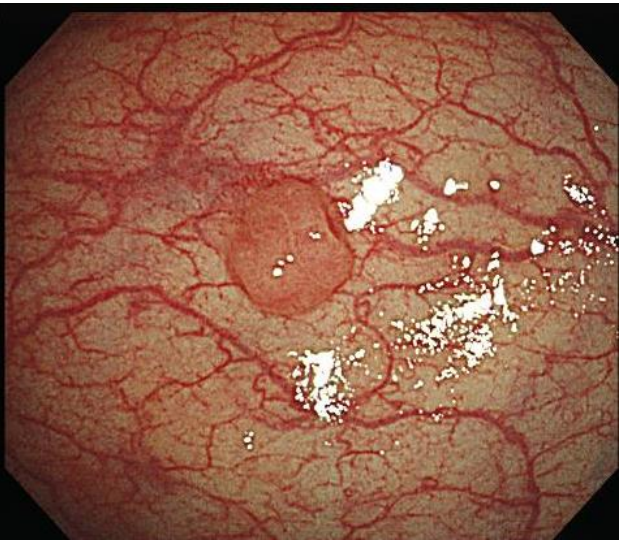
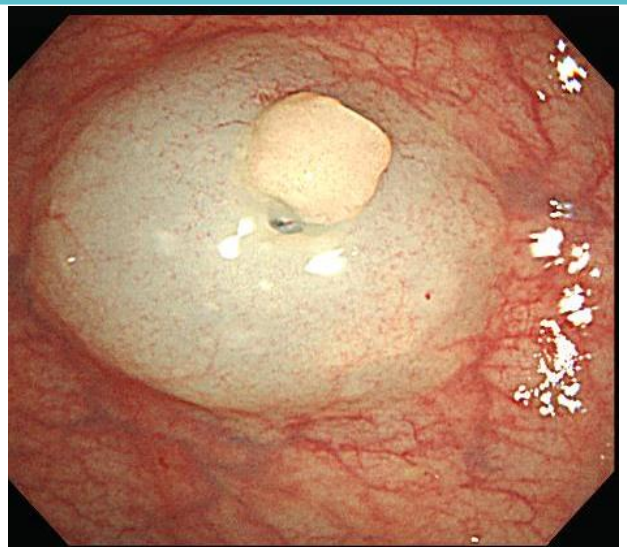
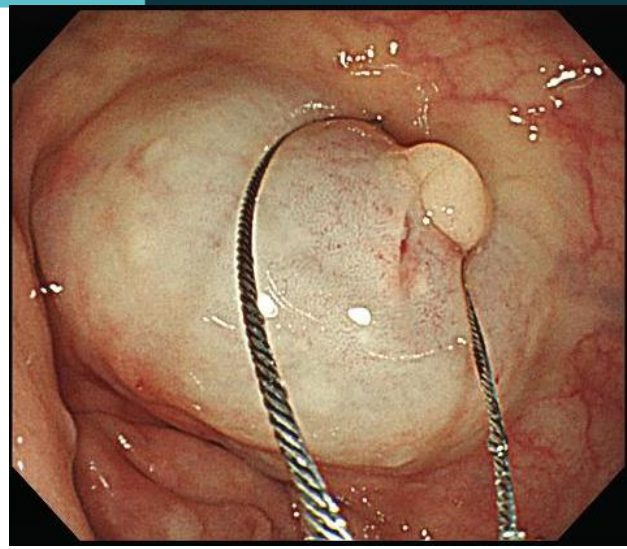
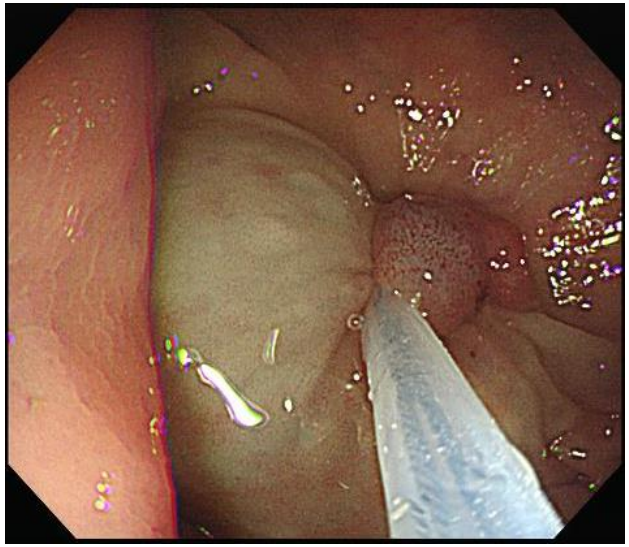
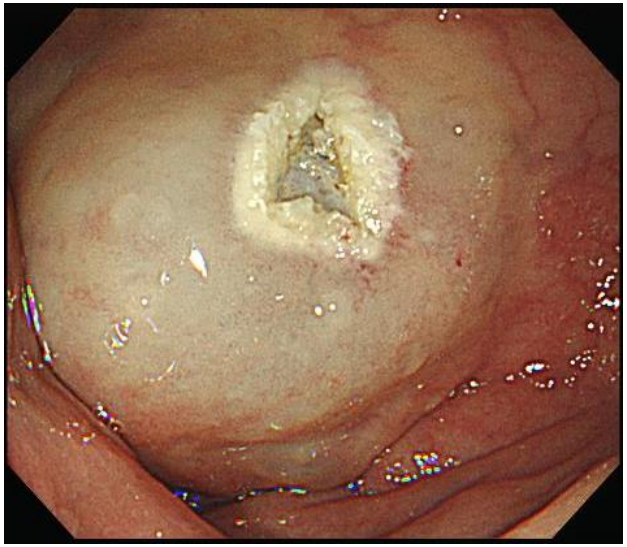
- Diminutive, Small polyp, Large pedunculated polyp
- Risk of delayed bleeding and perforation

# Cold vs Hot snaring

| | Cold snare group N=77 | Hot snare group N=71 | P-value |
|---|---|---|---|
| Size of polyps, mm (±SD) | 7.21±1.4 | 7.56±1.45 | 0.111 |
| **Time of polypectomy, sec (±SD)** | **25.71±4.3** | **70.28±11.3** | **<0.001** |
| Incomplete resection, n (%) | 4 (5.13) | 4 (5.63) | 0.89 |
| Complete retrieval rate, n (%) | 74 (94.9) | 67(94.4) | 0.906 |
| Complications, n (%) | | | 0.954 |
| Bleeding | 1 (1.3) | 1 (1.4) | |
| Perforation | 0 | 0 | |

Aslan F et al Turk J Gastroenterol 2014;25:279-283

# EMR

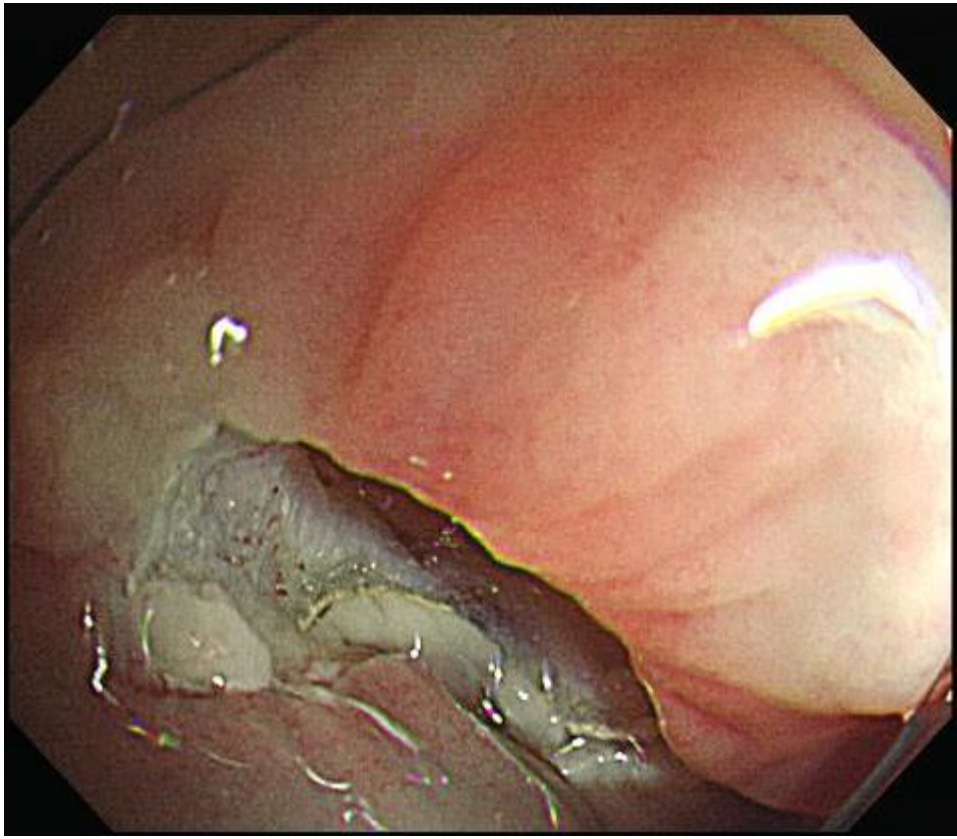
# EMR

- Small and large polyp
- Most popular
- Low incomplete resection rate
- Relatively Low complication rate(Bleeding, Perforation)

# Colon perforation



- Therapeutic colonoscopy 0.15~3.0%



**Panteris V. Endoscopy 2009;41:941-951**
**Gosen C. Am Surg 2009;75:184-186**
**Cho SB. Surg Endosc 2012;26:473-479**
**Zhang YQ. Int J Colorectal Dis 2013;28:1505-1509**

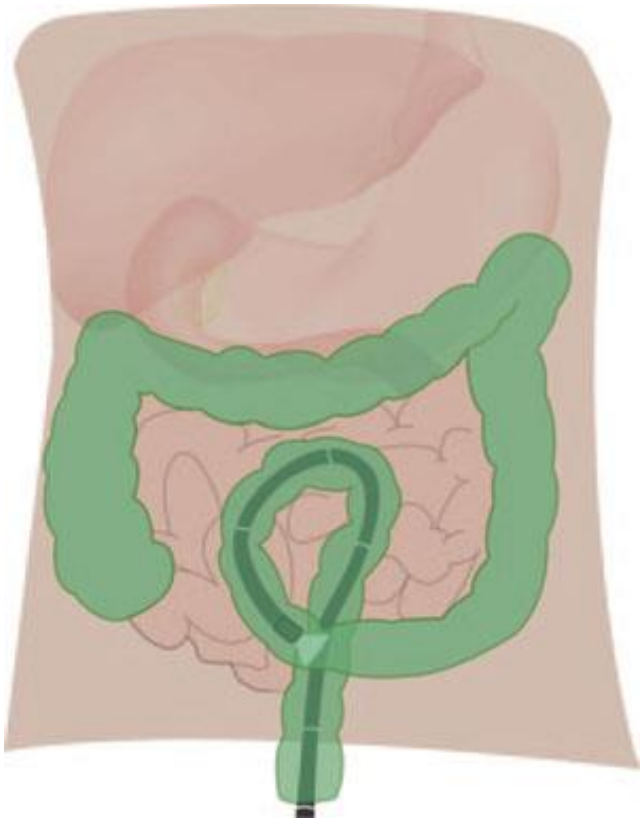
# Bleeding after Therapeutic Colonoscopy

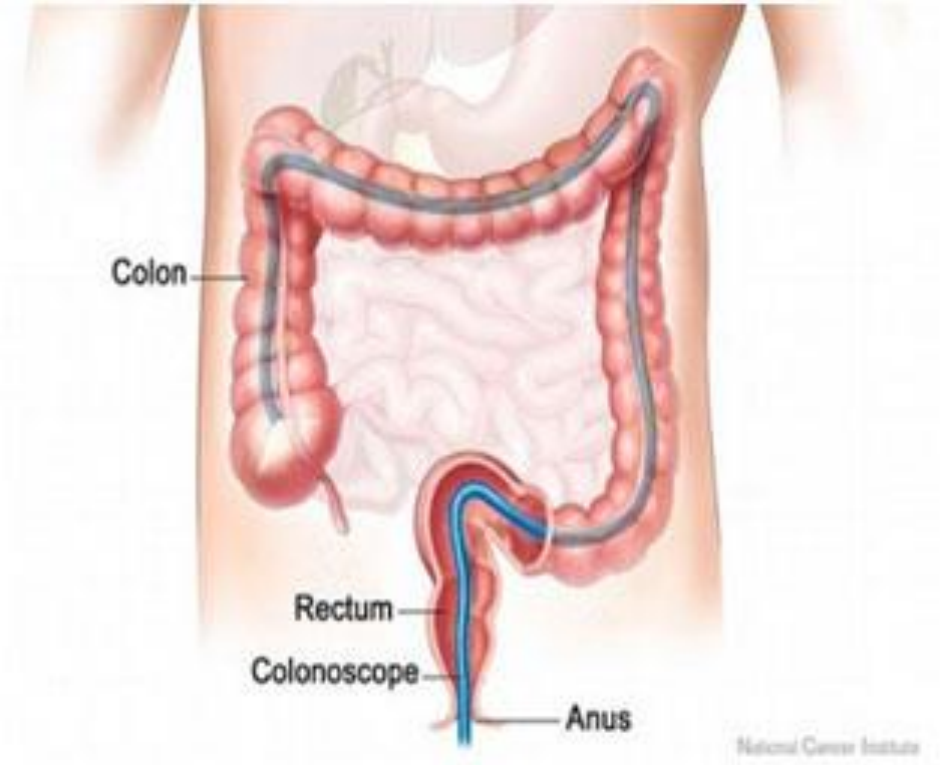


| Study | Setting/Type of Study | No Pt/Polyp | Incidence |
|---|---|---|---|
| Singh | Multicenter, Retro | 3268/NA | 21(0.6%) delayed |
| Consolo | Single center, Retro | 1038/1354 | 17(1.3%) procedural |
| Sawhney | Multicenter, Retro | 4592/NA | 41(0.9%) delayed |
| Watanabe | Multicenter, Retro | 3138/6617 | 37(1.2%) dalayed |
| Kim | Multicenter, Pro | 5152/9336 | 215(4.2%) procedural |
| Heldwein | Multicenter, Pro | 2257/3976 | 36(1.6%) major<br>158(7%) minor |
| Hui | Multicenter, Retro | 1657/NA | 37(2.2%) endoscopic Tx |
| Nivatvongs | Multicenter, Retro | 1190/1576 | 10(0.8%) |

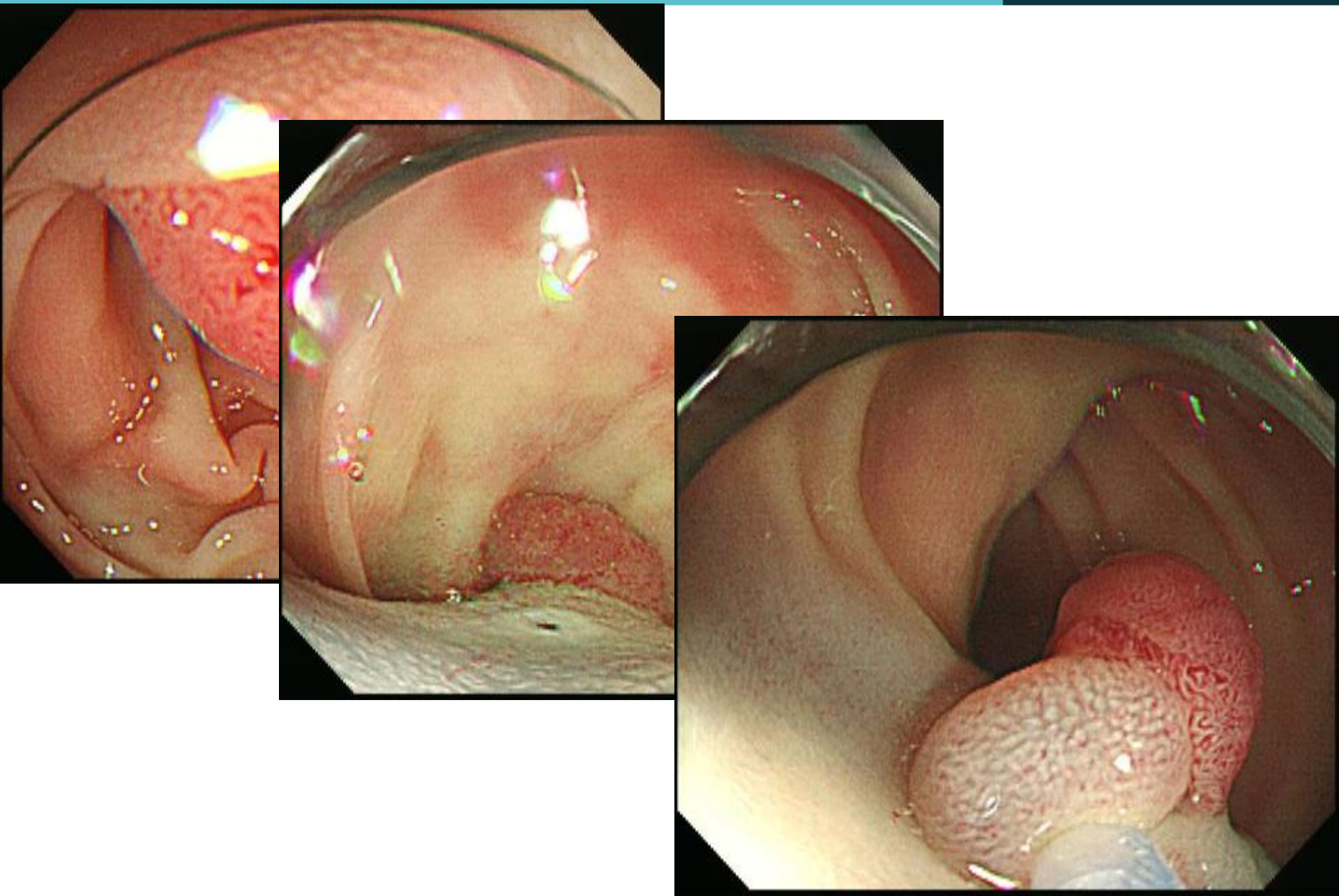
**K. Dimitris. Surg Laparosc Endosc Percutan Tech 2012;22:102-107.**

# 내시경 직선화 – 루프 풀기

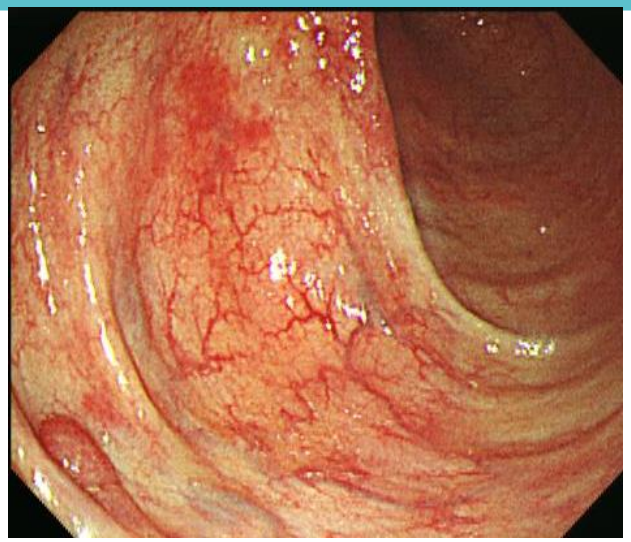


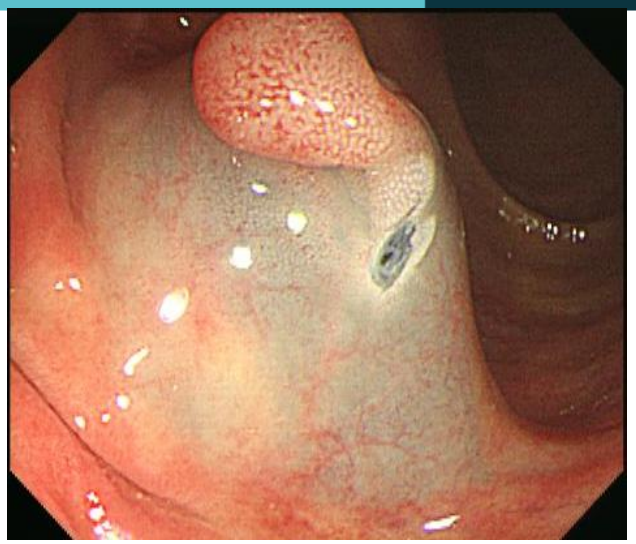


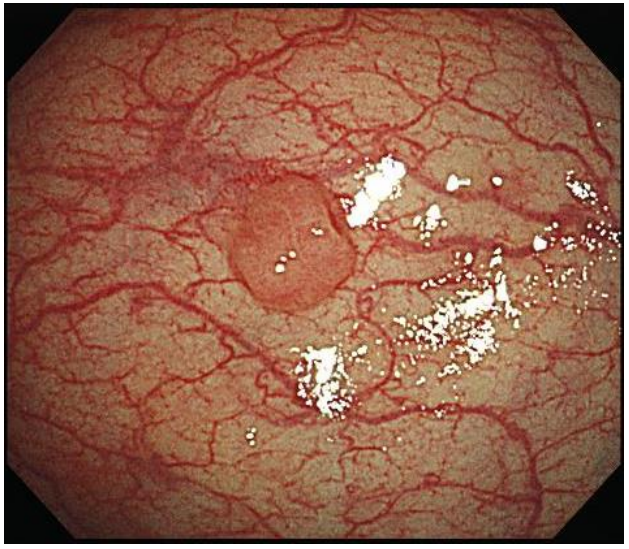
# 5~7시 방향 정렬

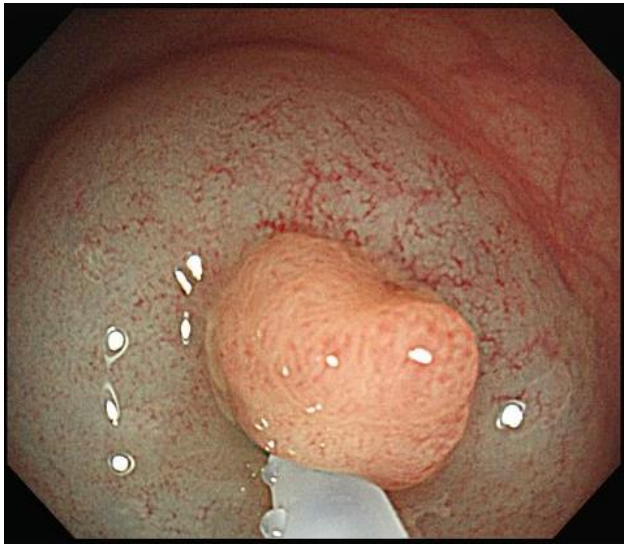


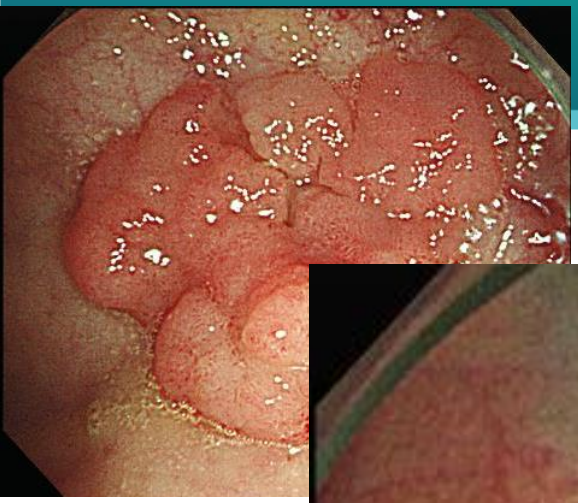
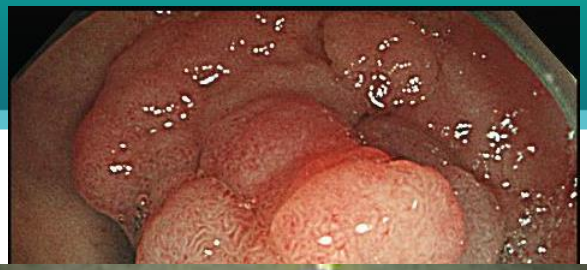
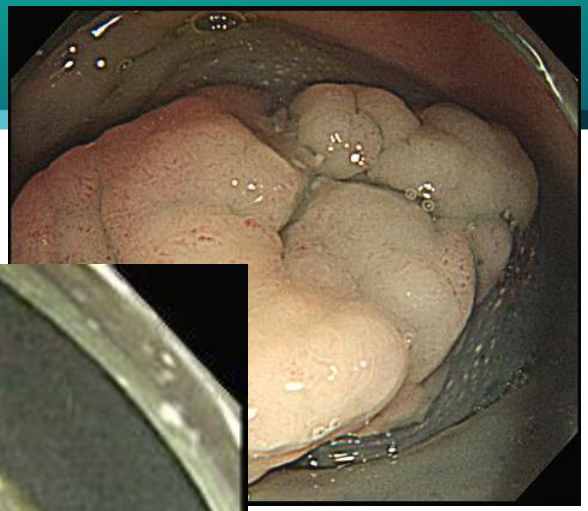
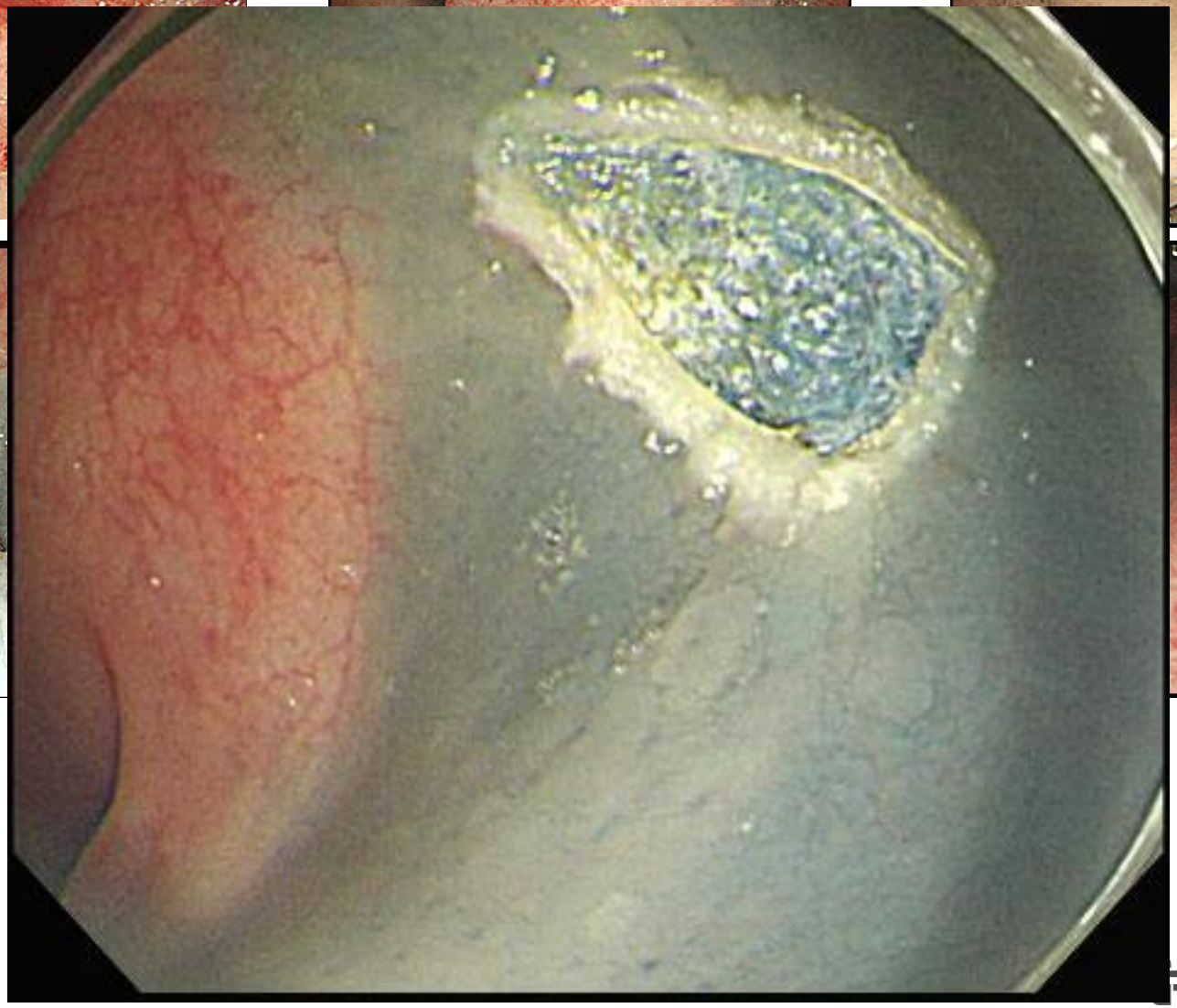
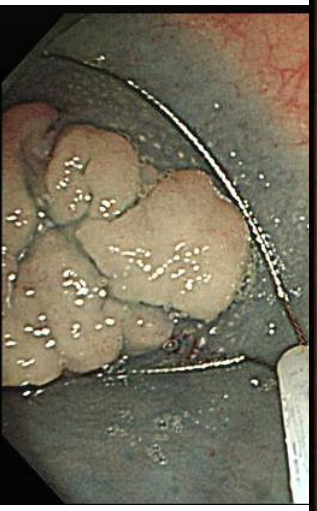
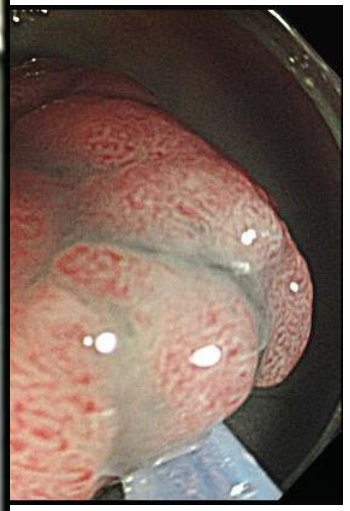
# Submucosal injection



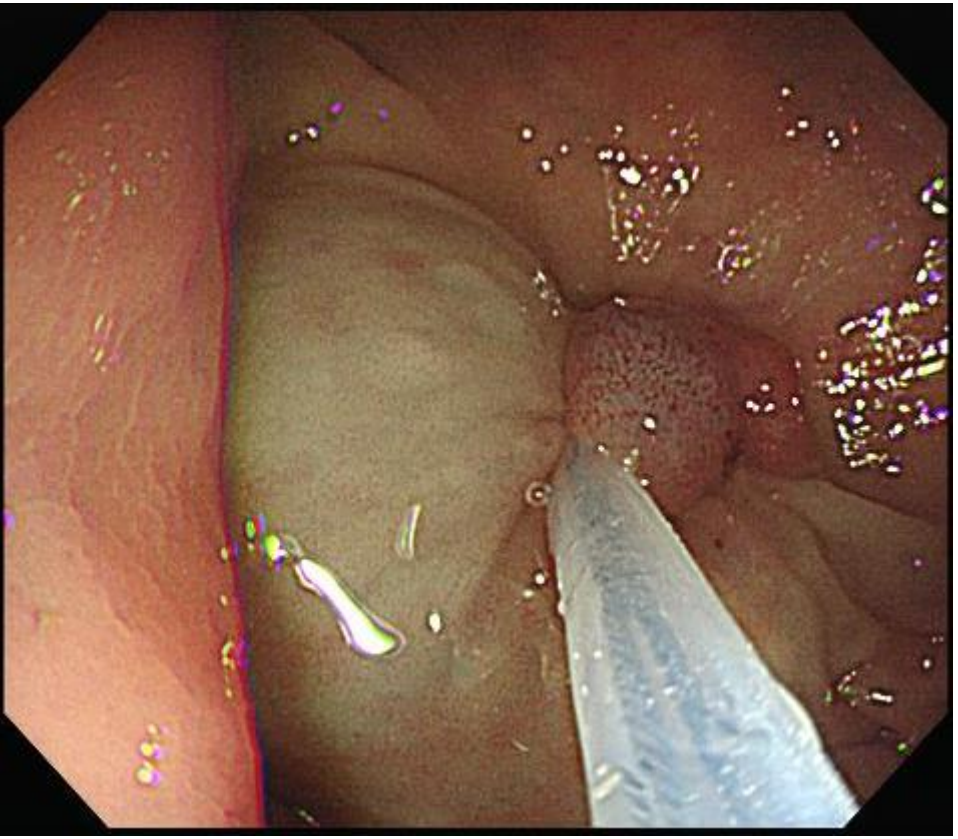


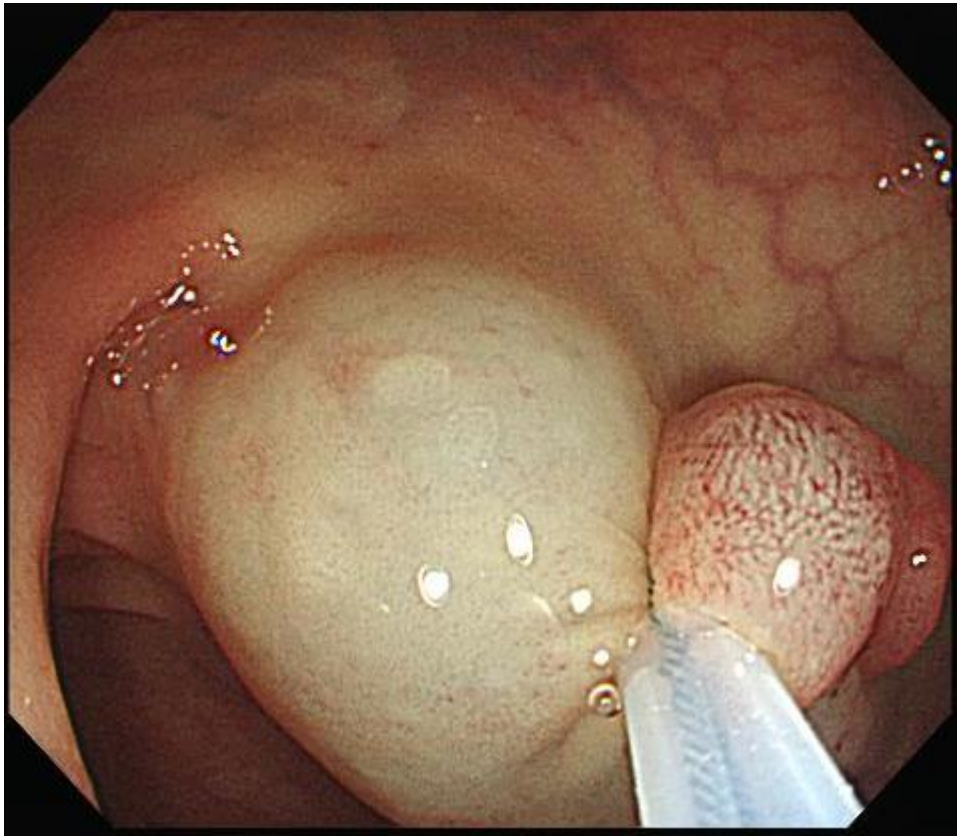


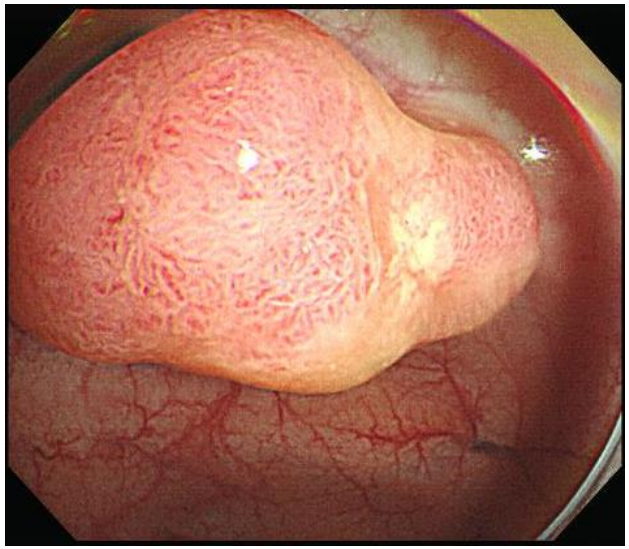
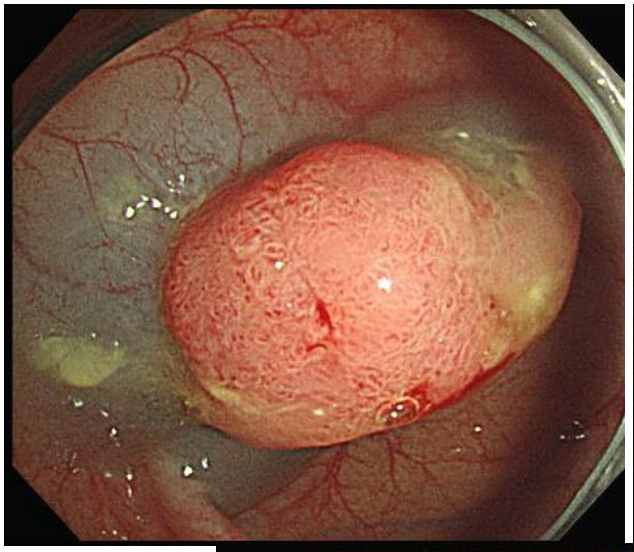
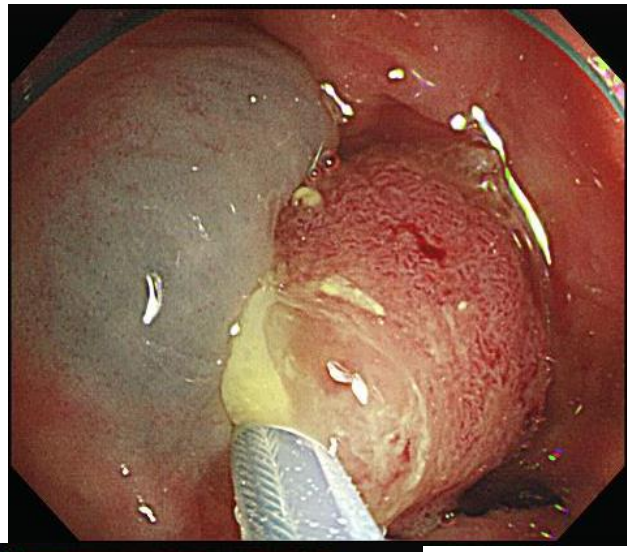
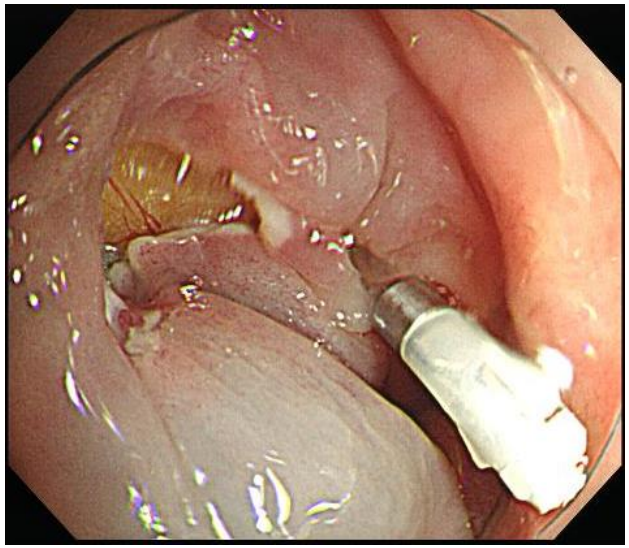
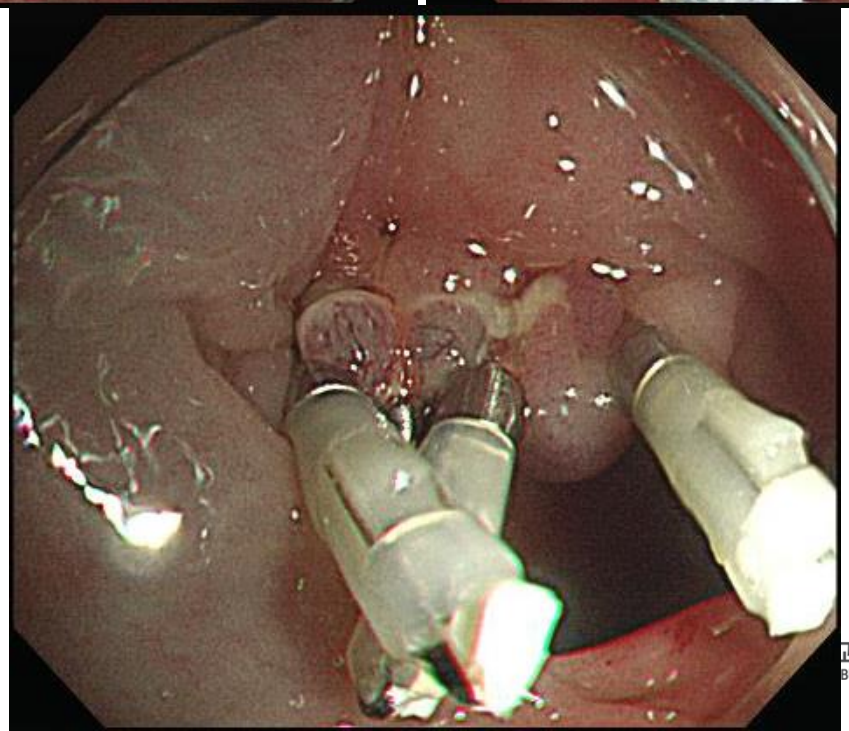


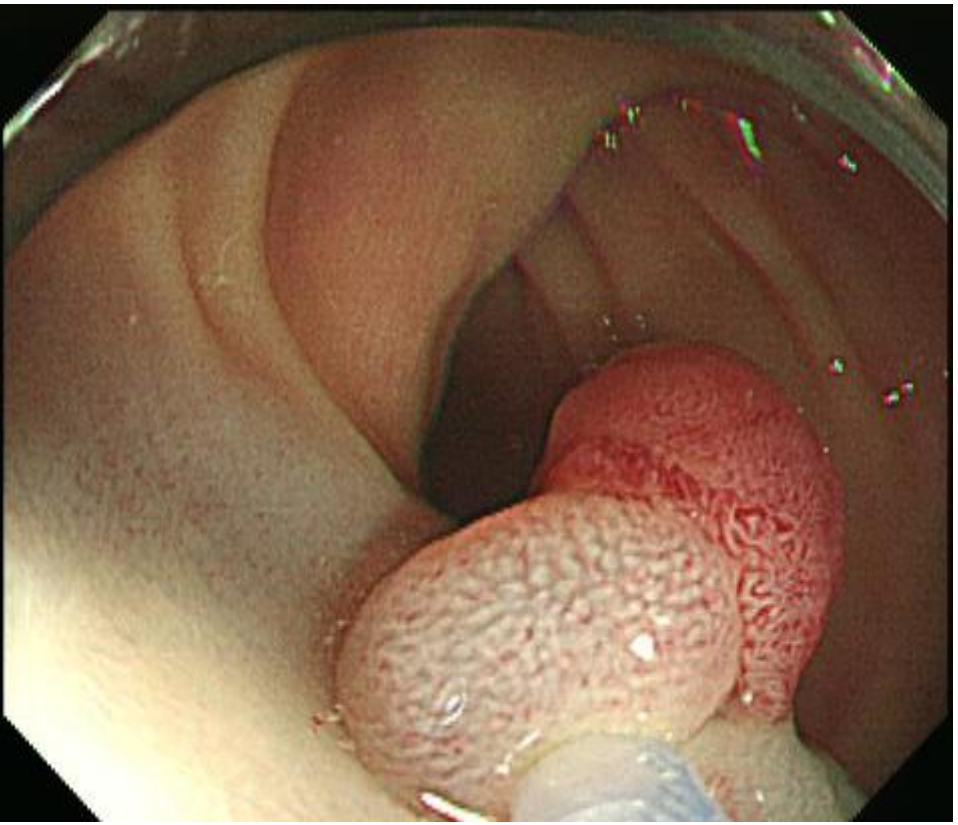







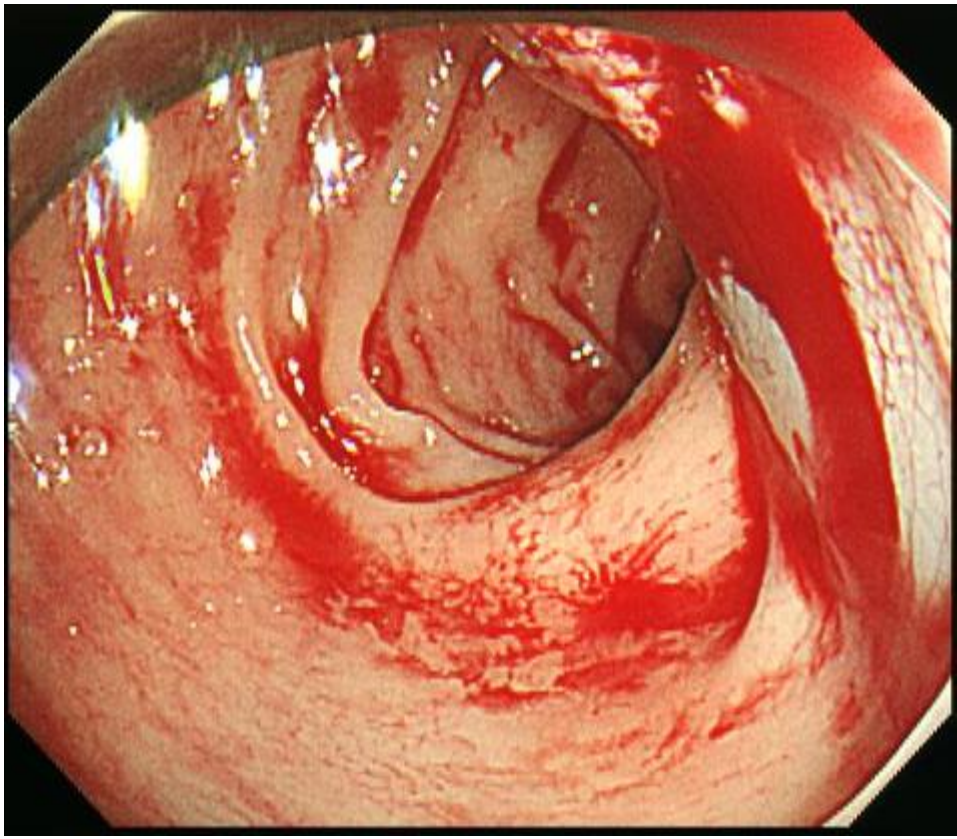
# Push and Pull - Tenting





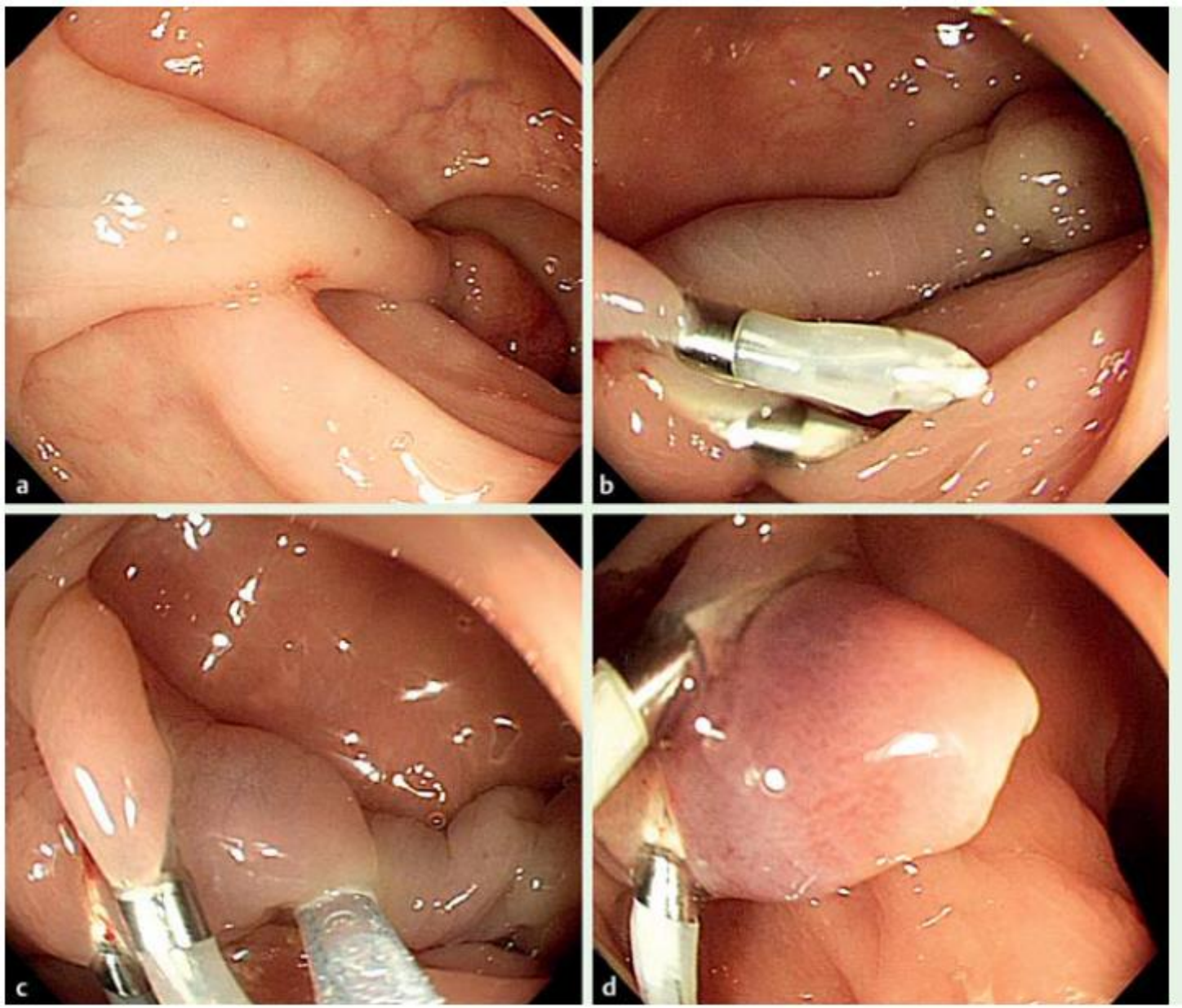










# Prophylactic clipping

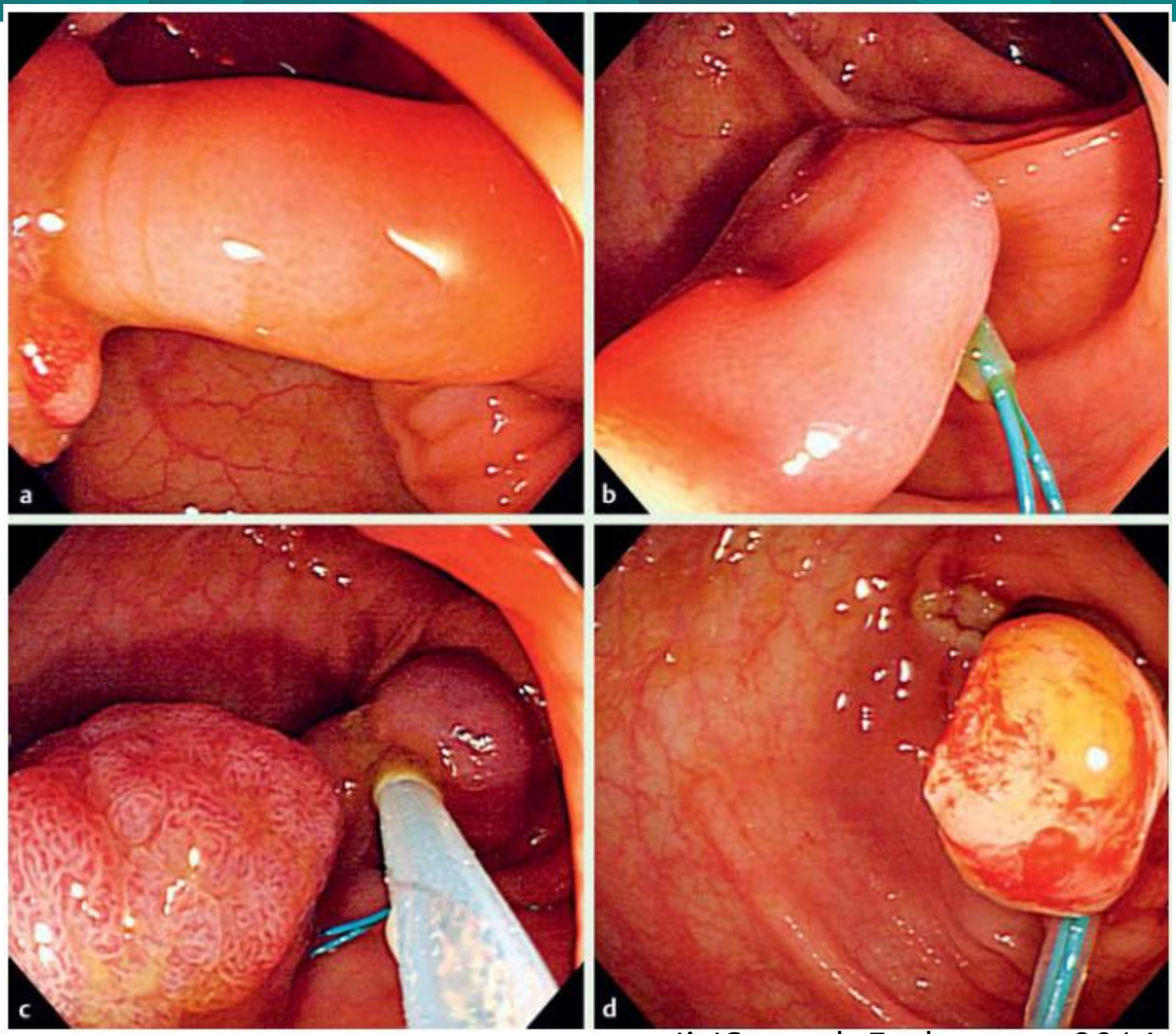





Ji JS, et al. Endoscopy 2014;46:598-604

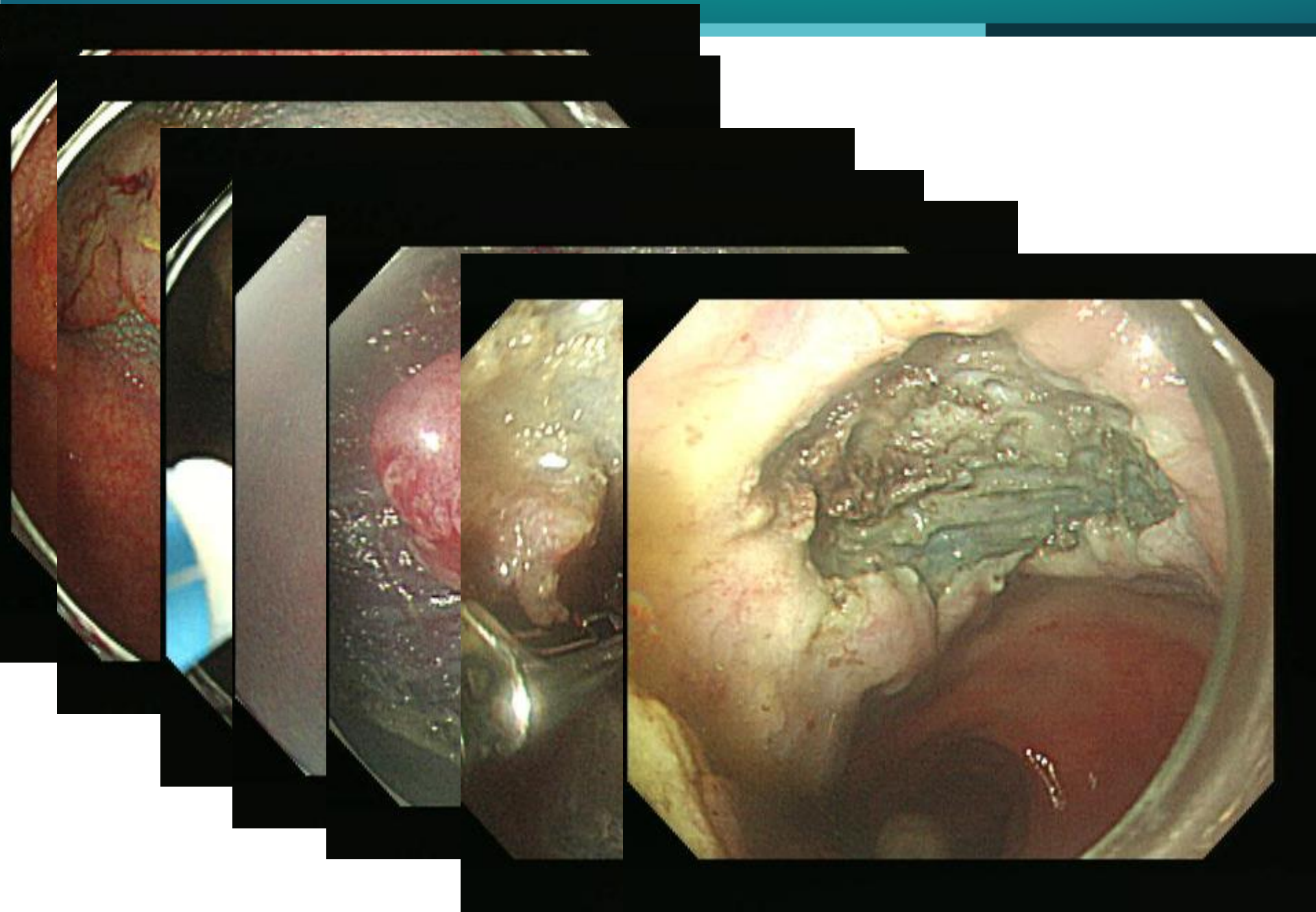
# Prophylactic endoloop



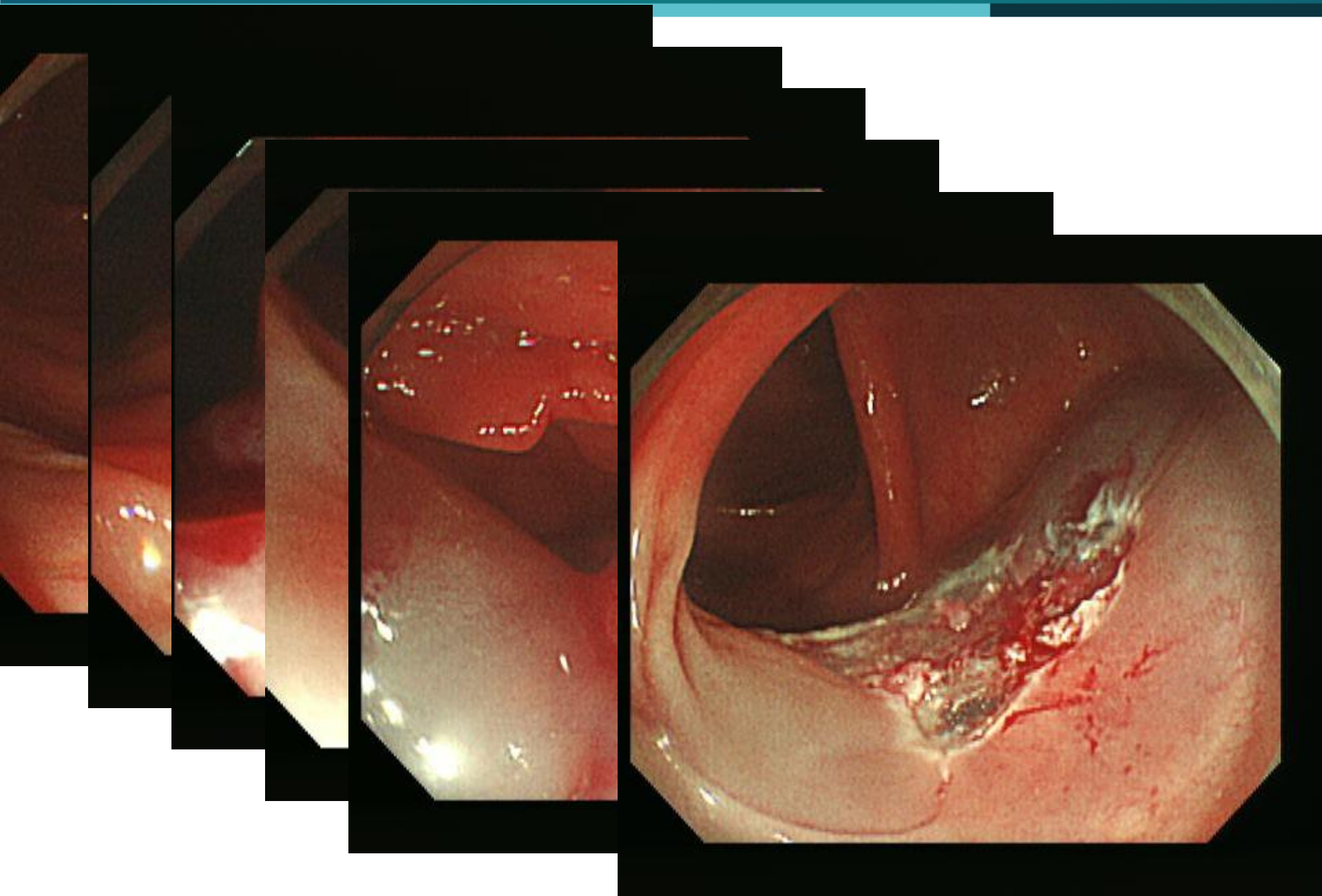



Ji JS, et al. Endoscopy 2014;46:598-604

# ESD



# EPMR



# EMR vs. ESD(Adenoma >2cm)

- Recurrence rate

  **EMR – Western 16%, Japan 7%**

  **ESD – Japan 1.4%**

- Procedure time

  EMR(Western) – 25 min

  **ESD(Japan) – 116 min**

- Perforation risk

  EMR 1.3%

  ESD 4.9%

**Moss A, et al. Gastroenterology 2011;140:1909-1918.**
**Saito Y, et al. Gastrointest Endosc 2010;72:1217-1225.**
**Moss A, et al. Gut 2015;64:57-65.**
**Oka S, et al. Am J Gastroenterol 2015;110:697-707.**
**Tomiki Y, et al. Dig Endosc 2015;27:679-686.**

# Summary

- 크기와 폴립 종류에 맞는 절제술
- Dimunitive polyp – cold forcep biopsy
- Small polyp – cold snaring
- Large or pedunculated polyp – EMR

# Summary



- 개개인의 능력과 익숙한 술기
- 내시경실의 장비, 인력을 고려
- 완전절제
- Complicated case – transfer 고려

# BUSAN PAIK HOSPITAL

사랑과 정성을 다하는

## 부산백병원

# 경청해주셔서 감사합니다.


**인제대학교 부산백병원**
부산광역시 부산진구 개금동 복지로 75
홈페이지 www.paik.ac.kr/busan/
대표전화 051)890-6114