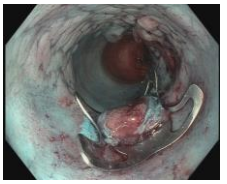
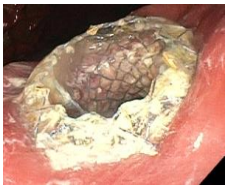
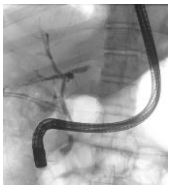
Potpourri



Endoscopic Management of Complications

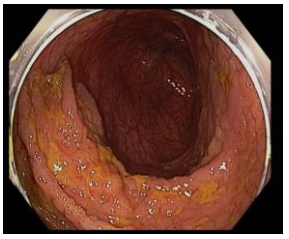
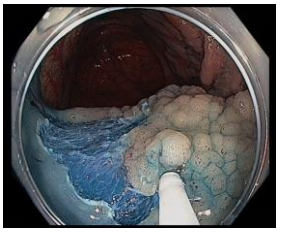
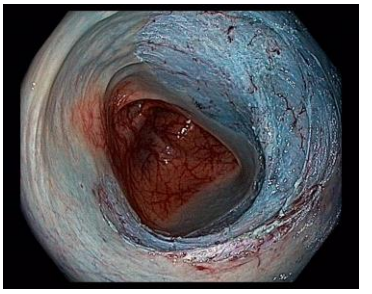
Remus Frei

Endoscopic Management of Complications

- Iatrogenic complications
  - Complications of endoscopic interventions
  - Complications of surgery
- Complications of acute diseases
- Complications of medical therapy

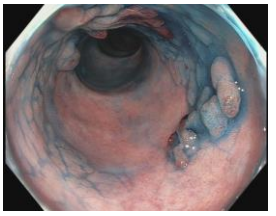
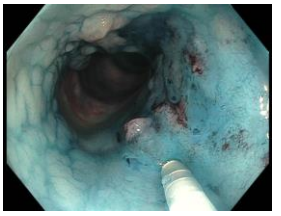
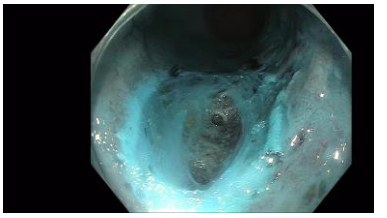
Kantonsspital St.Gallen – ein Unternehmen, drei Spitäler. St.Gallen Rorschach Flawil

Lateral spreading tumor granular type (LST-G)
Male 65 years

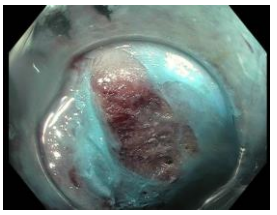
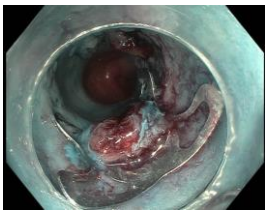
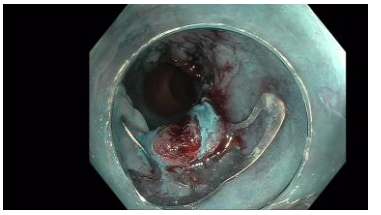
Splenic flexure complete resection in piece meal EMR (pEMR)

Complication of endoscopic intervention: EMR
Male 1938, Hematochezia

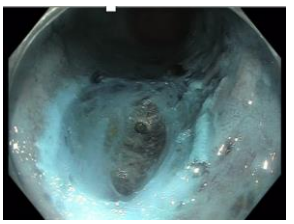
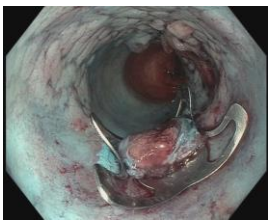
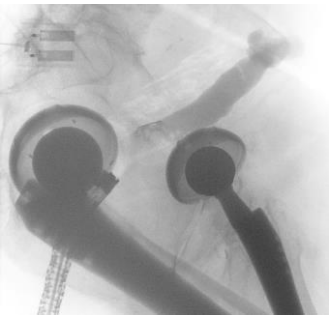
Sessile and flat lesion, Paris IIa and Is rectosigmoid junction

Immediate closure with over the scope clip (OTSC)

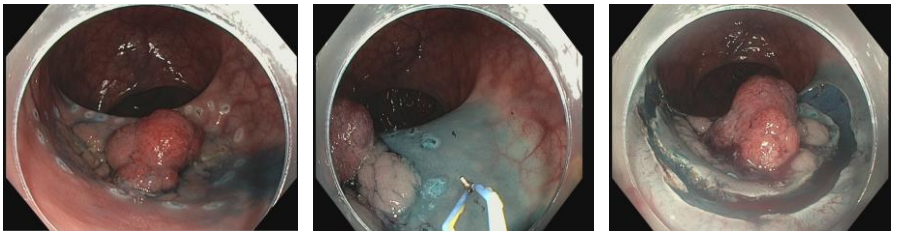
OVESCO Clip 14/6 t

Fluoroscopic control after application of OTSC

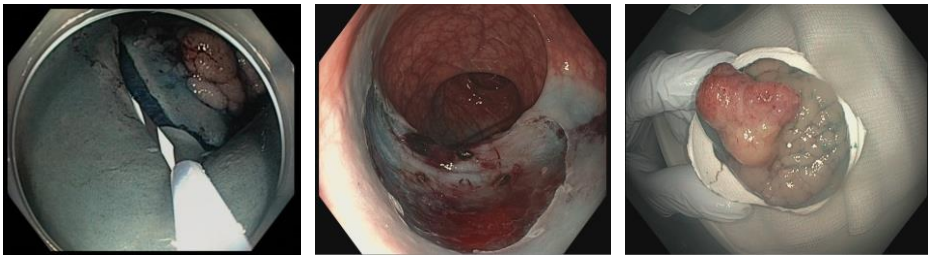
No extravasation of contrast agent

LST-G with dominant nodule
Resection in hybrid ESD with FARIn Instrument



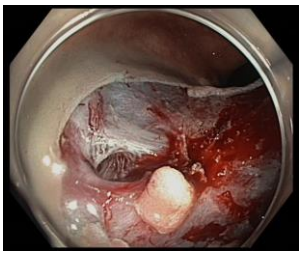
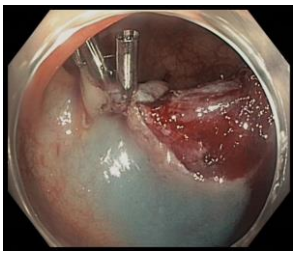
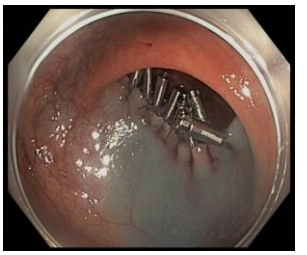
LST with dominant nodule Paris IIa und Is, risk of submucosal invasion up to 10%

Resection in hybrid ESD with FARIn Instrument



Complete Ro resection en bloc with partially insulated snare: ESR

Small perforation after circular incision
Closure with TTS Clips

Complete closure of the resection site

Perforations after endoscopic resections

- **Perforation rates**
  - EMR: 0.09% to 3.1%
  - EMR-P: 2.9% to 8.8%
  - ESD : 1.4% to 10.4%
- **Risk facors for perforation**
  - older age, comorbidities
  - lesion size
  - flat lesions
  - right-sided location
  - inadequacy of lifting

Efficacy and adverse events of EMR and … for the treatment of colon neoplasms: a meta-analysis. Gastrointest Endoscopy 2015

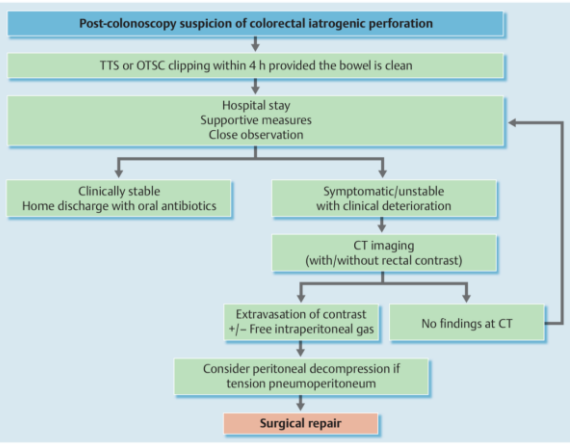
Perforations with endoscopic closure

- 466 acute perforations in which endoscopic closure was attempted
- 253 colon perforations
- Sucessful closure in 83.8% (212 of 253)
- No perforation-related major morbidity or mortality

Endoscopic clip closure versus surgery for the treatment of iatrogenic colon perforations during colonoscopy: a review of 115,285 patients. Surg Endosc. 2013

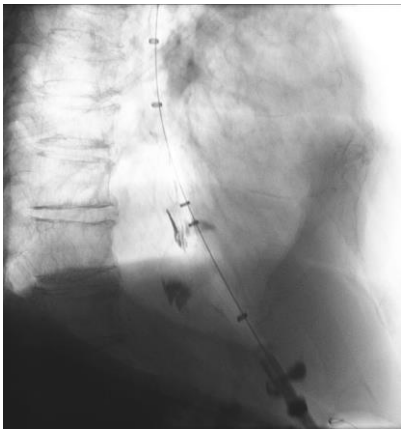
Endoscopic closure of acute perforations of the GI tract: a systematic review of the literature. Gastrointest. Endosc. 2015

THM: Iatrogenic colonic perforation



Paspatis Gregorios A et al. Diagnosis and management of iatrogenic endoscopic perforations: ESGE position statement ... Endoscopy 2014; 46: 693–711

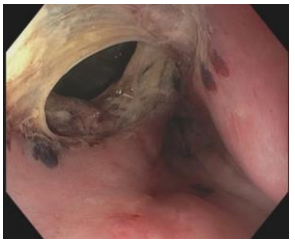
Male 1942: Pneumatic Dilatation of Achalasia

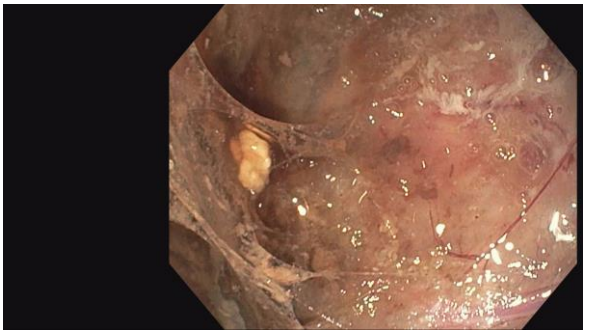


Retrosternal pain after dilatation

First Dilatation, 30mm, 10 psi, 60s 29.8.2019

Endoscopy 12 hours after dilatation

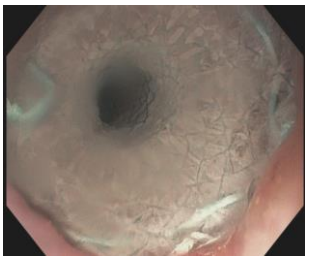
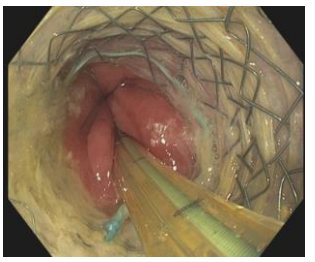
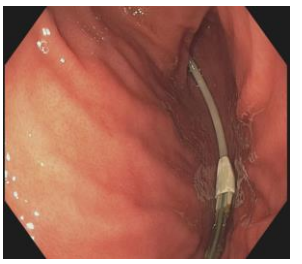




Perforation risk of pneumatic dilatation in Achalasia: 2.0% (0%-16%)

Review article: an analysis of the efficacy, perforation rates and methods used in pneumatic dilation for achalasia.Katzka DA, Castell DO Aliment Pharmacol Ther. 2011

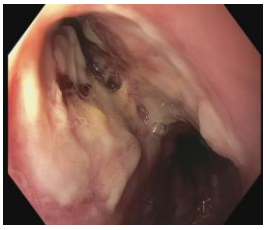
Insertion of a fcSEMS and nasojejunal tube

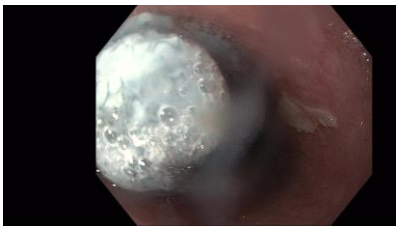




fcSEMS

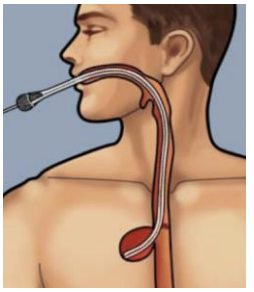
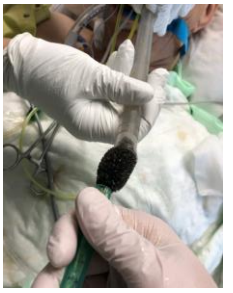
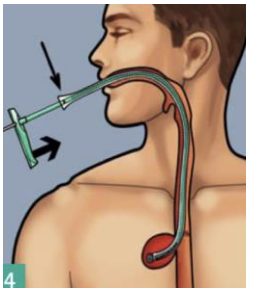
nasojejunal tube for enteral nutrition

Persistent fluid collection, elevated CRP und fever
Insertion of Esosponge for endoscopic vacuum therapy



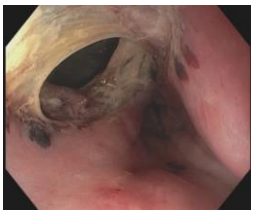
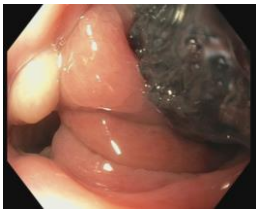
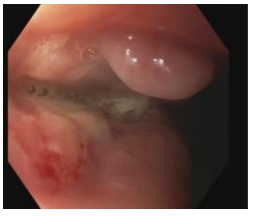
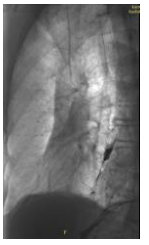


Sponge system for endoscopic vacuum therapy

Polyurethane sponge, negative pressure 125mm Hg, change every 3 days

Endoscopic vacuum therapy from 19.9. – 27.9.2019

Complete healing of the perforation

Endoluminal vacuum therapy in esophageal perforations and leaks

- first published 2008
- Results: 180 patient
- Healing of the perforation 91%
- overall mortality 12.8%
- Compared with published data on mortality from oesophageal perforation, the application of negative pressure appears to be beneficial.

Endoscopic vacuum-assisted closure of upper intestinal anastomotic leaks.Wedemeyer J, Schneider Gastrointest Endosc. 2008

Systematic review of the use of endo-luminal topical negative pressure in oesophageal leaks and perforations. Dis Esopahgus 2017

THM: Endoscopic Vacuum Therapy

Small tool - big effect

Easy to use

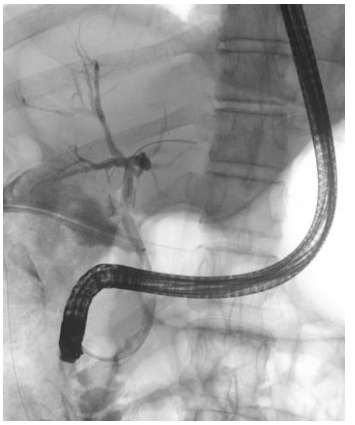
Enteral nutrition over sponge challenging (Jejunocath)

Cave: extraluminal placement

Kantonsspital St.Gallen – ein Unternehmen, drei Spitäler. St.Gallen Rorschach Flawil

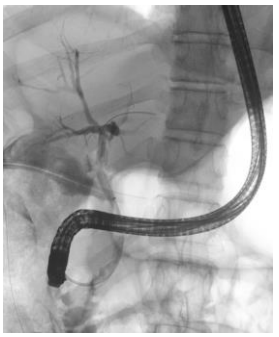
Male 1947 Cholecystectomy

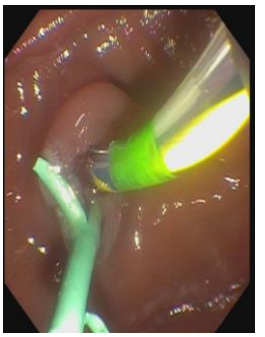
Persistent bile flow over drainage

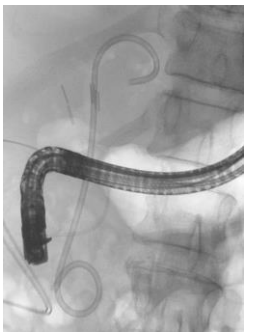


Complication of surgery: Bile leak after ChE

Insertion of double pigtail plastic stent 7cm 10F

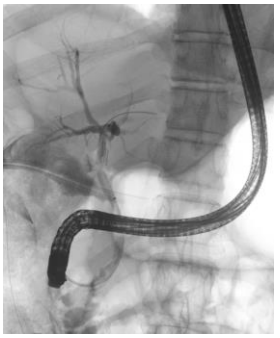
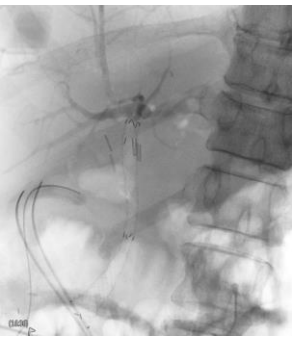
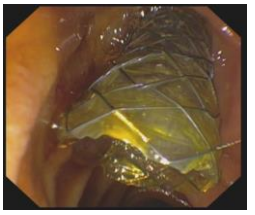






Persistent biliary secretion

Insertion of a fully covered metal stent (fcSEMS)

→ Complete closure of the leak

Bile leaks after Cholecystectomy

- 0.3–0.5% after Cholecystectomy
- most commonly from the cystic duct or a duct of Luschka

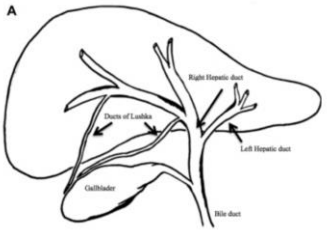
- Bile Leaks based on ERCP findings
  - Low-grade leaks
    - Contrast extravasation simultaneously/immediately after intrahepatic ducts
  - High-grade leaks
    - Contrast extravasation prior to intrahepatic duct filling

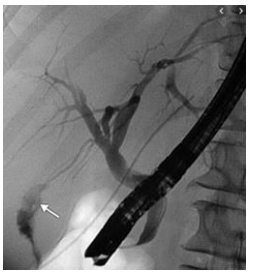
- Biliary obstruction due to retained stones 20%

Endoscopic management of bile leakage after cholecystectomy: a single center experience for 12 years. Clin Endosc. 2014;47:246–253.

Pinkas H, Brady PG. Biliary leaks after laparoscopic cholecystectomy: time to stent or time to drain. Hepatobiliary Pancreat Dis Int. 2008;7:628–632.

Bile leaks: Ducts of Luschka





1753 discribed by Ferrein
1863 by Hubert von Luschka

Accessory bile duct, running along the gallbladder fossa
Draining into the right or common hepatic duct
Prevalence 4%

1.Schnelldorfer What is the duct of Luschka?--A systematic review. J Gastrointest Surg. 2012

Results: Endoscopic therapy for bile leaks

- 207 patients with biliary leaks
- Endoscopic therapy based on the severity of the leaks
- 75 patients with **low-grade leaks**: sphincterotomy alone
  - 97% success rate; seven failures required additional therapy
- 97 patients with **high-grade leaks** stented
  - 100% successful closure rate

Sandaha GS, Bourke MJ, Haber GB, Kortan PP. Endoscopic therapy for bile leaks based on a new classification: results in 207 patients. *Gastrointest Endosc.* 2004

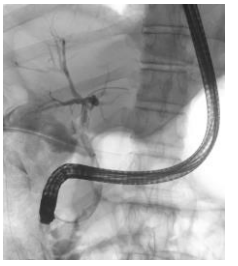
Refractory post cholecystectomy bile leak

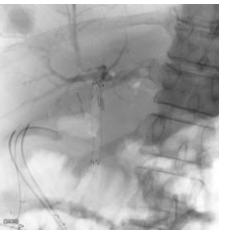
- 40 Patients with refractory bile leak
  - multiple plastic stenting (MPS): 20
  - fully covered metal stent (fcSEMS) : 20
- Closure of the leak
  - MPS: 65%
  - fcSEMS: 100% (p= .004)
- Predictors of treatment failure in the MPS
  - Use of <3 plastic stents, a plastic stent diameter and a high-grade biliary leak
- 7 MPS failures were successfully retreated with FCSEMSs

A non-randomized study in consecutive patients with postcholecystectomy refractory biliary leaks who were managed endoscopically with the use of multiple plastic stents or fully covered self-expandable metal stents (with videos). Gastrointest Endosc 2015; 82: 70 – 78

THM: Post Cholecystectomy bile leaks

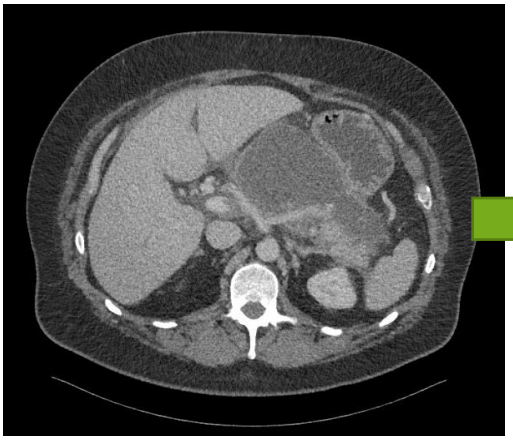
- Endoscopic therapy is highly effective
- Sphincterotomy probably enough for small leaks
- Plastic stenting standard
- fcSEMS in refractory cases





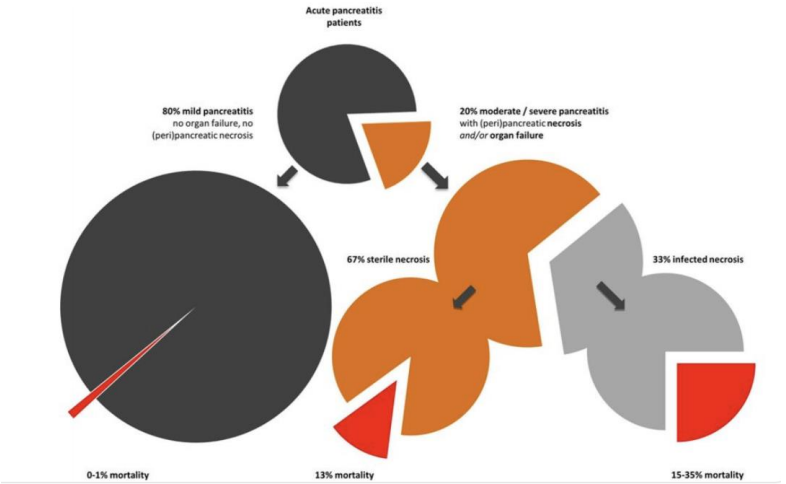
Complication of acute disease

Male 1964 Pain fever after acute pancreatitis



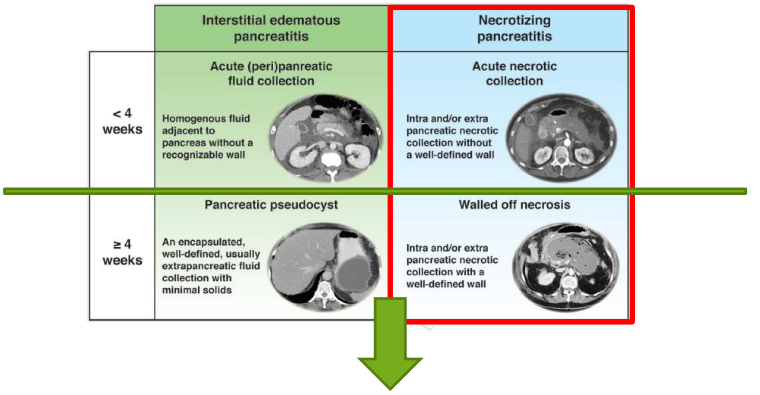
WOPN
Walled off necrosis

Acute Pancreatitis



Gut 2019

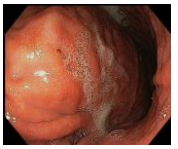
Pancreatic fluid collections

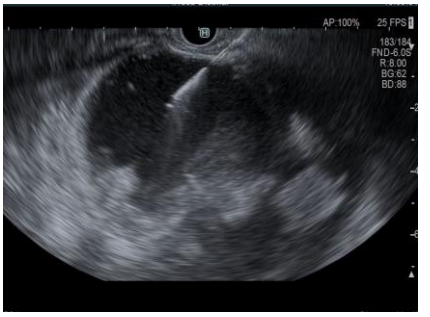


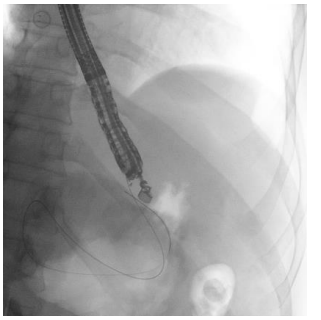
Minimal invasive drainage if symptomatic
After 4 weeks

Banks et al, revised atlanta criteria, Gut 2013

Transluminal drainage of WOPN

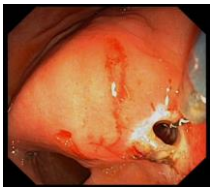




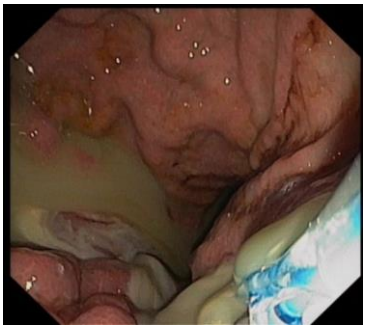


Bulging | EUS guided punction (19G) | Insertion of a guidewire

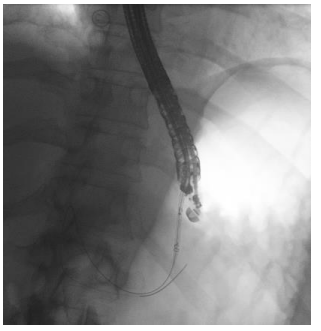
Insertion of LAMS (lumen apposing metal stent)



Cystotom/Ringmesser

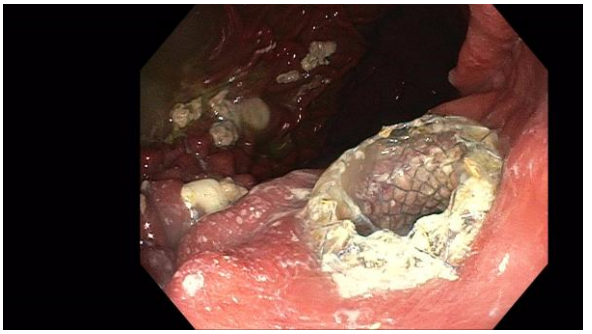


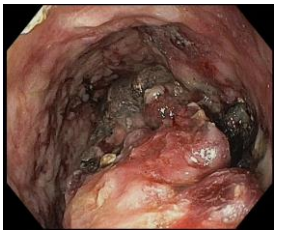
Tract dilatation



Insertion of a LAMS

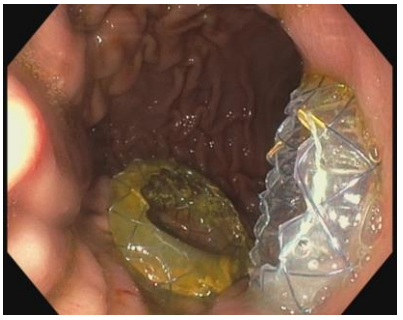
DEN: Direct Endoscopic Necrosectomy

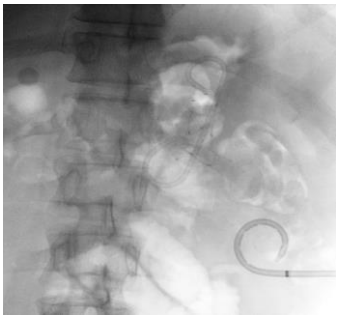




After necrosectomy

Multiple transluminal gateway





Multiple transluminal gateway (2 mal LAMS) and retroperitoneal drainage (ca 27%)

Endoscopic or surgical step-up approach for infected necrotising pancreatitis: a multicentre randomised trial. Lancet 2018

Endoscopic or surgical step up ?

- **98 patients randomly assigned to**
- **Endoscopic step-up approach (n=51)**
  - 1. Transluminal Drainage
    - 2 double pigtails (7F) plus nasocystische tube 8.5F
  - 2. Necrosectomy if needed
- **Surgical step-up approach (n=47)**
  - 1. CT-guided or ultrasound-guided percutaneous catheter drainage
  - 2. video-assisted retroperitoneal debridement (VARD), if needed

Tension Trial: *Endoscopic or surgical step-up approach for infected necrotising pancreatitis: a multicentre randomised trial. Lancet 2018*

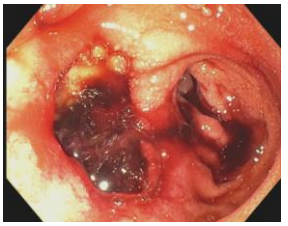
Results Tension trial

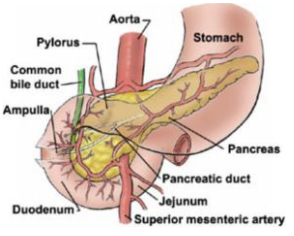
- No difference in mortality and major adverse events
  - 18% vs 13% (p=0.5)
- Endoscopic Step up approach
  - Shorter hospital stay 53d vs 69d (p=0.041)
  - Lower costs
  - Pancreatic fistula 5% vs 32% (p=0.001)

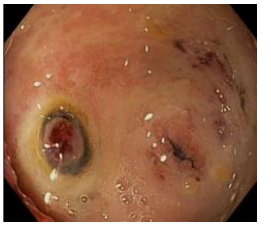
Endoscopic or surgical step-up approach for infected necrotising pancreatitis: a multicentre randomised trial. Lancet 2018

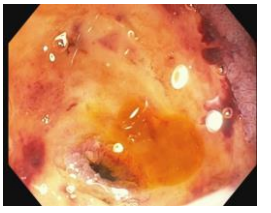
Complication of medical therapy

Male 1949, chronic NSAR consumption, melena, hemorrhagic shock





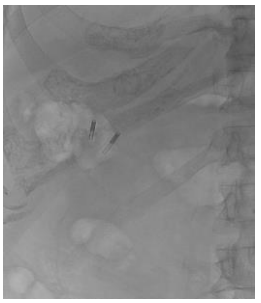




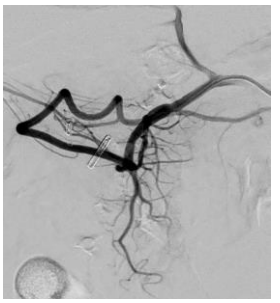
Ulceration in the duodenal bulb Forrest IIa

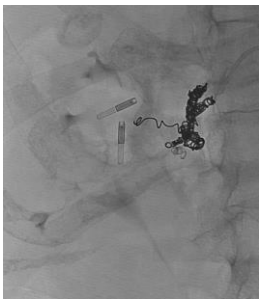
Kantonsspital St.Gallen – ein Unternehmen, drei Spitäler. St.Gallen Rorschach Flawil

Coiling of the gastroduodenal artery



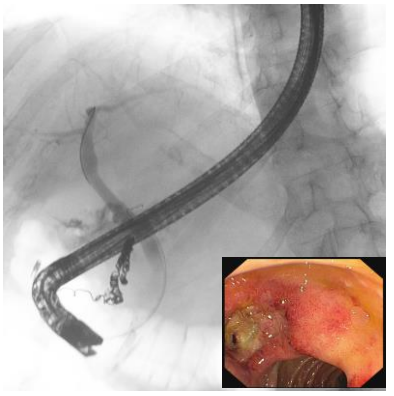
No extravasation of contrast during angiography



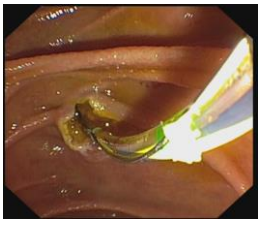


Coiling of the gastroduodenal artery

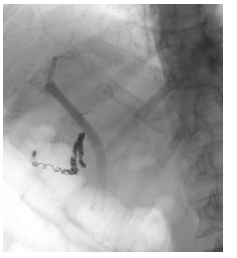
Treatment of the choledochduodenal fistula



Extravasation of contrast

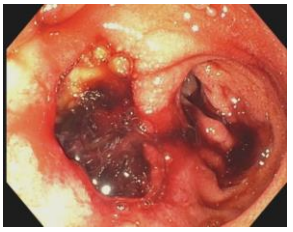
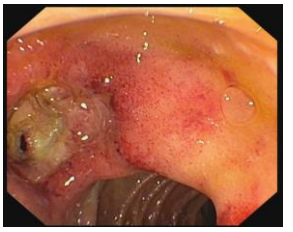
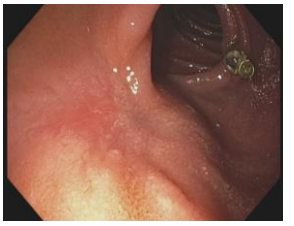
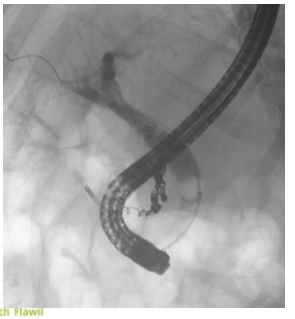


Sphincerotomy



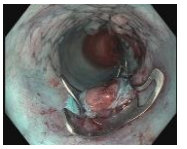
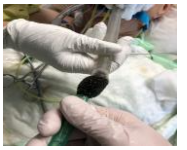
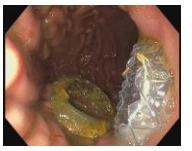
Insertion of a fcSEMS

Healing of the ulceration and fistula

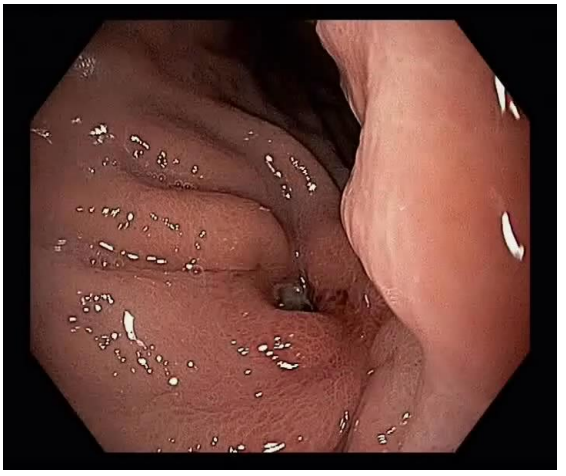





THM: Endoscopic Management of Complications

- Know the complications of surgical and endocopic interventions
- Trust your first impression
- Interdisciplinary topic
  - Radiologists and surgeons are your best friends

Kantonsspital St.Gallen



Kantonsspital St.Gallen

Buried Bumper Syndrome: Tissue dissection by Forceps guided Papillotome

Gian-Marco Semadeni, Jan Borovicka, Remus Frei
Klinik für Gastroenterologie und Hepatologie
Kantonsspital St. Gallen

Kantonsspital St.Gallen – ein Unternehmen, drei Spitäler. St.Gallen Rorschach Flawil

Background

Percutaneous endoscopic gastrostomy (PEG)

Widely used method of nutrition delivery

KSSG 2015: 109 PEG insertions, 34 PEG removals

Buried Bumper Syndrome (BBS)

Severe late complication of PEG

Estimated at around 1%

Cyrany et al., WJG 2016

Sphincterotomy alone to treat bile leaks ?

- 58 patients with biliary leaks
  - cholecystectomy (52), hepatic resection (5), and liver trauma (1)
  - The leak originating from
    - cystic duct (22), duct of Luschka (23), common bile, or hepatic duct (2), and intrahepatic duct (11)
  - Sphincertotomy alone: 37 Patients
  - Stent: 21 Patients
  - Single intervention resolved the bile leak in 34
    - 92% Sphincterotomy alone
    - 90% in the stent group ($p = 0.85$).
    - Resolution was slower ($p = 0.02$) and more patients required second intervention ($p < 0.01$) in the stent group.

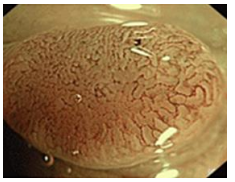
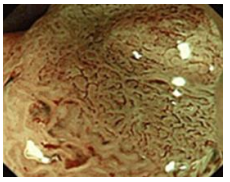
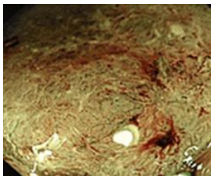
Dig Dis. 2019 Comparison of Biliary Stent versus Biliary Sphincterotomy Alone in the Treatment of Bile Leak

Buried bumper

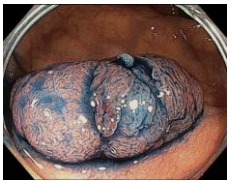
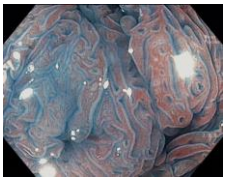
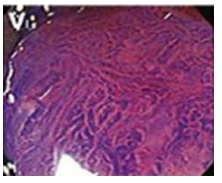
- PEG Komplication rate 0.4% to 22.5% of cases,
- Buried bumper 1% (0.3%-2.4%)

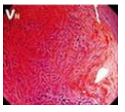
Advanced Endoscopic Imaging

Vessel pattern: NBI: narrow band imaging

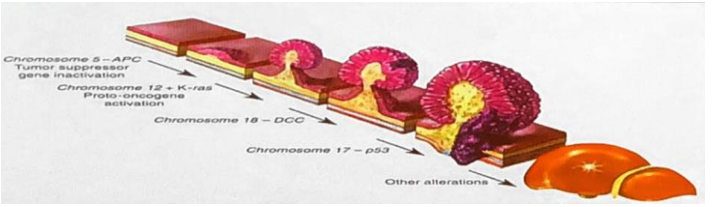




Surface Pattern: MCE: magnifying Chromoendoscopy (Kudo IV– V)



Spektrum der endoskopischen Therapie



Snare Polypectomy

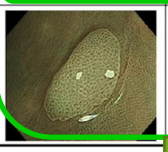
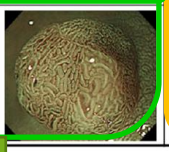
EMR

ESR / ESD

EFTR (Vollwandresektion)

Procedure risk

JNET-Classification, Japanese NBI Expert Team

	Type 1	Type 2A	Type 2B	Type 3
Vessel pattern	· Invisible *1	· Regular caliber · Regular distribution (meshed/spiral pattern) *2	· Variable caliber · Irregular distribution	· Loose vessel areas · Interruption of thick vessels
Surface pattern	· Regular dark or white spots · Similar to surrounding normal mucosa	· Regular (tubular/branched/papillary)	· Irregular or obscure	· Amorphous areas
Most likely histology	Hyperplastic polyp/ Sessile serrated polyp	Low grade intramucosal neoplasia	High grade intramucosal neoplasia/ Shallow submucosal invasive cancer *	Deep submucosal invasive cancer
Endoscopic image				

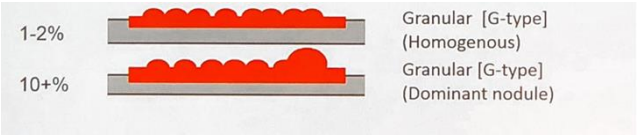
Accuracy*: 98.5 % 92% 87.4% 94%

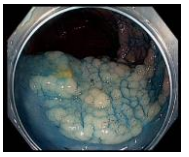
PE/EMR en bloc Surgery

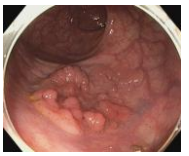
Lateral spreading tumors (LST) > 10mm

Kantonsspital St.Gallen

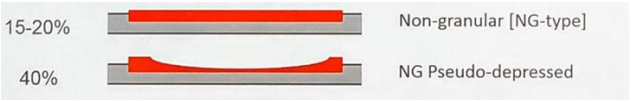
LST-granular type (LST-G)

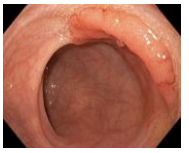






LST-non granular type (LST-NG)





Risk of malignancy

Holt BA, M.Bourke, Clin Gastroenterol Hepatol 2012

Paris Classification

Kantonsspital St.Gallen

Endoscopic appearance	JRSC class		Description
Protruded lesions >2.5mm	Ip		Pedunculated polps
	Ips		Subpedunculated polyps
	Is		Sessile polyps
< 2.5mm Flat elevated lesions	IIa		Flat elevation of mucosa
	IIa / IIc		Flat elevation with central depression
	IIb		Flat mucosal change
< 2.5mm Flat lesions	IIc		Mucosal depression
	IIc / IIa		Mucosal depression with raised edge

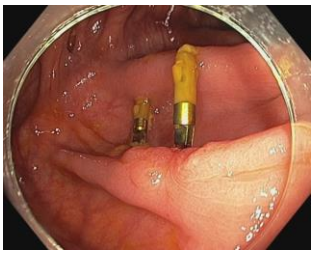
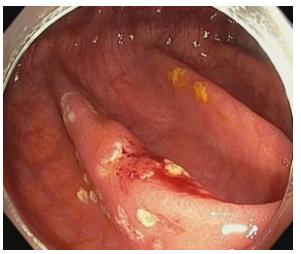
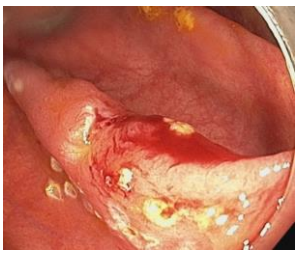
Abb. 2: Klassifikation der Japanese Research Society[1]

Oberflächliche Typ 0 Läsion

			Prävalenz (~ Häufigkeit)	Krebsrisko
0	I-p/sp		~15%	1 – 15%
0	II-a/b		~ 5%	4 – 6%
0	II-c (eingesenkt)		~ 0.5%	30 – 75%

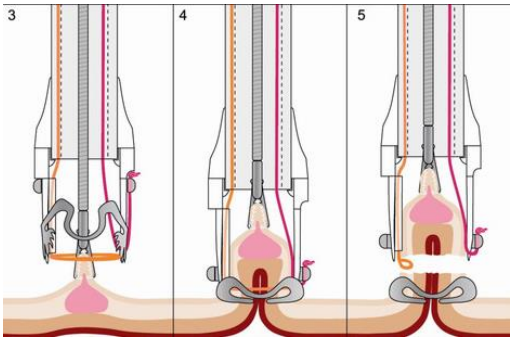
Risk of malignancy 30-75%

Excavated lesion: high grade dysplasia in biopsy

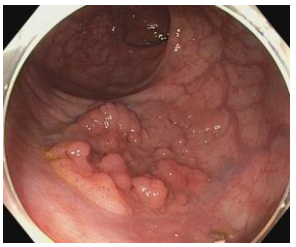
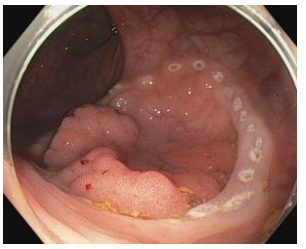
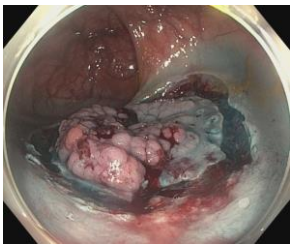
< 2.5mm Flat lesions | IIc | | Mucosal depression → Risk of malignancy 30-75%

Endoscopic full thickness resection (EFTR)



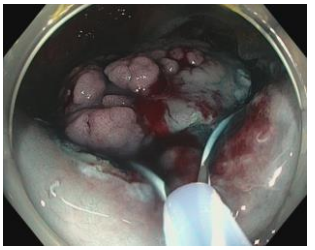
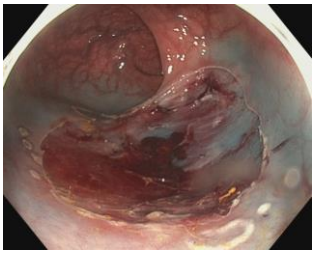
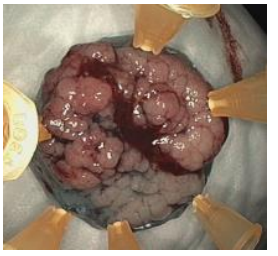
Kantonsspital St.Gallen – ein Unternehmen, drei Spitäler. St.Gallen Rorschach Flawil

LST-G with dominant nodule

ESR: en bloc resection with Farin-Instrument

En bloc Resection in ESR technique

ESR: endoscopic submucosal resection

Resection en bloc

LAMS versus plastic stents

- 9 studies (737 patients) for LAMS
- 6 studies (527 patients) for plastic stents

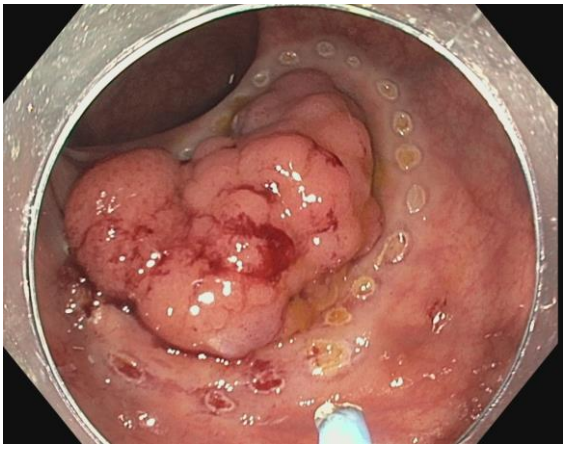
- clinical-success rate
  - LAMS: 88.5 %
  - Plastic stents: 88.1% p = 0.93

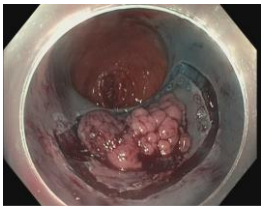
  - all adverse-events
    - LAMS: 11.2%
    - Plastic stents: 15.9% P = 0.38.

- LAMS and Plastic stents demonstrate equal clinical outcomes and equal adverse-events in the drainage of pancreatic WON.

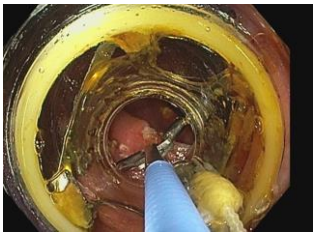
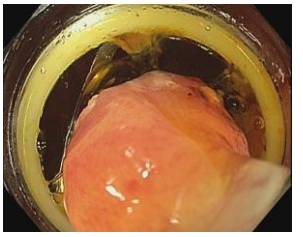
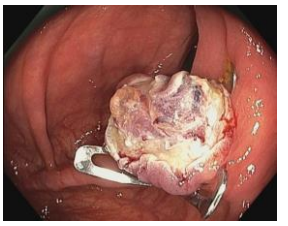
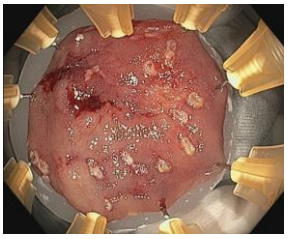
Endosc Ultrasound. 2019 Lumen apposing metal stents in drainage of pancreatic walled-off necrosisvs vs plastic stents? A systematic review and meta-analysis

Bruderer Ernst 7.3.1958

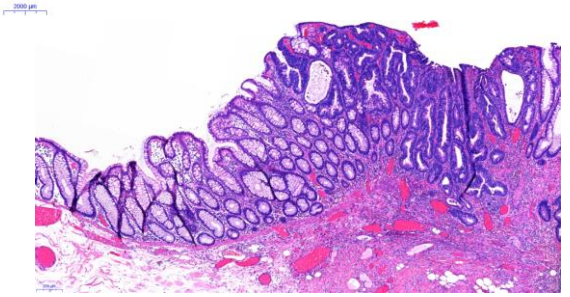




Endoscopic full thickness resection (EFTR)

Histology of EFTR

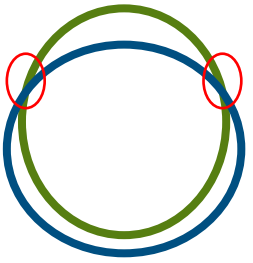



pT1bsm1 LV0 G1-2
R0 !

Dr. Regulo Rodriguez: Institut of Pathology KSSG 10/ 2018

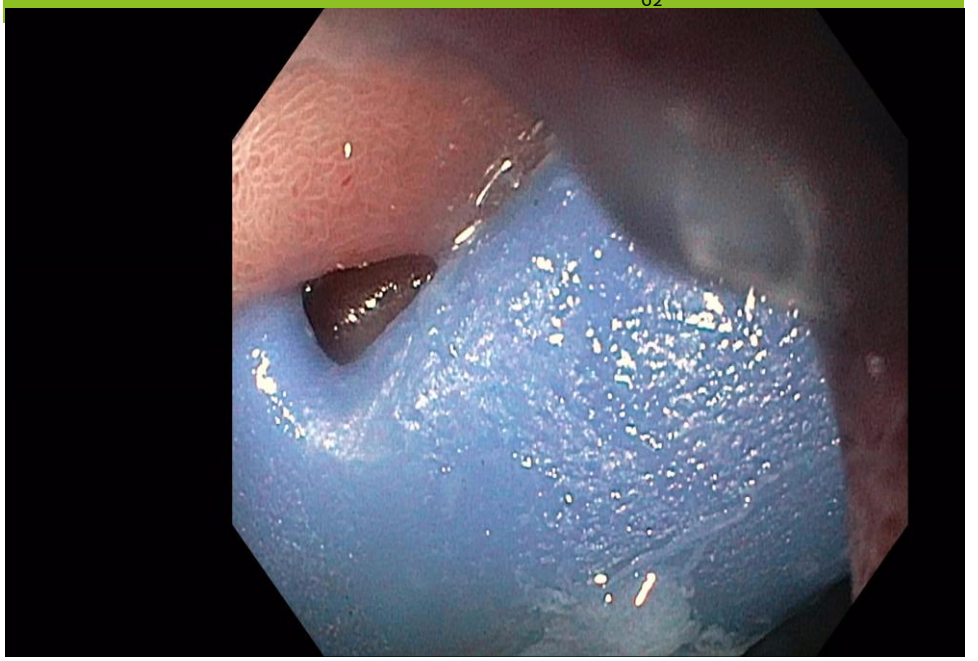
61

Kantonsspital St.Gallen



3. Frage: Verschluss der Ein-/Austrittsstelle?

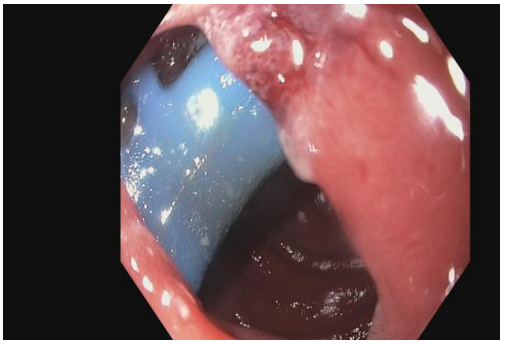
62



Kantonsspital St.Gallen – ein Unternehmen, drei Spitäler. St.Gallen Rorschach Flawil

Gian-Marco Semadeni

63

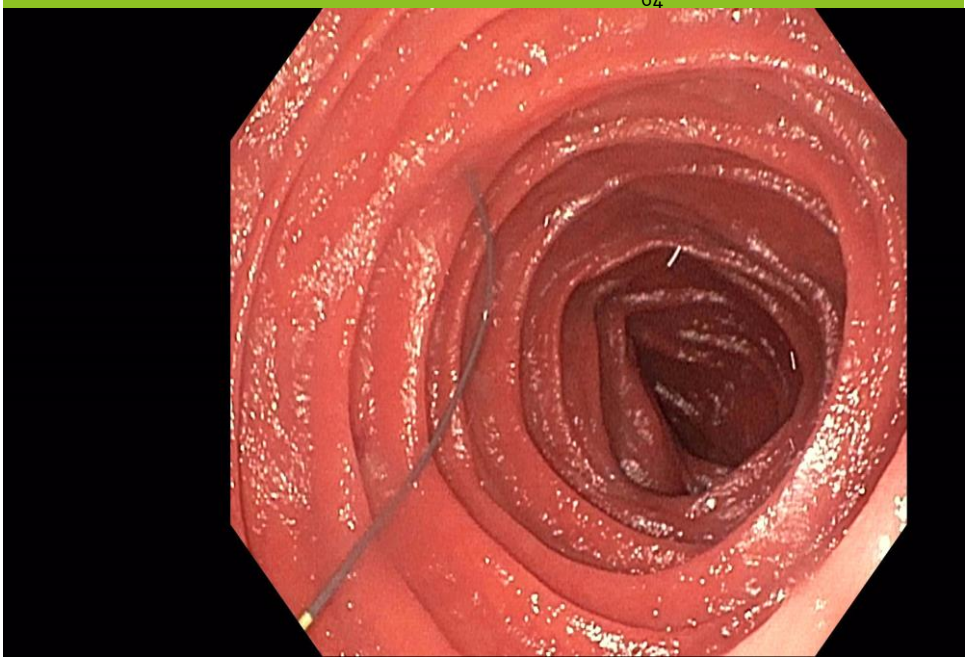


Diagnose: Intraluminale Banderosion

1. **Frage: Entfernung chirurgisch oder endoskopisch?**
2. **Frage: Wie kann man dieses Band durchtrennen und entfernen**

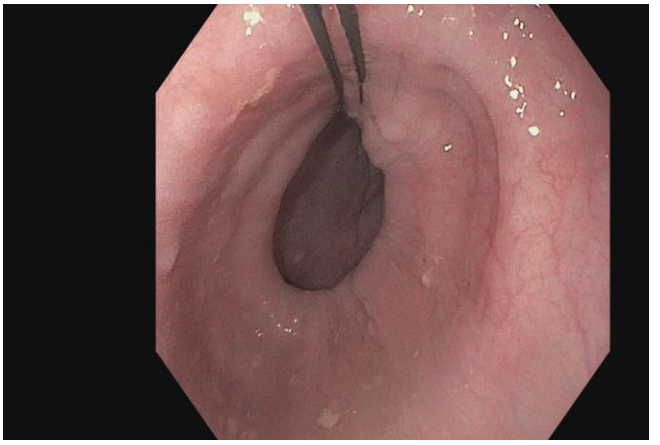
Gian-Marco Semadeni

64

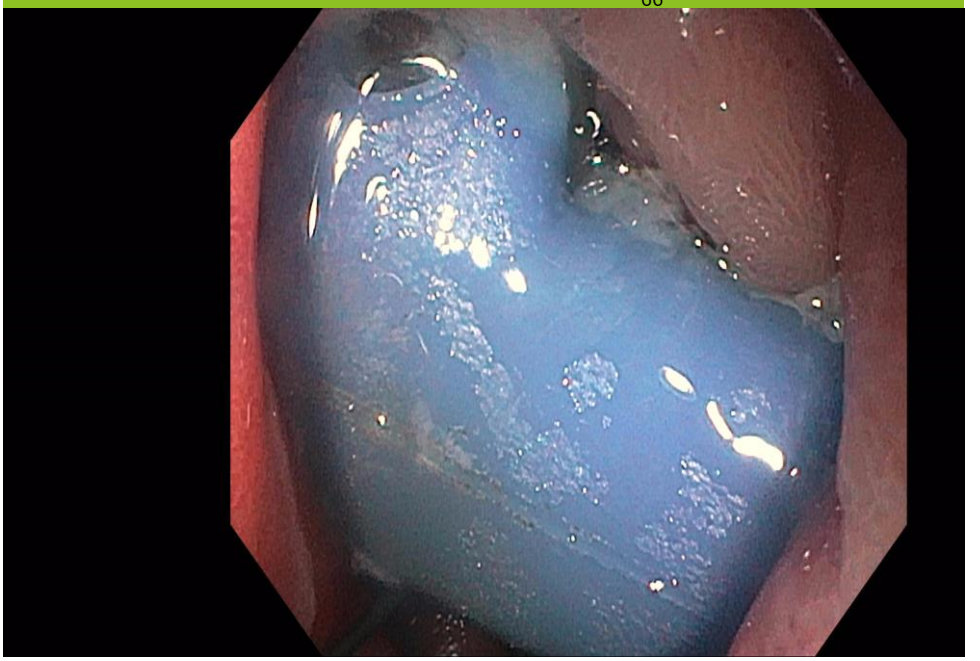


Gian-Marco Semadeni

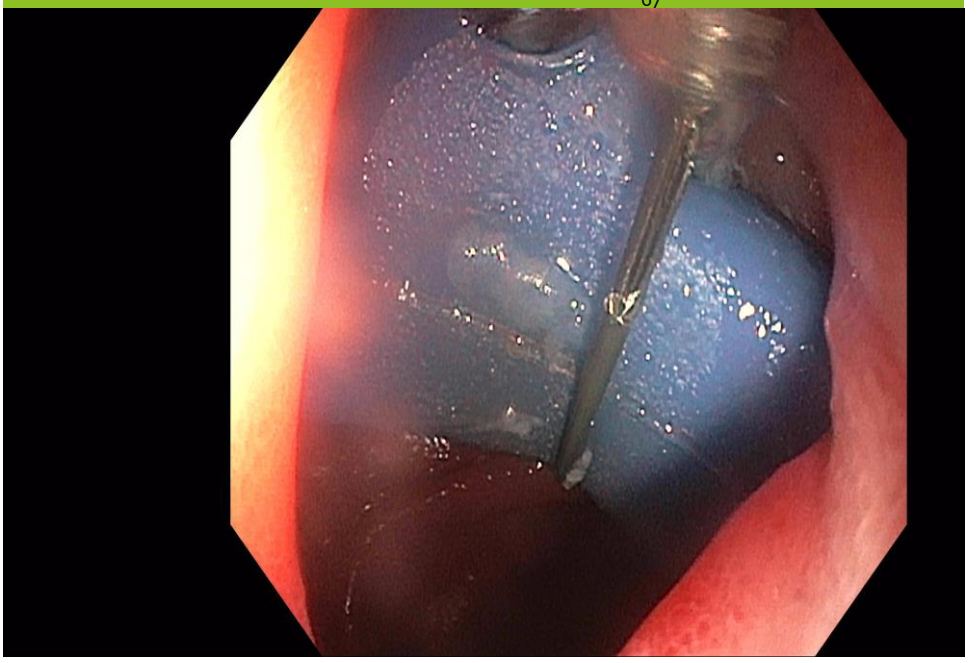
65



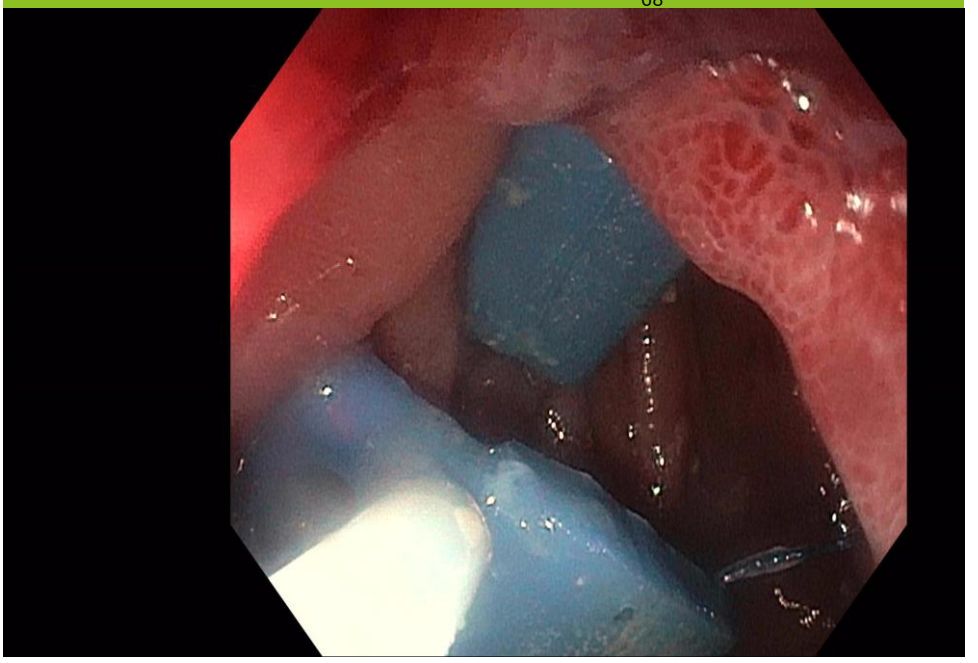
66



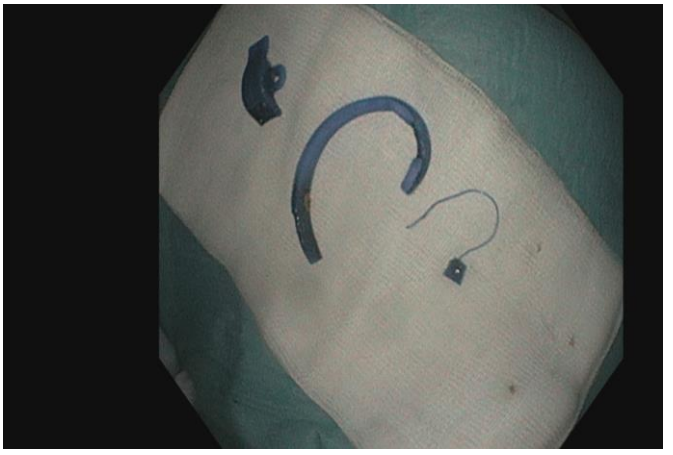
67

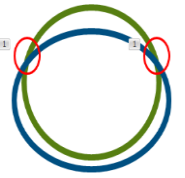


68



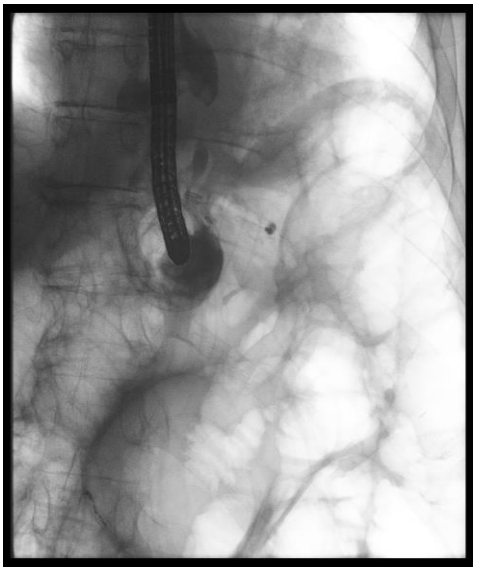
69





Gian-Marco Semadeni

70



Gian-Marco Semadeni

Banderosionen

Häufigkeit: 1-10%
Symptomatik: Dysphagie, Nausea/Vomitus, Schmerzen

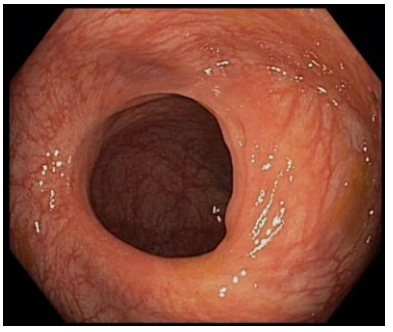
Wenig Daten zu Komplikationen/Erosionen bei banded RYGB (BGB)

16 Patienten, Zeitraum 11/14-12/16 (Nashville) – davon 11 mit BGB
Erfolgreiche endoskopische Bandentfernung: 14/16 (87.5%)
15/16 Patientin Entlassung am Interventionstag
Kein Defekt-Verschluss

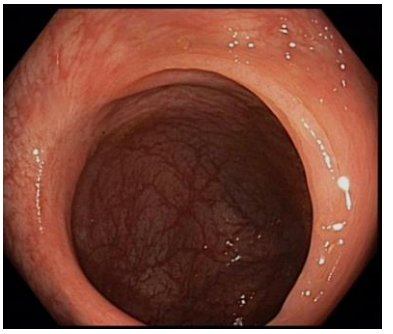
Spann et al., Surgery for Obesity and related Disease, 2017

Gian-Marco

Endoscopic control after 3 months



Slight narrowing of the colon



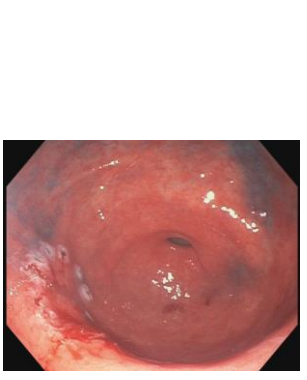
No recurrent adenoma

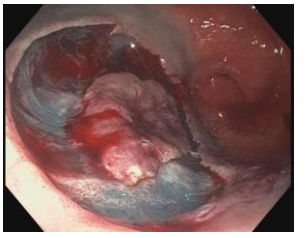
Short history of the transluminal approach

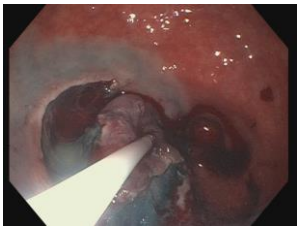
- 1975 in a case report by Rogers et al
  - Endoscopic drainage of pancreatic pseudocysts.
- 1985 Kozarek et al4 patients who underwent endoscopic cystogastrostomy needle decompression
- Cremer et al 1986 13 patients who underwent cystogastrostomy with trans-nasal drain placement.
- 1992 by Grimm et al[41] and 1996 by Wiersema[42], both of whom described a single case of successful endoscopic pseudocyst drainage using an echoendoscope

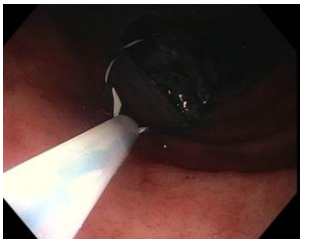
Grimm H, Binmoeller KF, Soehendra N. Endosonography-guided drainage of a pancreatic pseudocyst. Gastrointest Endosc. 1992;38:170–171

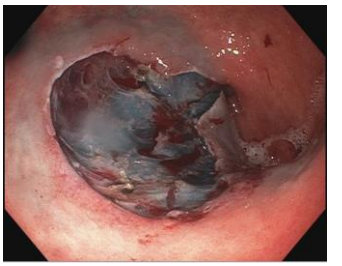
Excavated lesion Antrum, high grade Dysplasia











Kantonsspital St.Gallen – ein Unternehmen, drei Spitäler. St.Gallen Rorschach Flawil

Results: endoscopic vacuum therapy versus Stents

- Metaanalysis: Four studies including 163 patients
- Esophageal leak closure rate
  - significantly higher with Sponge than SEMS (OR 5.51, p < 0.001)
- Sponge has
  - shorter treatment duration (difference -9.0 days, p = 0.021)
  - lower major complication (p= 0.011),
  - Lower in-hospital mortality (P = 0.002) rate compared to SEMS.
- EVT for esophageal leak is feasible and safe. It has the potential to become the new gold standard in the endoscopic treatment of esophageal leaks and perforations. However, further comparative studies with SEMS are needed to strengthen the current evidence.

Dis Esophagus. 2018 Comparison of endoscopic vacuum therapy versus endoscopic stenting for esophageal leaks: systematic review and meta-analysis. Rausa E