

Future trends

- Entire GI screening with one capsule
- Moveable capsule
- Therapeutics

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Device-assisted enteroscopy (DAE)

- Generic term: Endoluminal examination of the small bowel by an endoscopic technique that includes assisted progression
 - Balloon
 - Overtube
 - Stiffening device etc
- Double balloon enteroscopy (Fujinon Inc. Japan)
- Others
 - Single balloon enteroscopy (Olympus Optical Co. Japan)
 - Spiral enteroscopy (Spirus Medical, USA)
 - Balloon guided endoscopy: NaviAid AB device (SMART medical systems Israel)

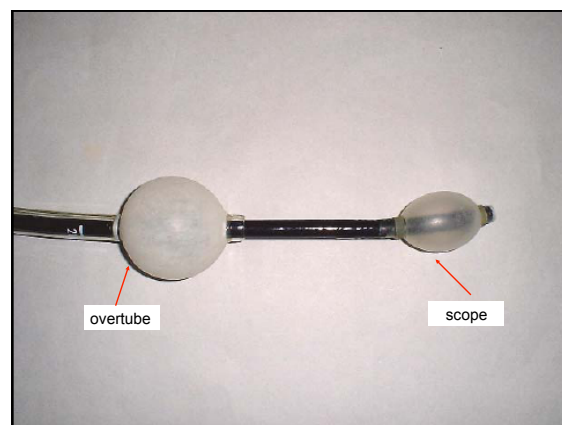
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DBE background

- Yamamoto: First total enteroscopy 1999 with handmade prototype
- Yamamoto H et al. Gastrointest Endoscopy 2001
- Released 2003 (Fujinon)



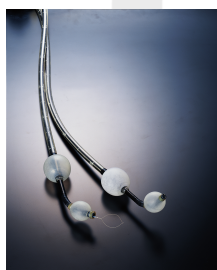
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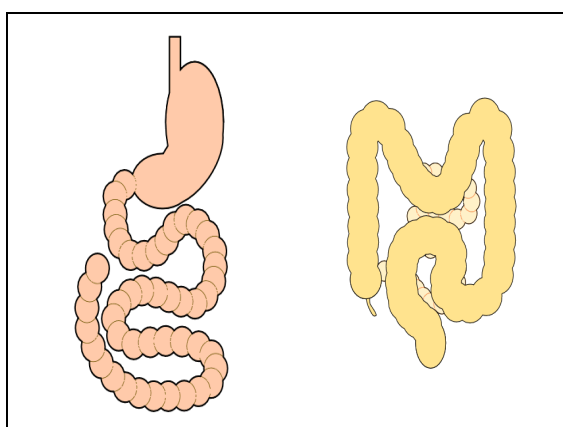
DBE system

• System

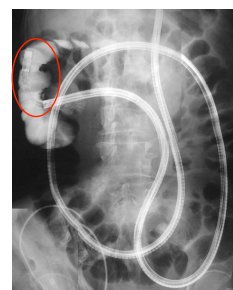
- Specialised enteroscope
 - 200cm working length
 - Outer diameter
 - 8.5mm (P5=diagnostic)
 - 9.4mm (T5=therapeutic)
- Accessory channel
 - 2.2 mm (P5)
 - 2.8mm (T5)
- Overtube 145cm
- Air pump
- 2 balloons: endoscope and overtube



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Total enteroscopy

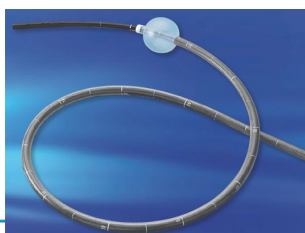


Provided by Dr. Yamamoto
of Jichi Medical School

DOUBLE BALLOON
ENTEROSCOPY

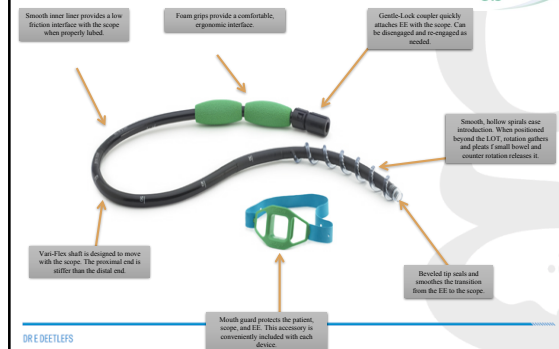
Other types of enteroscopy

- Single balloon enteroscopy (SBE) (Olympus)
- Endo-Ease Discovery SB (Spirus)



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Endo-Ease discoveryTM sb



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Capsule endoscopy and Double balloon enteroscopy

- Complimentary
- CE
 - Diagnostic
- DBE
 - Diagnostic in selected cases
 - Therapeutic

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CE Advantages

- Complete small bowel visualisation
- Painless
- Very low risk
- Outpatient procedure
- Cost effective

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CE Disadvantages

- Poor with certain pathology
 - Masses vs bulges: can not reliably differentiate
 - Proximal lesions
 - Small bowel diverticulosis
- Poor localisation and extent of pathology
- No histology
- No treatment
- Cost

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DBE advantages

- Deep enteroscopy (seldom total enteroscopy)
- Biopsies for histology
- Therapeutic
 - Haemostasis: APC/Heater probe/clips
 - Polypectomy
 - Balloon dilatation of strictures
 - Retrieval of FB (including capsules)
 - Marking: Tattoos
- Others uses
 - ERCP in altered anatomy
 - Difficult colonoscopy

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DBE disadvantages

- Technically demanding
- Staff
- Duration: 90-120 min
- Cost
- Risks



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DBE complications

- Pancreatitis
- Bleeding
- Perforation
- Ileus
- Necrosis
- Sedation related: long procedure
- **Overall rate**
 - 1% Diagnostic
 - 3-4% Therapeutic

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Indications for CE

- **Obscure GI bleeding**
- **Crohn's**
- Possible indications (selected cases)
 - Polyposis syndromes
 - Tumours
 - Coeliac disease

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Contraindications

- Relative contra-indications
 - Dysphagia
 - Obstructive stenosis of GI tract
 - Cardiac pacemaker/ICD
 - MRI
 - Pregnancy
 - Children < 2
- Too frail for surgery or if pts would not want surgery



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Dysphagia and upper GI transit problems

- Oropharyngeal dysphagia
- Oesophageal dysphagia
 - Structural
 - Zenker's
 - Distal oesophageal diverticulum
 - Peptic stricture
 - Functional
 - Achalasia etc
- Gastric transit problems
 - Gastroparesis
 - Structural
 - Pyloric stenosis etc

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Dysphagia and upper GI transit problems

- Outcome
 - Capsule can't be swallowed
 - Capsule doesn't reach the small bowel
- Therefore important: Don't let the patient go home until CE has reached the duodenum:
 - Check DR3
 - Have emergency endoscopy available

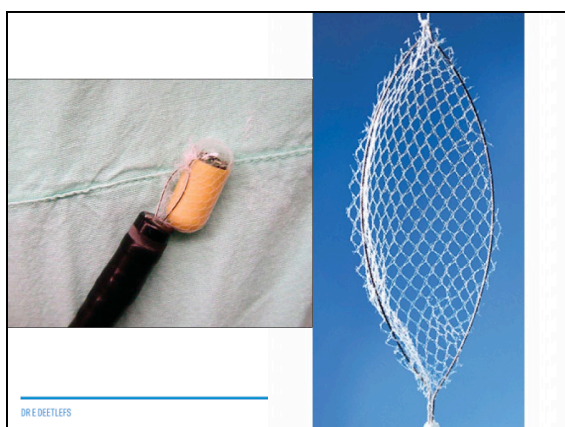


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Direct endoscopic placement

- Who?
 - High risk patients
 - During the study
 - Inability to swallow
 - Gastric retention
- Mechanisms of placement
 - Roth Net
 - Snares
 - AdvanCE™ capsule endoscope delivery device

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Direct placement of video capsules...

The AdvanCE™ capsule delivery system allows for direct endoscopic placement of video capsules* in patients who are unable to swallow or pass the capsule through the pylorus.



The AdvanCE™ system...

- Facilitates endoscopic delivery of video capsules into the stomach or duodenum
- Minimizes wasted video capsules due to lost battery life spent in the esophagus or stomach
- Enables small intestinal surveillance in challenging patients with dysphagia, pill phobia, gastroparesis, anatomical abnormalities, and more

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Capsule retention



FunnyOldPlanet.com

Capsule retention

Title

Indications and Detection, Completion, and Retention Rates of Small Bowel Capsule Endoscopy: A Systematic Review

Liao Z, Gao R, Xu C, Li ZS.

Gastrointest Endosc 2010;71:280-286.

- 22 840 CE
- Pooled 1.4%
 - OGIB 1.2%
 - Neoplastic lesions 2.1%
 - Crohn's (Definite or suspected) 2.6%

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Capsule retention: who is at risk?

- Symptoms of small bowel obstruction
- High risk conditions
 - Multiple and complex abdominal surgery
 - Known adhesions
 - Radiation
 - Known Crohn's disease

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Preventing retention

- Prediagnostics
 - Symptoms
 - Poor prediction
 - X-rays, Small bowel follow through, MRI
- The patency system

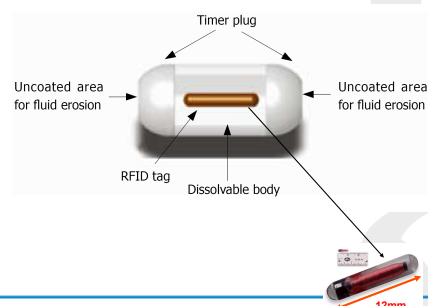
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The patency system



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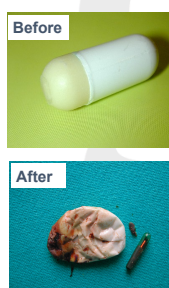
Agile Patency Capsule



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Agile Patency Capsule

- Agile capsule stays intact in the GI for a minimum of 30 hours post ingestion
- Then disintegrates and passes through stricture
- I.e. if capsule is seen within 30 hours = SAFE
 - \pm 100% predictive of PillCam passing successfully



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Managing retention

- 90% pass conservatively
 - Delayed passing
 - Medical therapy
 - Steroids
 - Immunomodulators
 - DBE
 - Surgery



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Pacemakers and ICD's



Table 1 Studies investigating patients with cardiac pacemakers who underwent capsule endoscopy

Author	Year	Number of patients/ cardiac pacemakers (n)	Brand of cardiac pacemaker	Kind of study	Interference	Brand of capsule endoscopy
Harris [3]	2013	76	Medtronic, Guidant and others	<i>In vivo</i>	No	Given Imaging
Bandorski [12]	2012	300	No specification	<i>In vivo</i>	No	Given Imaging Olympus
Cushieri [4]	2012	14	Medtronic, St. Jude Medical, Ela	<i>In vivo</i>	No	Given Imaging
Bandorski [5]	2011	49	Medtronic, Vitatron, Ela, Guidant, St. Jude Medical, Biotronik, Boston Scientific	<i>In vivo</i>	No	Given Imaging+ Olympus
Dirks [6]	2008	5	No specification	<i>In vivo</i>	No	Given Imaging
Bandorski [7]	2008	21	Medtronic, Oyupka, Siemens, Vitatron, Ela, Guidant, St. Jude Medical	<i>In vivo</i>	No	Given Imaging+ Olympus
Bandorski [9]	2006	1	Biotronik	<i>In vitro</i>	No	Given Imaging
Payeras [10]	2005	20	No specification	<i>In vivo</i>	No	Given Imaging (Test Cap)
Bandorski [11]	2005	45	No specification	<i>In vivo</i>	No	Given Imaging
Dubner [15]	2005	100	St. Jude Medical, Medtronic, Guidant, Biotronik, Sorin	<i>In vivo</i>	Yes (n=4, noise mode)	Given Imaging (Test Cap)
Guyomar [13]	2004	1	ELA	<i>In vivo</i>	No	Given Imaging
Leighton [14]	2004	5	No specification	<i>In vivo</i>	No	Given Imaging
Chung [27]	2012	3	St. Jude Medical, Medtronic	<i>In vivo</i>	No	Intramedic

Bandorski et al. Ann Gastr 2014

Table 2 Studies investigating patients with implantable cardioverter defibrillators who underwent capsule endoscopy

Author	Year	Number of patients/ ICD (n)	Brand of ICD	Kind of study	Interference	Brand of CE
Harris [3]	2013	34	n.a.	<i>In vivo</i>	No	Given Imaging
Bandorski [12]	2012	30	No specification	<i>In vivo</i>	No	Given Imaging Olympus
Cushieri [4]	2012	5	Medtronic, St. Jude Medical	<i>In vivo</i>	No	Given Imaging
Bandorski [5]	2011	11	Biotronik, Guidant, Medtronic, St. Jude Medical, Boston Scientific	<i>In vivo</i>	No	Given Imaging+ Olympus
Bandorski [16]	2009	45	Biotronik, Guidant, Medtronic, St. Jude Medical	<i>In vitro</i>	No	Given Imaging+ Olympus
Dubner [20]	2008	6 (<i>In vitro</i>)	Medtronic, St. Jude Medical, Guidant, Biotronik	<i>In vitro</i>	Yes (oversensing with inappropriate shock delivery)	Given Imaging Test Cap
		6 (<i>In vivo</i>)			No	
Pelargonio [18]	2005	1	Medtronic	<i>In vivo</i>	No	Given Imaging
Bandorski [11]	2005	8	No specification	<i>In vivo</i>	No	Given Imaging
Leighton [19]	2005	5	Guidant, Medtronic, St. Jude Medical	<i>In vivo</i>	No	Given Imaging
Chung [27]	2012	3	St. Jude Medical, Medtronic	<i>In vivo</i>	No	Intramedic

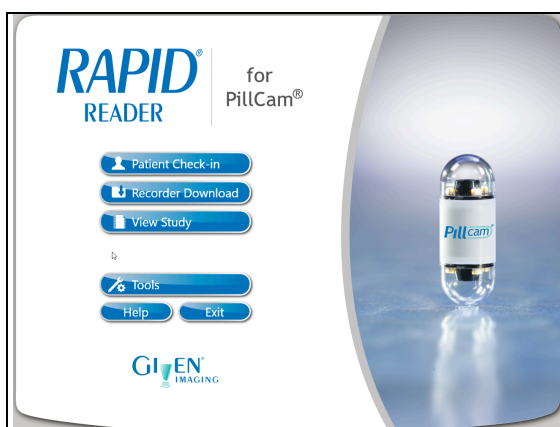
n.a., not available; ICD, implantable cardioverter defibrillator; CE, capsule endoscopy

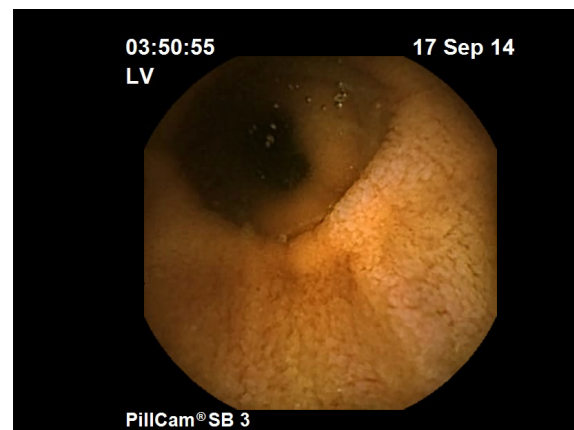
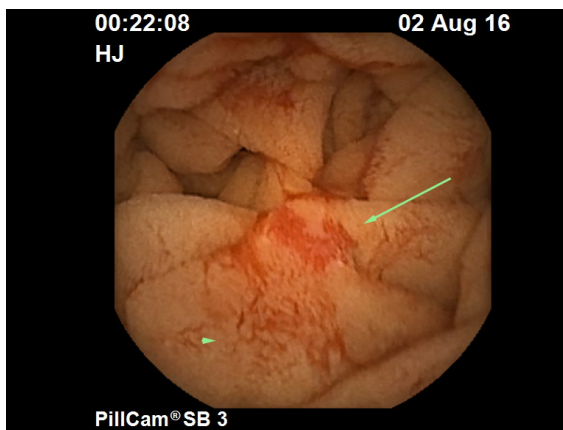
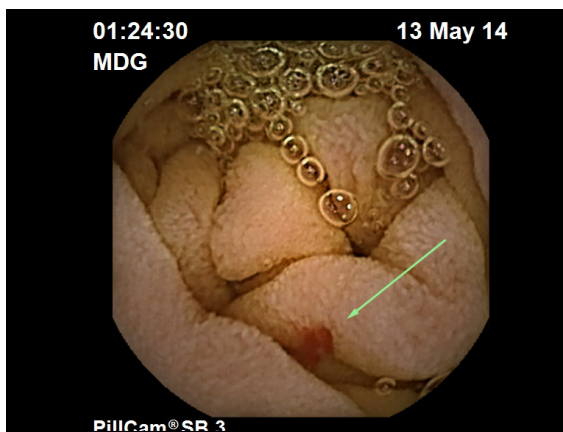
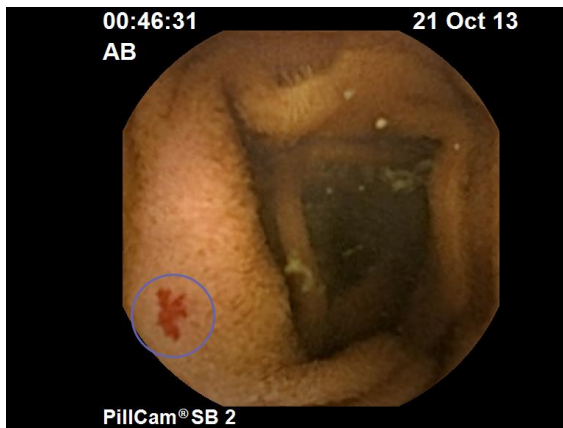
Bandorski et al. Ann Gastr 2014

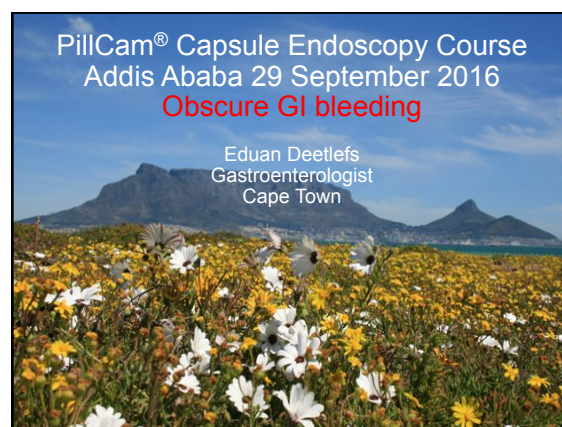
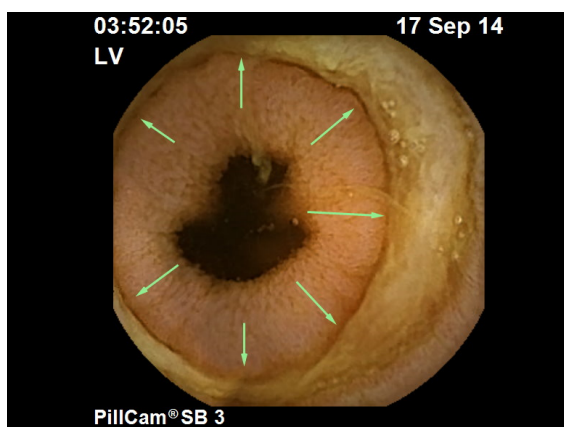
Pacemakers and ICD's

- Bottom line:
 - Individualise
 - Discuss with cardiologist
 - Consider admission/telemetry for high-risk patients

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Outline

- Definitions
- Causes
- Algorithm for management of OGIB
- Cases- my "top 10 tips"

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Obscure GI bleeding (OGIB)

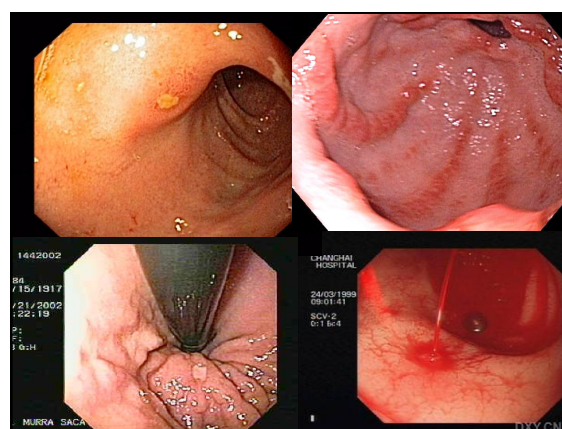
- Bleeding from the intestinal tract with a normal gastroscopy and colonoscopy
 - Including
 - Duodenal biopsies
 - Terminal ileum intubation
- Two types
 - Obscure overt: Melaena or haematemesis
 - Obscure occult: Iron deficiency anaemia
- OGIB accounts for $\pm 5\%$ of all cases of GI bleeding
 - Mostly in the small bowel

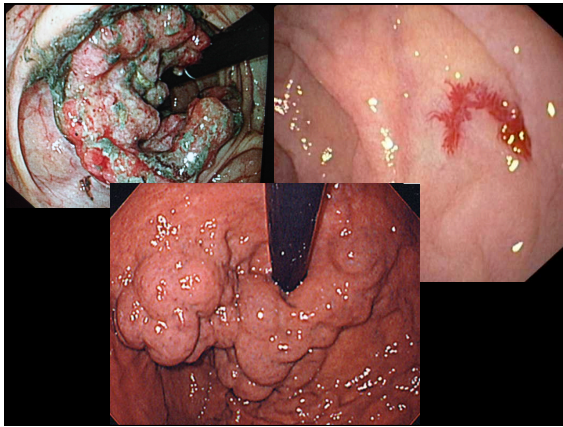
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Causes

- Missed lower and upper GI pathology
- Mid small bowel bleeding

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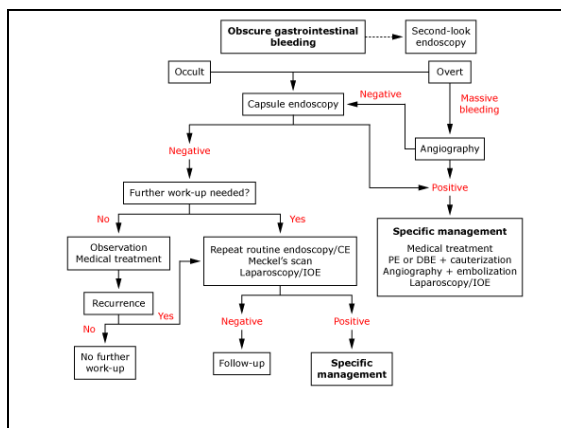


Mid small bowel bleeding

3 Groups of disorders

1. Vascular (Angiodysplasia, Dieulafoy etc)
2. Ulcers
3. Mass lesions
4. Other
 - Diverticulae
 - Meckels
 - Varices
 - Etc.

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352 Guideline

Small-bowel capsule endoscopy and device-assisted enteroscopy for diagnosis and treatment of small-bowel disorders: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline



Authors

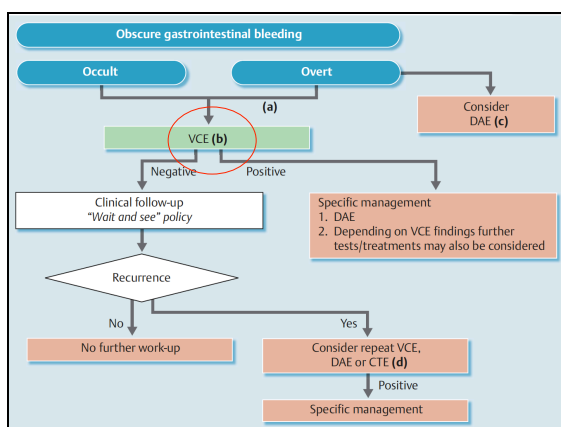
Marco Pennazio¹, Cristiano Spada², Rami Elakim³, Martin Keuchel⁴, Andrea May⁵, Chris J. Mulder⁶, Emanuele Rondotelli⁷, Samuel N. Adler⁸, Joerg Albert⁹, Peter Bales¹⁰, Federico Barbaro¹¹, Christophe Cellier¹², Jean Pierre Chertom¹³, Michel Delvaux¹⁴, Edward J. Doucet¹⁵, Dirk Domagala¹⁶, Amir Kohn¹⁷, Mark McIndoo¹⁸, Bruno Rosa¹⁹, Georgina Rowe²⁰, David S. Sanders²¹, Jean Christophe Saurin²², Reena Sidhu²³, Jean-Marc Dumonceau²⁴, Cesare Hassan²⁵, Ian M. Gralnek²⁶

Institutions

Institutions listed at end of article.

Pennazio Marco et al. Small-bowel capsule endoscopy and device-assisted enteroscopy for diagnosis and treatment... Endoscopy 2015; 47: 352–376

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ESGE recommends small-bowel video capsule endoscopy as the first-line investigation in patients with obscure gastrointestinal bleeding (strong recommendation, moderate quality evidence).

That is because CE is:

- Safe
- Well tolerated
- Complete enteroscopy
- Highly sensitive
- If positive: Directs subsequent DBE (DAE)
 - Start with antegrade/per-oral DBE if:
 - Lesion <75% of time from ingestion to first caecal image
 - Lesion >60% of time from first duodenal image to first caecal image
- If negative:
 - Good prognosis
 - Only 5% rebleeds vs (50% rebleed rate for a positive CE)

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CE yield

- Overall
 - $\pm 60\%$
- Depends on
 - Ongoing overt bleeding (**92.3%**) vs occult bleeding (**44.2%**) vs previous overt (**12.9%**)
 - Transfusion requirements: higher yield the more severe
 - Timing

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JOURNAL OF GASTROENTEROLOGY
Volume 40, Number 3 (2005), 256-259, DOI: 10.1007/s00535-004-1532-5



The role of video capsule endoscopy for evaluating obscure gastrointestinal bleeding: usefulness of early use

Giampaolo Bresci, Giuseppe Parisi, Michele Bertoni, Emanuele Tumino and Alfonso Capria

- 2 groups 32 pts each
- <15 days of OGIB onset: **91% yield**
- >15 days of OGIB onset: **34% yield**

Med Prim Pract. 2011;20(1):80-5. doi: 10.1159/000322071. Epub 2010 Dec 13.

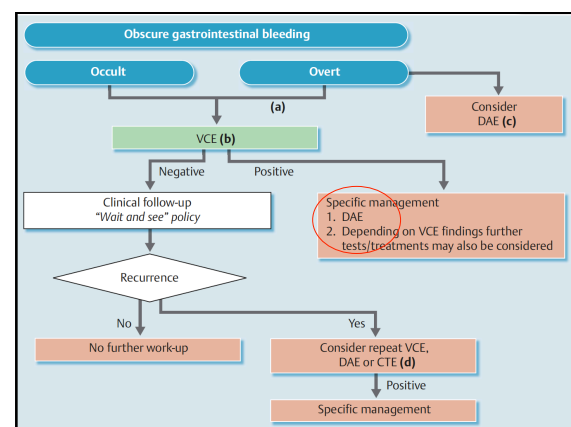
Diagnostic yield and clinical impact of capsule endoscopy in obscure gastrointestinal bleeding during routine clinical practice: a single-center experience.

Katsinelos P¹, Chatzimavroudis G, Terzoudis S, Patsis J, Fasoulas K, Katsinelos T, Kokori G, Zavos C, Vasiladis T, Kountouras J.

- Katsinelos et al
- <=10 days of OGIB onset: **87.5%**
- >10 days of OGIB onset: **11.1%**

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In patients with overt obscure gastrointestinal bleeding ESGE recommends performing small-bowel capsule endoscopy as soon as possible after the bleeding episode, optimally within 14 days, in order to maximize the diagnostic yield (strong recommendation, moderate quality evidence).



Journal of Gastroenterology and Hepatology JGHF

doi:10.1111/j.1440-1746.2010.06530.x

META-ANALYSIS AND SYSTEMATIC REVIEWS

Double balloon enteroscopy and capsule endoscopy for obscure gastrointestinal bleeding: An updated meta-analysis

Christopher W Teshima,^{a,1} Ernst J Kuipers,^{a,1} Sander Veldhuyzen van Zanten^a and Peter B F Mensink^a

^aErasmus MC University Medical Center, Department of Gastroenterology and Hepatology, and ^bInternal Medicine, Rotterdam, the Netherlands; and ^cUniversity of Alberta, Division of Gastroenterology, Edmonton, Canada

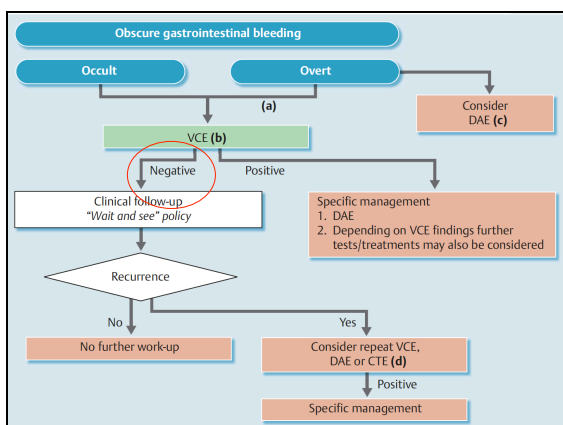
- Teshima 2011
 - Diagnostic yield:
 - CE: 62%
 - DBE: 56%
 - DBE after +ve CE: 75%
 - DBE after -ve CE: 27.5%

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CE vs DBE yield

- Similar diagnostic yield CE vs **complete enteroscopy**
- Different pathology
- DBE better for
 - Proximal lesions – disadvantages of CE
 - Moves quickly in proximal small bowel
 - Pickup depends on the direction the camera is facing
 - Only 40% of papillae seen in one study
 - Diverticular disease
 - Flat lesions
 - Small polyps <10cm
- CE better for
 - Angioectasia
 - Can disappear during enteroscopy (poor perfusion at low BP and drugs)

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What if capsule endoscopy is negative?

- No further bleeding
 - Supportive management
 - Oral or IV iron
- Recurrent bleeding/ further transfusion requirements
 - Investigate at time of active bleeding**
 - Repeat G and C
 - DBE
 - Angiography
 - CT if not done yet
- Review the diagnosis: Exclude other causes of anaemia
 - Haemolysis
 - Thalassemia
 - Myelodysplasia
 - AS: Heydes syndrome

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Risk of re-bleeding

- Obscure overt: 60%
- Obscure occult: 46%
- CE +ve 48%
- CE -ve 4.6%**
- 30-40% rebleeding rate after APC for angioectasia**

Lai LH et al. Am J Gastroenterol 2006
Carey EJ et al. Am J Gastroenterol 2007

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Case 1

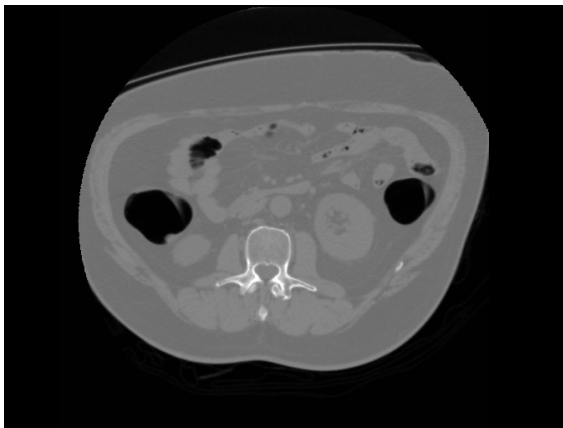
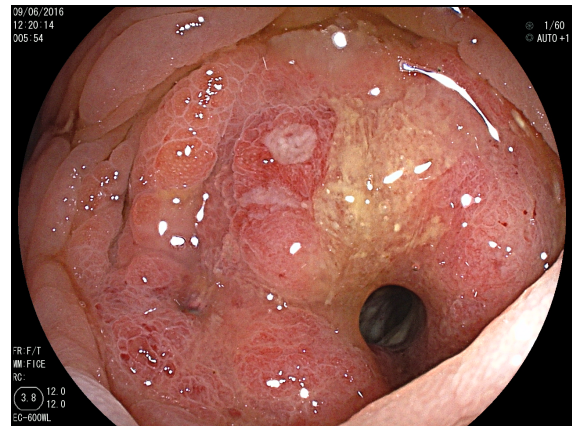
- 63 year old male
- Background medical history
 - Hypertension
 - Pre-diabetes
 - Gout
 - Mother died of colon cancer age 62
- Presented over Easter 2016 to a colleague
 - Acute onset dark and bloody stools
 - 7kg weight loss
 - Hb 8.3
 - G scope: Haemorrhagic gastritis
 - C scope: Uncomplicated diverticulosis and haemorrhoids
 - Subsequently further admissions for blood transfusions

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Case 1

- Referred to me for a small bowel capsule endoscopy May 2016
 - Normal
- Reviewing the case... **and he had a dream**
 - CT colonoscopy March 2014
 - Possible ascending colonic polyp
 - Not taken any further
 - The colonoscopy was in fact not complete- only to ascending colon
- Readmit for colonoscopy and CT abdomen....

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Tips

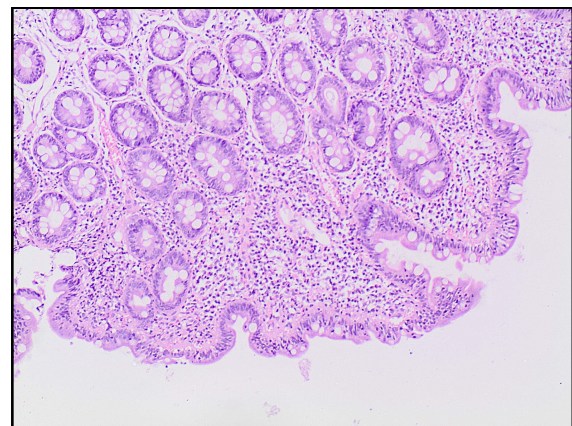
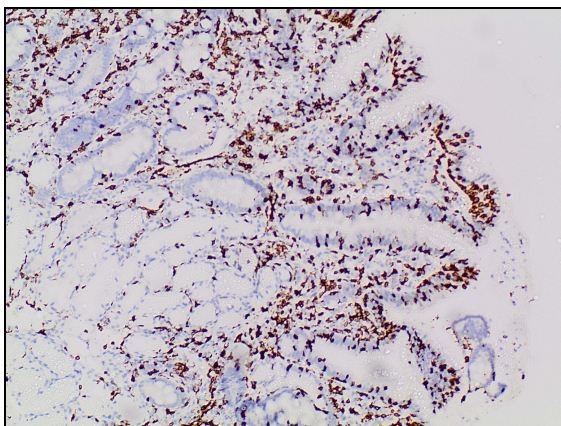
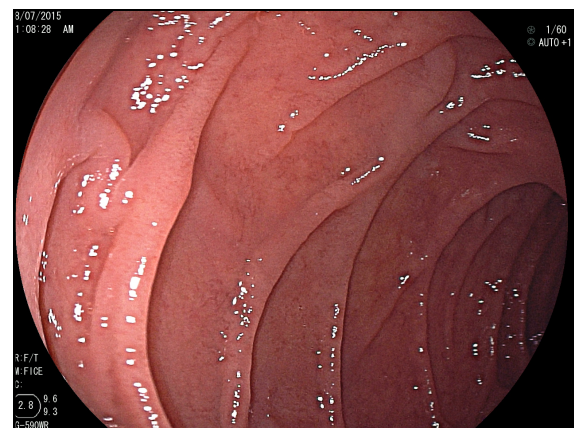
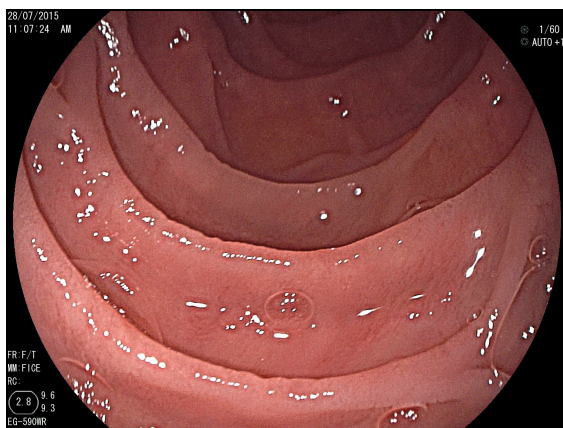
- Repeat colonoscopy if there is any doubt about whether the caecum was reached / quality
- Imaging is not an adequate substitution for an incomplete colonoscopy in obscure GI bleeding
- Always do a CT (or MRI) as part of your workup

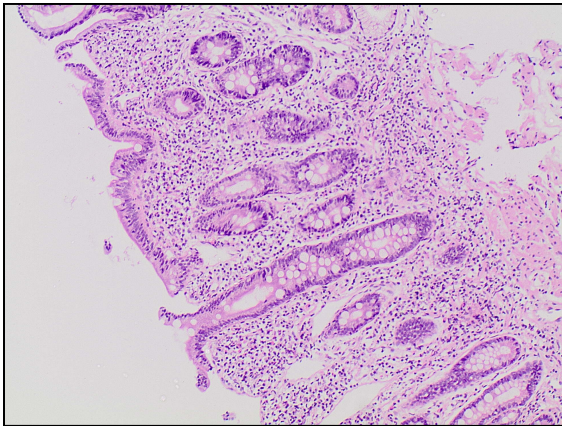
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Case 2

- 36 year old female
- No medical history
- Presenting July 2015
 - Iron deficiency since 2014 detected when tried to donate blood
 - Hb 13.2, Ferritin 7
 - Normal menses
 - No NSAIDS
- G and C scope

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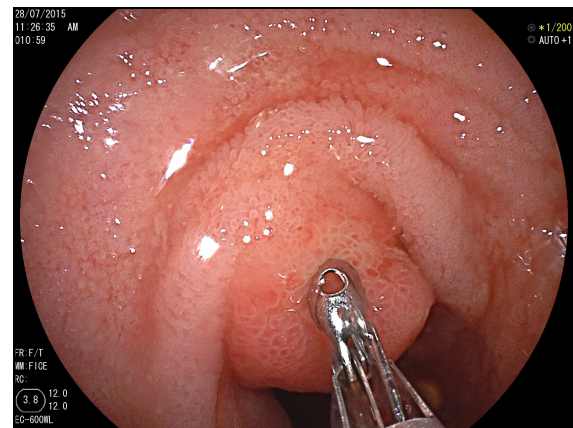
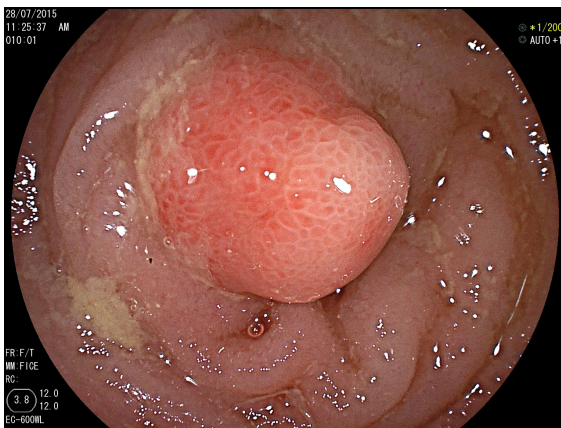




Case 2

- Coeliac disease diagnosed
 - Slightly duodenal mucosal atrophy and scalloping
 - Histology: IEL and subtotal villous atrophy (Marsh 3b)
 - Anti-TTG raised: 143 U/ml

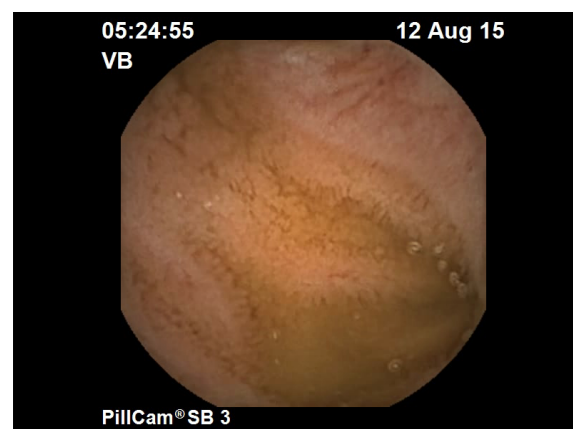
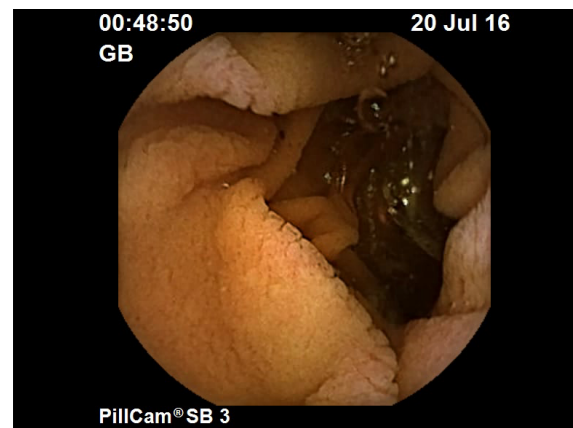
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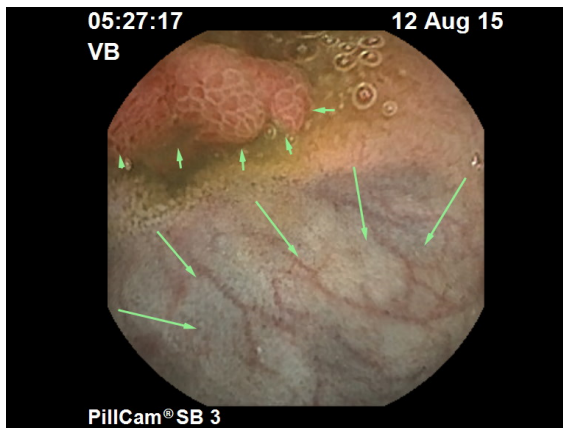


Case 2

- C scope
 - Normal colon
 - Submucosal tumour (1-2cm) in terminal ileum 5cm from the IC valve
 - **Histology: Well differentiated neuro-endocrine tumour**
- CT
 - 30 x 15mm submucosal TI tumour
 - Also entero-enteric intussusception seen proximal from the lesion

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Case 2

- Management
 - Surgical resection
 - Gluten free diet

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Tips

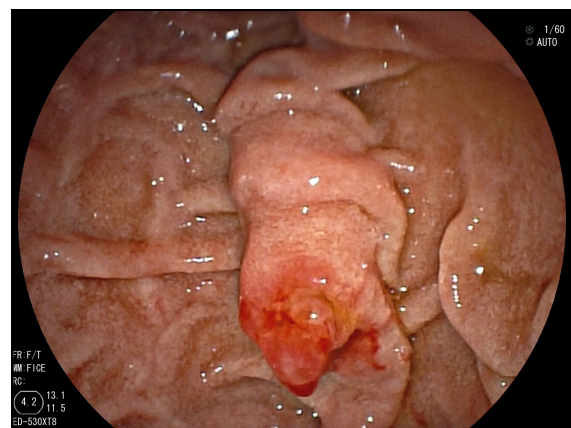
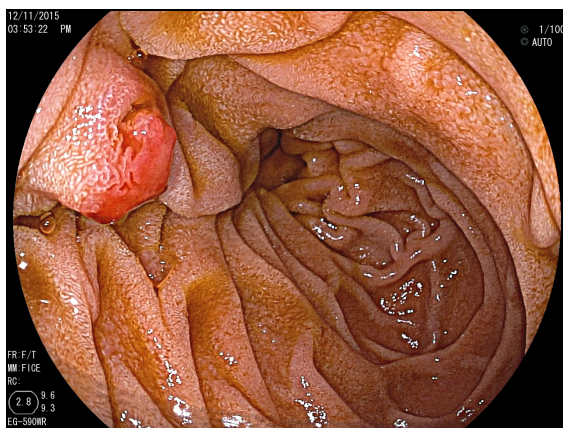
- Always take random duodenal biopsies in OGIB/IDA
- Always intubate the terminal ileum
- Look out for dual pathology

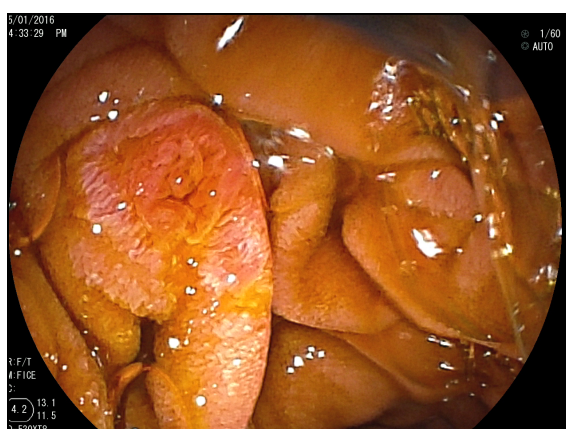
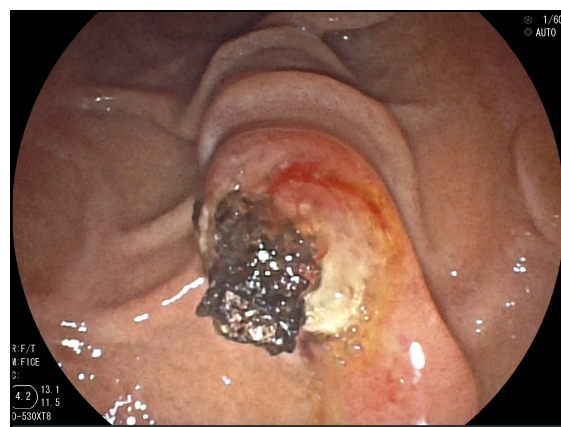
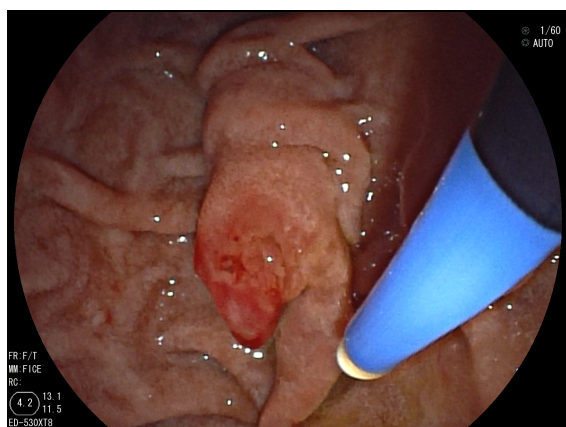
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Case 3

- 46 year old male
- Background medical history
 - Obesity
 - Type 2 diabetes mellitus
 - Hypertension
 - Dyslipidaemia
 - Renal impairment
 - Obstructive sleep apnoea on nasal CPAP
 - Right heart failure
 - Chronic venous hypertension
 - Gout
 - Previous open cholecystectomy
- Presenting November 2015
 - Decompensated heart failure
 - Iron deficiency anaemia: Hb 8.4, MCV 64, Ferritin 14
 - No overt GI bleeding

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Tips

- Duodenscope to evaluate the ampulla in some cases

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Case 4

- 68 year old lady
- Background medical history
 - Dilated cardiomyopathy and valvular heart disease
 - Hypertension
 - Scarred left kidney
 - Asthma
 - Acoustic neuroma
 - Arthritis/spondylosis
 - Gallstones
 - Family history of colon cancer

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Case 4

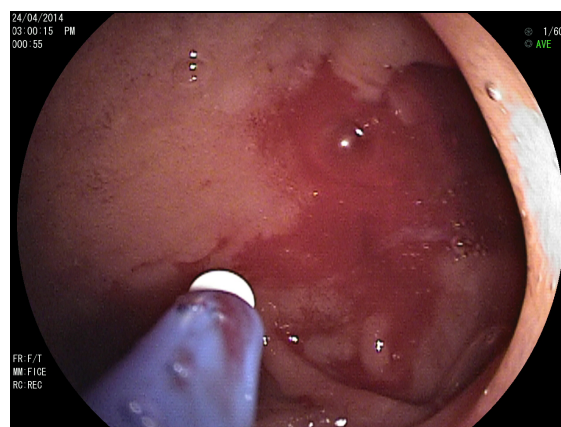
- Presenting with
 - Iron deficiency anaemia with intermittent melaena since at least 1998
 - Numerous essentially normal gastroscopies and colonoscopies over the years
 - Numerous transfusions and iron infusions
 - Normal small bowel capsule endoscopy: 2013

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Case 4

- Seen by me in 2014: Increasing transfusion requirements
- Per oral double balloon enteroscopy
 - 25% yield after previous negative capsule endoscopy
 - \pm 50% success rate cauterising angioectasia
 - Actively bleeding duodenal angioectasia: cauterised with APC

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Case 4

- Seen by me in 2014: Increasing transfusion requirements
- Per oral double balloon enteroscopy
 - 25% yield after previous negative capsule endoscopy
 - \pm 50% success rate cauterising angioectasia
 - Actively bleeding duodenal angioectasia: cauterised with APC
- Problem persisted
 - DBE: 2 (repeated x 1)
 - G scope: 4
 - Colonoscopy: 1
 - CT angiogram: 1
 - Multiple admissions: transfusions and intravenous iron

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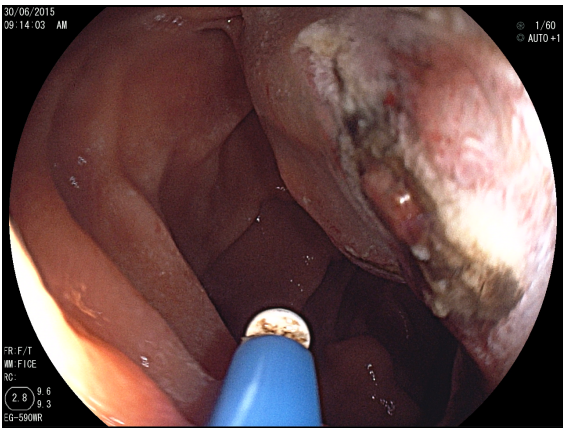
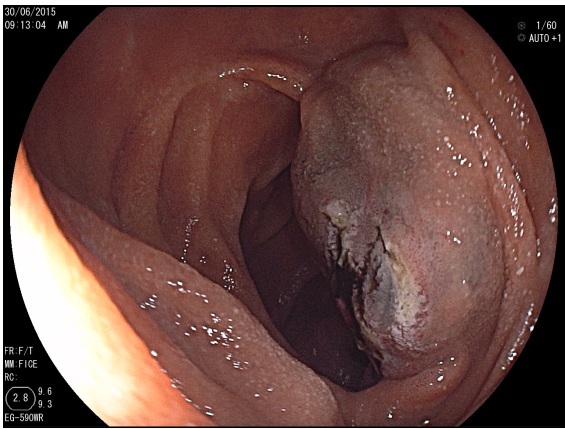
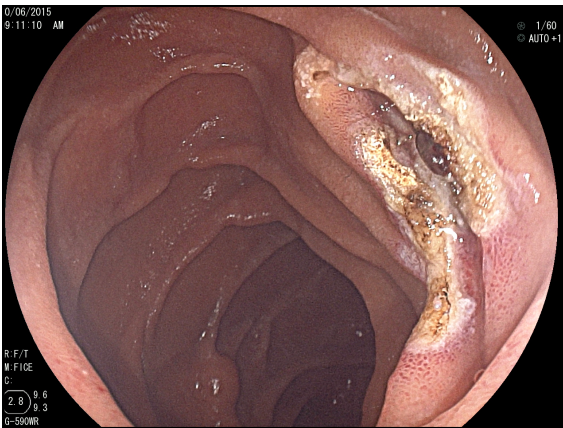
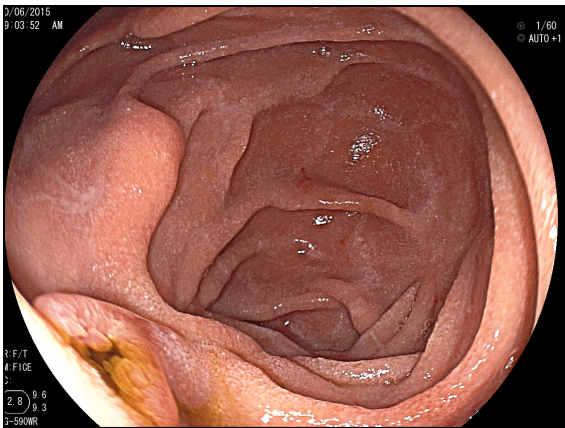
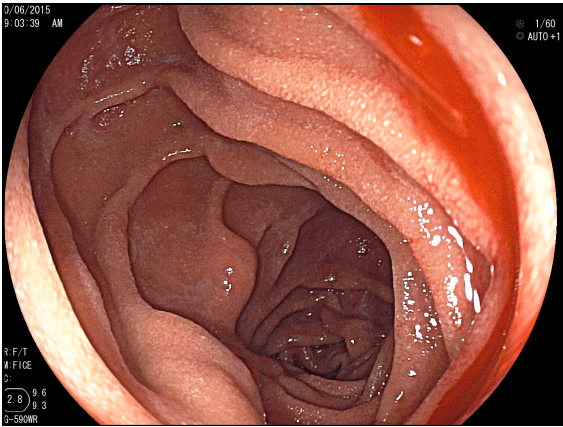
Test	24-Apr-2014 11:55 AM	15-May-2014 12:00 AM	20-May-2014 9:15 AM	02-Jun-2014 8:40 AM	19-Jun-2014 9:20 AM	23-Jun-2014 9:55 AM
Red cell count	3.12	3.65	3.47		3.16	
Haemoglobin	7.6	9.3	8.8	9.5	8.7	

	23-Jun-2014 11:00 AM	24-Jun-2014 5:35 PM	22-Jul-2014 10:20 AM	29-Jul-2014 12:21 PM	12-Aug-2014 9:05 AM	15-Aug-2014 6:10 AM	14-Sep-2014 7:30 AM
	7.9	13.4	4.48	3.97	3.35		
			13.1	11.3	9.2	13.0	11.8

	02-Jan-2015 9:49 AM	16-Mar-2015 12:00 AM	17-Mar-2015 9:00 AM	09-Apr-2015 1:20 PM	18-May-2015 12:00 AM	26-Jun-2015 9:20 AM	30-Jun-2015 8:10 AM
	4.86						3.31
	12.7	12.9	12.9	11.8	12.3	10.3	9.6

	01-Jul-2015 9:50 AM	28-Jul-2015 12:00 AM	07-Sep-2015 10:43 AM	09-Jan-2016 10:21 AM	06-May-2016 11:21 AM	04-Jun-2016 9:45 AM	05-Jul-2016 10:58 AM
	12.6	13.9	14.5	14.0	14.1	14.3	4.86
							0.46

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Tips

- Most small bowel vascular lesions occur in the duodenum and proximal jejunum: Careful evaluation \pm "Push enteroscopy"
- Lift and tattoo the vascular lesion if it is in a fold

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Case 5

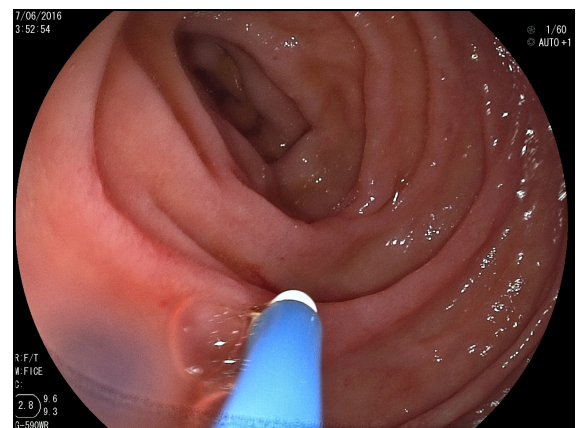
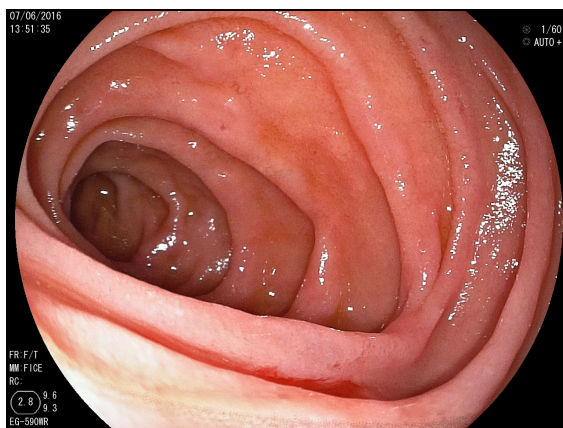
- 60 year old lady
- Background medical history
 - Insulin dependent type 2 diabetes mellitus
 - Hypertension
 - Dyslipidaemia
- Presenting 2013
 - Recurring iron deficiency anaemia and melaena
 - Multiple admissions: Transfusion and intravenous iron dependent
 - Multiple investigations normal
 - Gastroscopies: 4
 - Colonoscopies: 2
 - Duodenoscopes: 1
 - CT angiogram: 1
 - Capsule endoscopy: 1

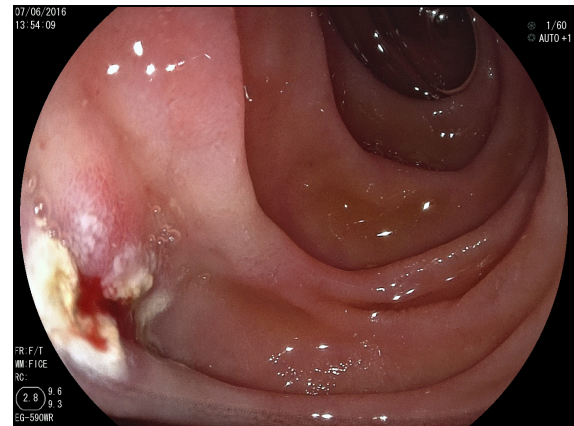
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- Then.... Effortil, Ephedrine to get systolic blood pressure > 120
..... and Heparin 3000 IU IVI

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Tips

- Try and expose the culprit lesion
 - Normalise Haemoglobin
 - Normalise blood pressure
 - \pm Heparin

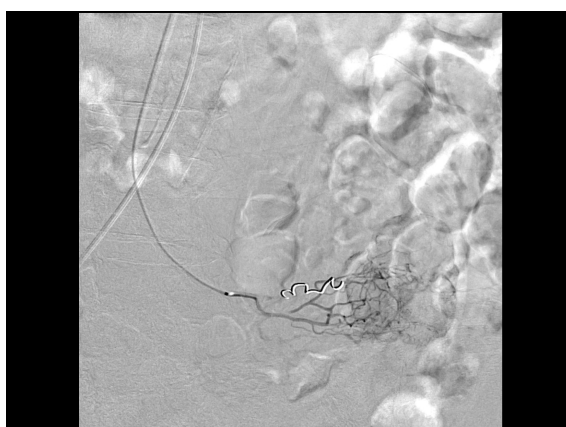
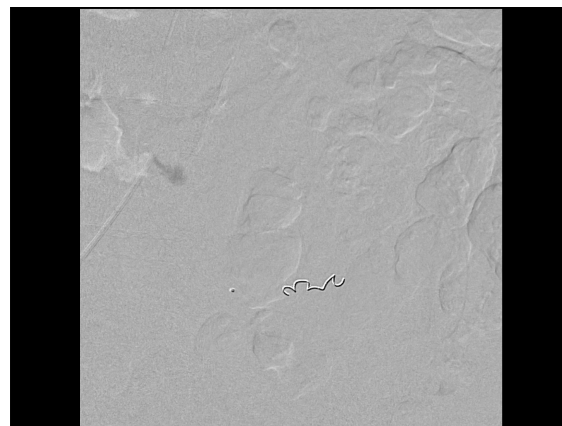
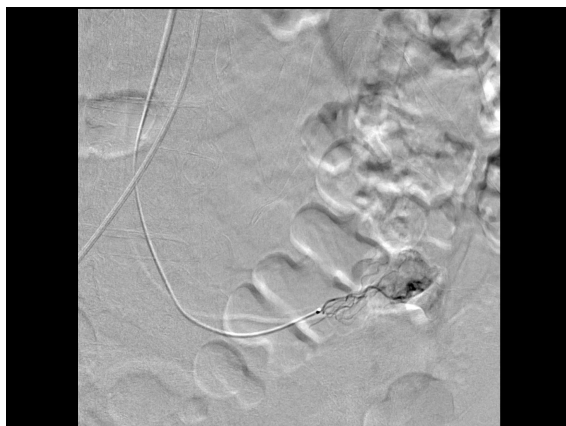
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Case 6

- 71 year old female
- Background medical history
 - Nil significant
- Presenting December 2014 (1 month after a course of NSAIDs)
 - Melaena, syncope, shocked and Hb of 5.6
 - Ongoing bleeding Hb 5.7 after 4 unit blood transfusion
 - Total of 11 units blood
 - 5 FFPs
 - CT angiogram followed by intervention

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Case 6

- Stabilised and follow-up CT angio no further bleeding
- Subsequently referred to me for a capsule endoscopy: January 2015
 - Medical aid first wanted a G + C scope: Essentially normal
- Then visited Johannesburg
 - Melaena and Hb 8.3
 - CT angiogram: apparent blush mid-jejunal loop adjacent to embolised jejunal vessel

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Case 6

- Laparotomy
 - Normal small bowel
 - Intra-operative enteroscopy via enterotomy
 - Altered blood in the caecum
 - Fresh blood in the duodenum but no mucosal lesion
 - Gastroscopy
 - Oozing Dieulafoy with attached clot in the fundus
 - Profuse bleeding when clot was removed
 - Oversewn and haemostasis was achieved
- Stabilised
- Subsequently still wanted a capsule endoscopy: Normal

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Tips

- Angiography for life-threatening small bowel bleeding
- Consider multicentric pathology

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Case 7

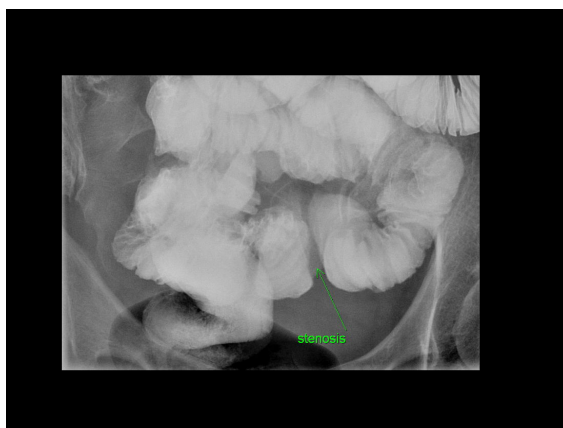
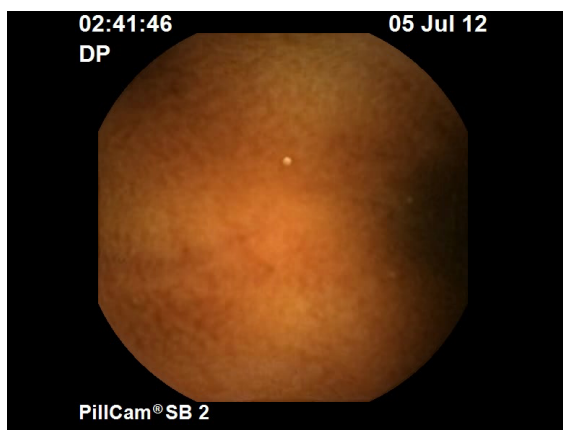
- 55 year old female
- Background medical history
 - Lap chole for acalculous cholecystitis 2011
 - Hysterectomy
 - Arthritis: Methotrexate and NSAIDs
- Presenting 2012
 - Severe intermittent abdominal pain
 - Transfusion and intravenous iron dependent IDA: progressive over 10 years

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Case 7

- Investigations
 - Normal G + C scope
 - Normal MRE
 - Normal MRCP

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NSAIDs and GIT

- Oesophagitis
- Gastritis and PUD (GU > DU)
- Small bowel ulcers
- Colitis
- Colonic webs
- Worsening: IBD and diverticulosis

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Tips

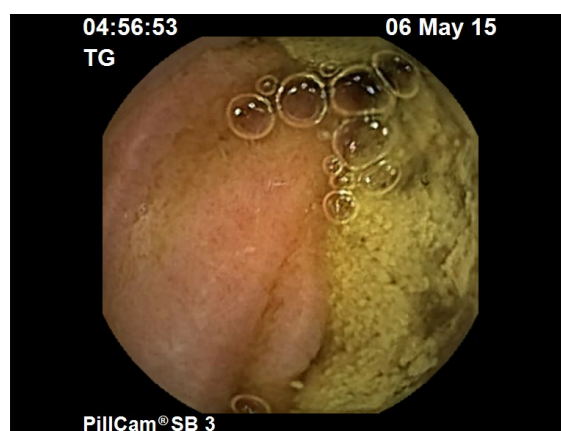
- Always use maintenance PPI therapy
- Always stop NSAIDS
...But remember PPI's don't protect against non-gastric NSAID injury

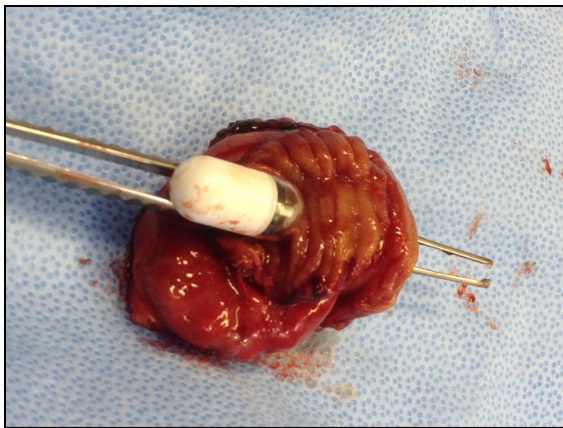
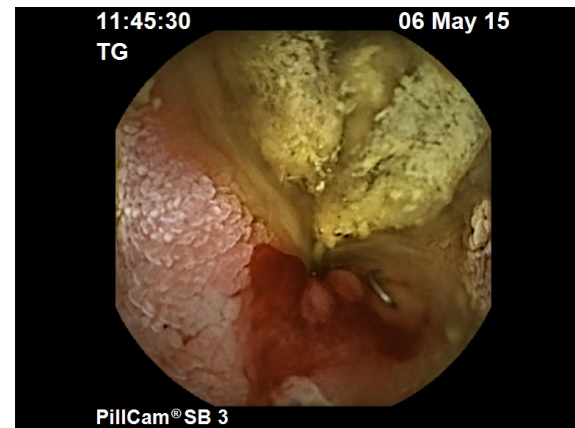
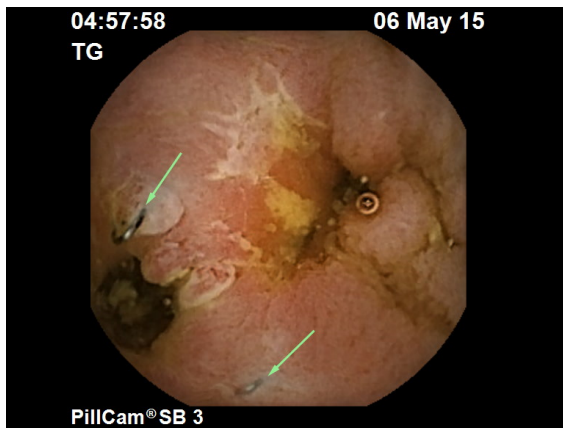
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Case 8

- 22 year old female
- Background medical history
 - Crohn's ileocolitis 2007 age 15 : ileocaecal resection
 - Further surgery November 2012
 - Optimal medical therapy: Immunomodulators and several biologics
- Presenting 2015
 - Ongoing symptoms suggestive of intermittent small bowel obstruction
 - Faecal calprotectin > 600ug/g
 - Iron deficiency anaemia: IV iron dependent
 - Colonoscopy: minimal disease only at anastomosis
 - MRE: Normal
 - SBFT: Normal

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Tips

- SBFT and MRE don't exclude obstructive small bowel lesions
- Obstructive symptoms relative contra-indication for CE

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Case 9

- 35 female
- Background medical history
 - RA diagnosed age 26
 - Methotrexate + Folic Acid
 - Chloroquine
 - Salazopyrin
 - Prednisone
 - Diclofenac rarely
- Presenting with anaemia since childhood
 - No overt GI bleeding
 - No menorrhagia
- Multiple normal gastroscopies and colonoscopies over the years... referred for another G and C

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	Cr	Hb	Red cell count	MCV	WCC	PLT	Ferritin	Iron	Trans	Sats	CRP
2007		9		63	9.1	418					
2011		8.8		66	8	500	219	9.6	1.7	23	7
2014	67	9.1		65	7.9	330					
3/2015		8.8		66	9.1	277					
6/2015		9.7	4.89	67	11	263	91	43	1.9	89	4.5

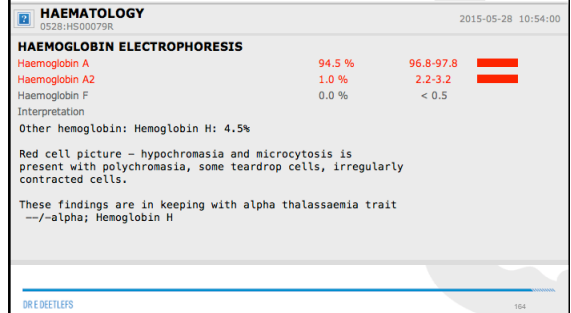
Case 9

- What is the next investigation?

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Case 9



Case 9

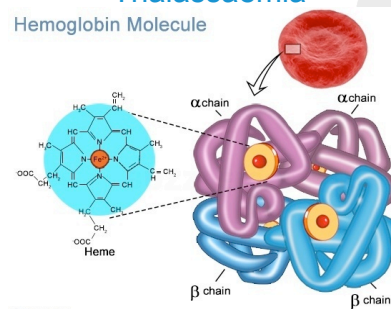
- Management
 - Reassured
 - Stopped iron
 - Cancelled repeat G + C scope
 - Continue on Folate
 - Haematology referral

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Thalassaemia

Hemoglobin Molecule



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Thalassaemia

- Autosomal recessive
- Decreased formation of globin chains of Hb
- Complications
 - Anaemia
 - Bone deformities
 - Iron overload
 - Cardiovascular

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Thalassaemia

- Alpha-Thalassaemia
 - Alpha chain: 4 genes (Chromosome 16)
 - Number of alleles affected determine severity
 - Alpha thalassaemia minima (1 gene)
 - Alpha thalassaemia minor (2 genes)
 - Haemoglobin H disease (3 genes)
 - Hydrops fetalis

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Tips

- Make sure you are dealing with an iron deficiency anaemia !

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Summary Tips

1. Make sure you are dealing with an iron deficiency anaemia: Thalassaemia etc
2. Good quality G and C scope
 - Duodenal biopsies
 - Caecal intubation (imaging is not a substitute)
 - Terminal ileum intubation
3. Duodenoscopy to evaluate some lesions
4. Most small bowel vascular lesions occur in the duodenum and proximal jejunum: Careful evaluation ± Push enteroscopy
5. Always do a CT (or MRI) as part of your workup
6. Angiography for life-threatening small bowel bleeding

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Summary Tips

7. Possible small bowel obstruction sometimes an indication rather than a contraindication to use capsule endoscopy
8. Consider multicentric and dual pathology

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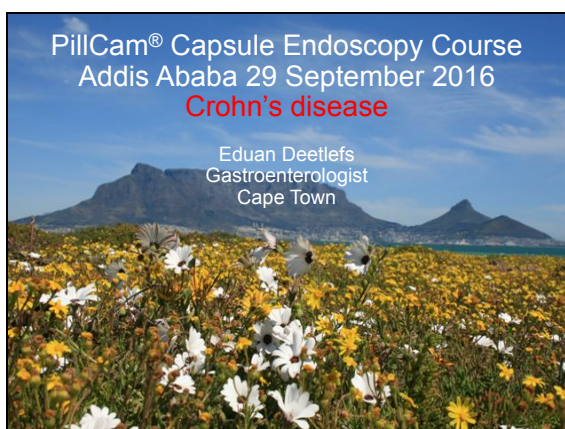
Summary Tips

9. Try and expose the culprit lesion
 - Normalise Haemoglobin
 - Normalise blood pressure
 - ± Heparin
10. Lift and mark the vascular lesion if it is in a fold
11. Always use maintenance PPI therapy
12. Always stop NSAIDS
 -But remember PPI's don't protect against non-gastric NSAID injury

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PillCam® Capsule Endoscopy Course Addis Ababa 29 September 2016 Crohn's disease

Eduan Deetlefs
Gastroenterologist
Cape Town



Background

- ± 2/3 of patients with Crohn's disease has small bowel involvement at diagnosis
- In ± 90 % of those with small bowel involvement have involvement of the terminal ileum
- Colonoscopy with terminal ileum intubation (ileocolonoscopy) is therefore the first-line investigation in suspected Crohn's disease
- But a minority of patients might have more proximal small bowel Crohn's disease ie isolated mid small bowel Crohn's
- There might therefore be a potential role for capsule endoscopy in the diagnosis and management of small bowel Crohn's disease

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Background

- CE highly sensitive for detection of small bowel Crohn's
 - **96-100%**
- Definitely superior to CT and small bowel follow-through
- May be superior to MRI enterography especially for:
 - Early lesions
 - Proximal small bowel disease

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Title

Diagnostic Accuracy of Capsule Endoscopy for Small Bowel Crohn's Disease Is Superior to That of MR Enterography or CT Enterography

Jensen MD, Nathan T, Rafaelsen SR, Kjeldsen J.
Clin Gastroenterol Hepatol 2011;9:124-129.

Table 2. Sensitivity and Specificity of CE, MRE, and CTE for the Diagnosis of CD in the Terminal Ileum With Ileoscopy and/or Surgery as Gold Standard

	CE (n = 69)	MRE (n = 72)	CTE (n = 73)
Sensitivity (%)	100 (79-100)	81 (58-95)	76 (53-92)
Specificity (%)	91 (79-97)	86 (74-94)	85 (72-93)
PPV (%)	79 (53-92)	71 (49-87)	67 (45-84)
NPV (%)	100 (93-100)	92 (80-98)	90 (78-97)
Prevalence of CD in the terminal ileum with gold standard (n)	16	21	21
False positive (n)	5	7	8
False negative (n)	0	4	5

NOTE: In patients examined with CE, MRE, and CTE, a gold standard assessment of the terminal ileum was obtained in 69, 72, and 73 patients, respectively. 95% confidence intervals are displayed in parentheses. NPV, negative predictive value; PPV, positive predictive value.

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Limitations of CE in Crohn's

- Retention
- Poor specificity
- No histology
- Only luminal examination

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CE retention in Crohn's

- Two scenarios
 - Suspected but unconfirmed Crohn's
 - With obstructive symptoms or known stenosis:
 - High risk of retention
 - Without obstructive symptoms, known stenosis or surgical resections
 - Low risk of retention 1.6% (similar to pts with OGIB)
 - Confirmed Crohn's disease
 - High risk of retention: up to 13%

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CE specificity in Crohn's

- Poor specificity
 - Only luminal examination
 - No histology
 - Many other causes of ulcers
 - NSAIDs
 - Up to 55-75% incidence of small bowel erosion or ulceration
 - Diaphragm like strictures
 - Traditional NSAIDs, COX2 inhibitors and Aspirin
 - Remember PPIs don't protect against deep small bowel injury
 - Stop at least 1/12 prior to CE study
 - Healthy individuals: minor mucosal breaks in up 5-10% (Up to 20%)
 - Many others

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Two main indications for CE in Crohn's disease

- **Suspected isolated mid-small bowel Crohn's disease after a negative ileo-colonoscopy**
- Why would you suspect it
 - Diarrhoea and abdominal pain too non-specific to warrant CE
 - But Crohn's possibly if associated with:
 - Positive faecal calprotectin
 - Raised inflammatory markers
 - Iron deficiency anaemia
 - Non-specific imaging abnormalities: CT or MRI
 - Weight loss
 - Perianal disease
 - Extra-intestinal manifestations of Crohn's
- ESGE
 - First investigation after a negative ileocolonoscopy
 - If obstructive symptoms or known stenosis
 - Do cross-sectional imaging first: CT or MRE

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Two main indications for CE in Crohn's disease

- **Established Crohn's disease at ileocolonoscopy**
 - Next investigation is cross-sectional imaging: CT or MRE
 - Extent
 - Location
 - Extra-luminal disease
 - CE next step if
 - Cross-sectional imaging unremarkable or non-diagnostic AND
 - Findings will influence management
- Always do PillCam Patency capsule before CE

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5 ESGE recommends ileocolonoscopy as the first endoscopic examination for investigating patients with suspected Crohn's disease (strong recommendation, high quality evidence).

In patients with suspected Crohn's disease and negative ileocolonoscopy findings, ESGE recommends small-bowel capsule endoscopy as the initial diagnostic modality for investigating the small bowel, in the absence of obstructive symptoms or known stenosis (strong recommendation, moderate quality evidence).

ESGE does not recommend routine small-bowel imaging or the use of the PillCam patency capsule prior to capsule endoscopy in these patients (strong recommendation, low quality evidence). In the presence of obstructive symptoms or known stenosis, ESGE recommends that dedicated small bowel cross-sectional imaging modalities such as magnetic resonance enterography/enteroclysis or computed tomography enterography/enteroclysis should be used first (strong recommendation, low quality evidence).

6 In patients with established Crohn's disease, based on ileocolonoscopy findings, ESGE recommends dedicated cross-sectional imaging for small-bowel evaluation since this has the potential to assess extent and location of any Crohn's disease lesions, to identify strictures, and to assess for extraluminal disease (strong recommendation, low quality evidence).

In patients with unremarkable or nondiagnostic findings from such cross-sectional imaging of the small bowel, ESGE recommends small-bowel capsule endoscopy as a subsequent investigation, if deemed to influence patient management (strong recommendation, low quality evidence).

When capsule endoscopy is indicated, ESGE recommends use of the PillCam patency capsule to confirm functional patency of the small bowel (strong recommendation, low quality evidence).

Scoring systems for CE in Crohn's

- **Monitoring of Crohn's is a possible future indication for CE**
 - Especially if a single capsule study can evaluate the entire GI tract
 - Stomach
 - Small bowel
 - Colon
 - Aiming for mucosal healing
- Scoring systems facilitates future CE follow-up and are not validated for diagnosis
 - Objective
 - Standardised terminology (CEST)
- Evaluate the following parameters
 - Extent of involvement
 - Severity
 - Type of involvement: Inflammatory, stricturing
- CEDAI and Lewis scores

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CEDAI

Table 1. Capsule Endoscopy-Related Crohn's Disease Activity Index. The criteria used to calculate the CEDAI are summarized. The score is based on the sum of an assessment of the severity of mucosal inflammatory changes (parameter A) in the proximal and distal small intestine weighted for extent (parameter B) and the presence of associated structuring complications (parameter C).

Segment	A: Inflammation (0-5)	B: Extent (0-3)	C: Strictureing (0-3)	CEDAI Score
Proximal (section 1)	0 = none 1 = mild-moderate edema/hyperemia/denudation 2 = severe edema/hyperemia/denudation 3 = small ulcer (<5 mm) 4 = moderate ulcer (5-20 mm) 5 = large ulcer (>20 mm)	0 = none 1 = focal 2 = patchy 3 = diffuse	0 = none 1 = single (passed) 2 = multiple (passed) 3 = obstructing	A1 × B1 + C1
Distal (section 2)	0 = none 1 = mild-moderate edema/hyperemia/denudation 2 = severe edema/hyperemia/denudation 3 = small ulcer (<5 mm) 4 = moderate ulcer (5-20 mm) 5 = large ulcer (>20 mm)	0 = none 1 = focal 2 = patchy 3 = diffuse	0 = none 1 = single (passed) 2 = multiple (passed) 3 = obstructing	A2 × B2 + C2
Total				Total section 1 + section 2

CEDAI: Capsule Endoscopy-Related Crohn's Disease Activity Index. Reprinted with permission from [3].

Image courtesy of: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2811111/>

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Lewis Score

Lewis score

Small bowel segmentation

Parameters	Descriptors		
Villi	Normal/ edematous	Short/long/ whole tertile	Single/patchy/ diffuse
Ulcers	Non/single/ few/multiple	Short/long/ whole tertile	<25%, 25%-50%, >50%
Stricture	Non/single/ few/multiple	Ulcerated/ non-ulcerated	Traversed/non- traversed

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Journal of Crohn's and Colitis (2012) 6, 492–497

Available online at www.sciencedirect.com

SciVerse ScienceDirect

ELSEVIER

JCC

Lewis Score: A useful clinical tool for patients with suspected Crohn's Disease submitted to capsule endoscopy

Bruno Rosa*, Maria João Moreira, Ana Rebelo, José Cotter

- Performance
 - Positive Predictive value: 82.6%
 - Negative Predictive value: 87.9%
 - Sensitivity: 82.6%
 - Specificity: 87.9%
- 3 bands
 - Insignificant disease: **135**
 - Mild disease: **135-790**
 - Moderate and severe disease: **> 790**

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