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## Minimally-invasive imaging of the small intestine

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# APPENDICES



# Appendix A1

## MR enteroclysis in small-intestinal diverticulitis

Stijn J. B. Van Weyenberg, MD<sup>1</sup>, Chris J. J. Mulder<sup>1</sup>,  
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*Clin Gastroenterol Hepatol* 2010;8:e123.

## Summary

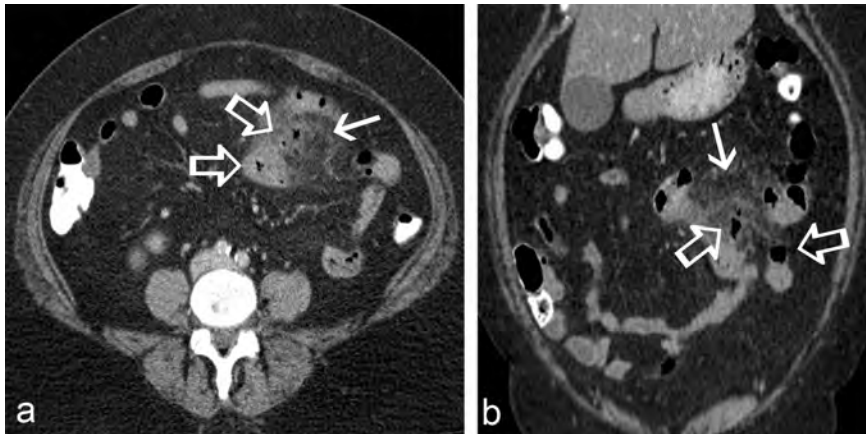
Small-bowel diverticula are rare, and usually asymptomatic. If inflammation occurs, this presents in the same fashion as in colonic diverticulitis. Multiple radiologic imaging methods have been described in the diagnosis of small-bowel diverticulitis, but often these do not inform on the extent and location of small-bowel diverticula. A case of jejunal diverticulitis is presented, where MR enteroclysis was used to depict the presence and extent of small-bowel diverticula.

A 55-year old female patient was referred to our hospital because of severe abdominal pain, diarrhoea and fever. On physical examination she was febrile with a temperature of 39.5°C and had diffuse abdominal pain with rebound tenderness. Her laboratory studies showed a C-reactive protein level of 248 mg/L. Contrast-enhanced abdominal computed tomography (CT) (*figure A1.1*) showed thickening of the proximal jejunal bowel wall with infiltration of the mesenteric fat and multiple extraluminal air bubbles surrounding this area, some of which were possibly in contact with the small-bowel lumen.

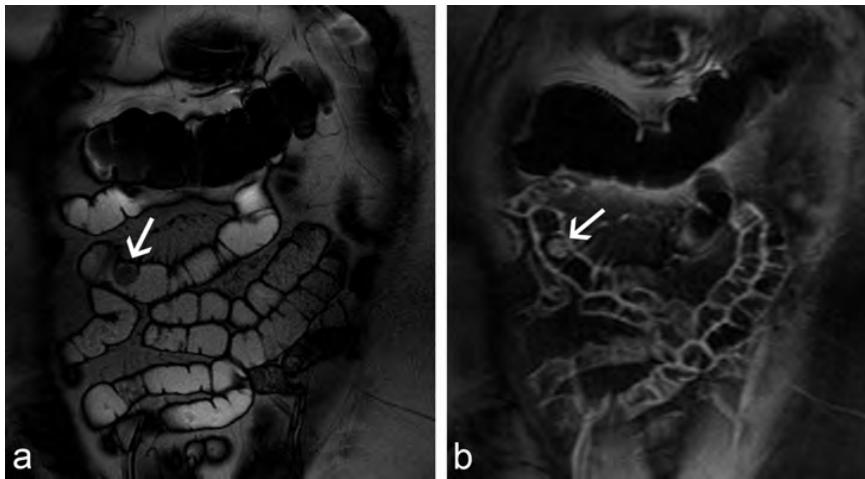
On the basis of these CT findings, jejunal diverticulitis with possible walled-off perforation was suspected, although other causes of small-bowel perforation could not be excluded. Treatment with broad spectrum antibiotics (ceftriaxone and metronidazole) was commenced, after which the patient's condition improved quickly. After one week of antibiotic treatment she was discharged. In four weeks C-reactive protein levels returned to normal values.

Seven weeks after presentation, MR enteroclysis was performed to investigate the presence of jejunal diverticula and to define the regions of the small bowel affected (*figure A1.2*). MR enteroclysis showed multiple diverticula in the jejunum, but without small-bowel wall thickening or mesenteric lymphadenopathy, confirming the initial diagnosis of jejunal diverticulitis.

The incidence of diverticula in the small intestine distal to the duodenum is reported to be between 0.06% and 2.3%.<sup>1</sup> Usually, these diverticula are asymptomatic. Inflammation of jejunal diverticula presents in the same fashion as in colonic diverticulitis. History taking and physical examination allow no discrimination between these two entities. Multiple radiologic imaging methods have been described in the diagnosis of small-bowel diverticulitis.<sup>2,3</sup> Small-bowel radiography with oral barium, or barium delivered by means of a jejunal catheter, is able to depict small-bowel diverticula, but it usually does not provide



**Figure A1.1:** CT images obtained during admission. (a) Transverse section and (b) reconstructed coronal section show thickening of the proximal jejunal bowel wall slight infiltration of the mesenteric fat (arrows) and multiple extraluminal air bubbles surrounding this area (open arrows), some of which were possible in contact with the small-bowel lumen.



**Figure A1.2:** MR enteroclysis images obtained 7 weeks after initial presentation. (a & b) Coronal sections show multiple diverticula in the jejunum (arrows) without small bowel wall thickening or mesenteric lymphadenopathy.

information on mural, serosal or mesenteric involvement. Although abdominal ultrasound is able to demonstrate extraluminal air and hyperechoic fat, it does not inform about the extent of small-bowel diverticula. Conventional abdominal CT with oral contrast may allow a specific diagnosis of small-bowel diverticulitis. However in the absence of clearly depicted small-bowel diverticula, as was the case in our patient, inflammation in and around small-bowel loops cannot be distinguished from other conditions such as small-bowel Crohn's disease and small-bowel malignancies. Cross-sectional enteroclysis techniques are able to depict not only the presence and extent of small-bowel diverticula, but also its inflammatory complications such as bowel wall thickening, mesenteric fat infiltration and perforation.

## References

- 1 Sibille A, Wilcox R. Jejunal diverticulitis. *The American journal of gastroenterology*. 1992;87(5):655-8.
- 2 Greenstein S, Jones B, Fishman EK, Cameron JL, Siegelman SS. Small-bowel diverticulitis: CT findings. *AJR American journal of roentgenology*. 1986;147(2):271-4.
- 3 Kelekis AD, Poletti PA. Jejunal diverticulitis with localized perforation diagnosed by ultrasound: a case report. *European radiology*. 2002;12 Suppl 3:S78-81.







## Appendix A2

# MR enteroclysis of an ileal polypoid angiodysplasia

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*Gastroenterology* 2012;142:e3–4.

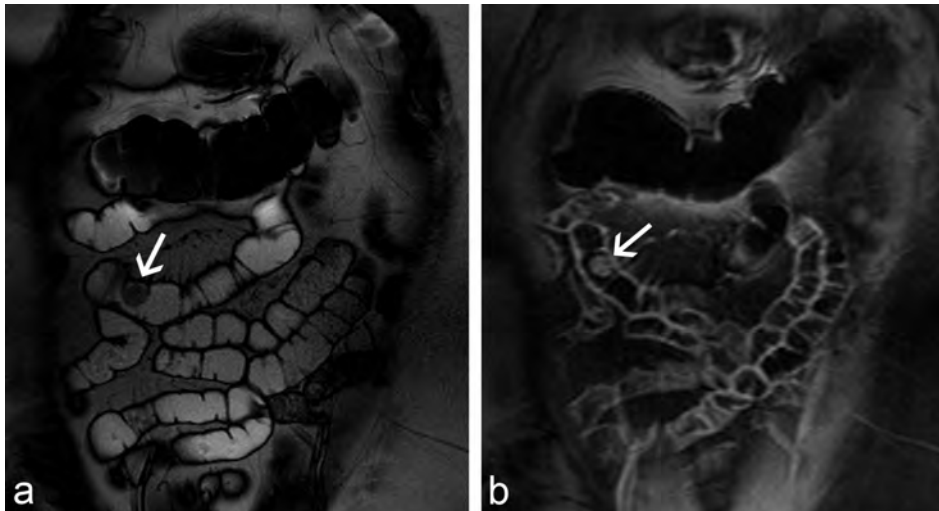
## Abstract

A 57-year-old woman was referred for analysis of iron-deficiency anaemia. Because oesophagogastroduodenoscopy, ileocolonoscopy and video capsule endoscopy revealed no cause, MR enteroclysis was performed. MR enteroclysis depicted a mass lesion in the ileum, the presence of which was confirmed with double-balloon endoscopy. Surgical resection was carried out. Histopathologic analysis proved this lesion to be a polypoid angiodysplasia.

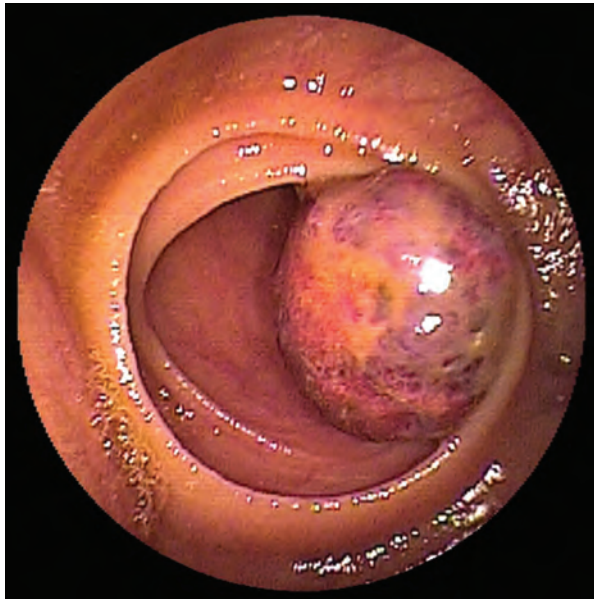
A 57-year-old woman was referred for analysis of iron-deficiency anaemia. Five months earlier she had undergone right lower lobectomy for stage 1a non-small cell lung cancer. She did not experience melaena or rectal blood loss, nor were there any other abdominal symptoms. Except for a thoracotomy scar, physical examination was unremarkable. Her laboratory studies showed an haemoglobin of 6.7 mmol/L. Mean corpuscular volume was 71 fl and serum ferritin was 11 ng/mL. Oesophagogastroduodenoscopy showed no abnormalities, whereas ileocolonoscopy revealed mild diverticulosis of the sigmoid, without signs of inflammation. To investigate a possible bleeding cause in the small intestine, video capsule endoscopy (VCE) was performed. The complete small intestine was visualized, but no abnormalities were found.

Because of a persisting suspicion of small-intestinal bleeding, MR enteroclysis was performed. This revealed a 2.5 cm large mass located in the proximal ileum (*figure A2.1*). Per-oral double-balloon endoscopy was performed, which located a round sessile lesion approximately 3 meter from Treitz' ligament (*figure A2.2*). Biopsy specimens were obtained and the proximity of the lesion was marked with submucosal Indian ink.

The biopsy specimens obtained during double-balloon endoscopy showed normal small-intestinal mucosa. In order to establish a histological diagnosis and to remove the most likely source of the ongoing obscure midgastrointestinal bleeding a laparoscopic resection of the lesion was performed. Using the endoscopic tattoo as guidance, approximately 25 cm of proximal ileum was resected (*figure A2.3*). Histopathologic evaluation showed the lesion consisted of dilated vessels with irregular thickened walls, rendering a diagnosis of polypoid angiodysplasia (*figure A2.4*). Post-operative recovery was uneventful. The anaemia resolved and has not recurred two years after the resection.



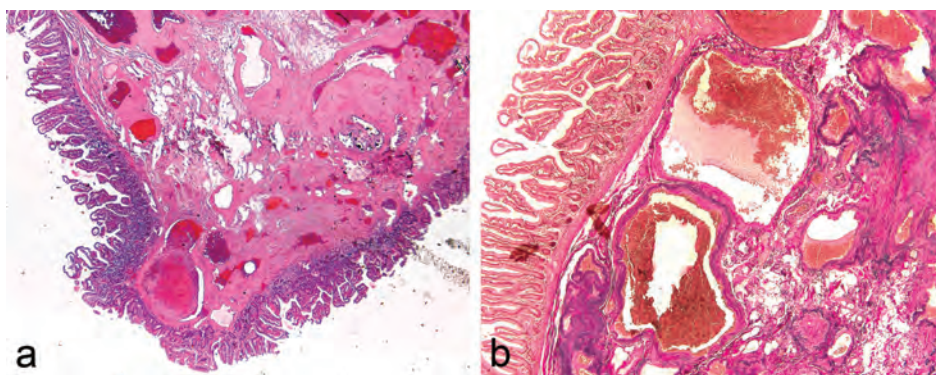
**Figure A2.1:** MR enteroclysis images. (a) Coronal true FISP image shows a mass lesion in the ileum (arrow). (b) Coronal volumetric interpolated breath hold examination (VIBE) image, obtained after intravenous administration of gadolinium shows the lesion is highly vascular (arrow).



**Figure A2.2:** DBE image shows the round and vascular lesion.



**Figure A2.3:** Photograph of the surgically resected part of the ileum. The tumour, which now appears less engorged when compared to the endoscopic appearance, is surrounded by blue discolouration, which is the result of the tattoo that was placed during endoscopy to guide surgical resection. Large ticks at the scale are 0.5 cm.



**Figure A2.4:** Histopathology specimens. (a) H&E stain shows the lesion is covered with normal appearing mucosa. (b) Elastic Van Gieson stain shows dilated vessels with irregular thickened walls.

The differential diagnosis of mass lesions in the small intestine includes both malignant as benign conditions. Malignant neoplasms can be either primary lesions, such as adenocarcinoma, lymphoma, neuroendocrine tumours and gastrointestinal stromal tumours, or metastases, of which lobular breast cancer, malignant melanoma and lung cancer are the most prevalent causes.<sup>1</sup> Benign small-intestinal neoplasms include neoplastic polyps, inflammatory fibroid polyps and vascular malformations. Vascular malformations of the small intestine are usually small and flat angioectasia. Polypoid vascular lesions are much more rare, and are usually haemangioma, which are characterized by thin-walled blood vessels.<sup>2</sup> In contrast, the vascular lesion of our patient consisted of dilated vessels with irregular thickened walls, rendering a more general histological diagnosis of polypoid angiodysplasia.

Small-intestinal mass lesions can be missed with VCE, so dedicated cross-sectional small-bowel imaging should be considered when the clinical suspicion of a possible mass is high, but VCE is negative.<sup>3</sup>

## References

- 1 Van Weyenberg SJ, Van Waesberghe JH, Ell C, Pohl J. Enteroscopy and its relationship to radiological small bowel imaging. *Gastrointest Endosc Clin N Am.* 2009;19(3):389-407.
- 2 De Palma GD, Aprea G, Rega M, Masone S, Simeoli I, Cutolo P, et al. Polypoid vascular malformation of the small intestine. *Gastrointest Endosc.* 2007;65(2):328-9; discussion 9.
- 3 Huprich JE, Fletcher JG, Fidler JL, Alexander JA, Guimaraes LS, Siddiki HA, et al. Prospective blinded comparison of wireless capsule endoscopy and multiphase CT enterography in obscure gastrointestinal bleeding. *Radiology.* 2011;260(3):744-51.



# Appendix A3

## Video capsule endoscopy in jejunal pseudomelanosis

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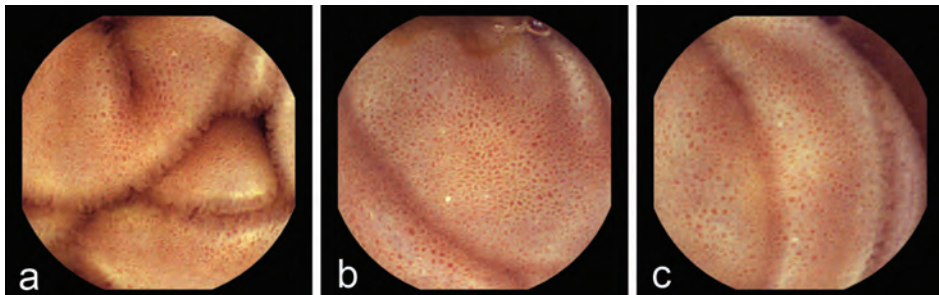
*Dig Liver Dis 2012;44:355.*



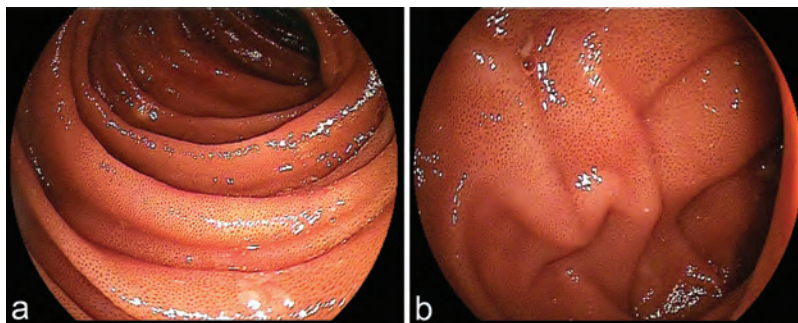
## Abstract

Pseudomelanosis refers to discolouration of the gastrointestinal mucosa caused by pigment deposition. Most often, these depositions occur in the colon, and are caused by oral iron therapy or anthraquinone laxatives. Pseudomelanosis of the small intestine is rare. A case of jejunal pseudomelanosis found during the investigation of midgastrointestinal bleeding is presented.

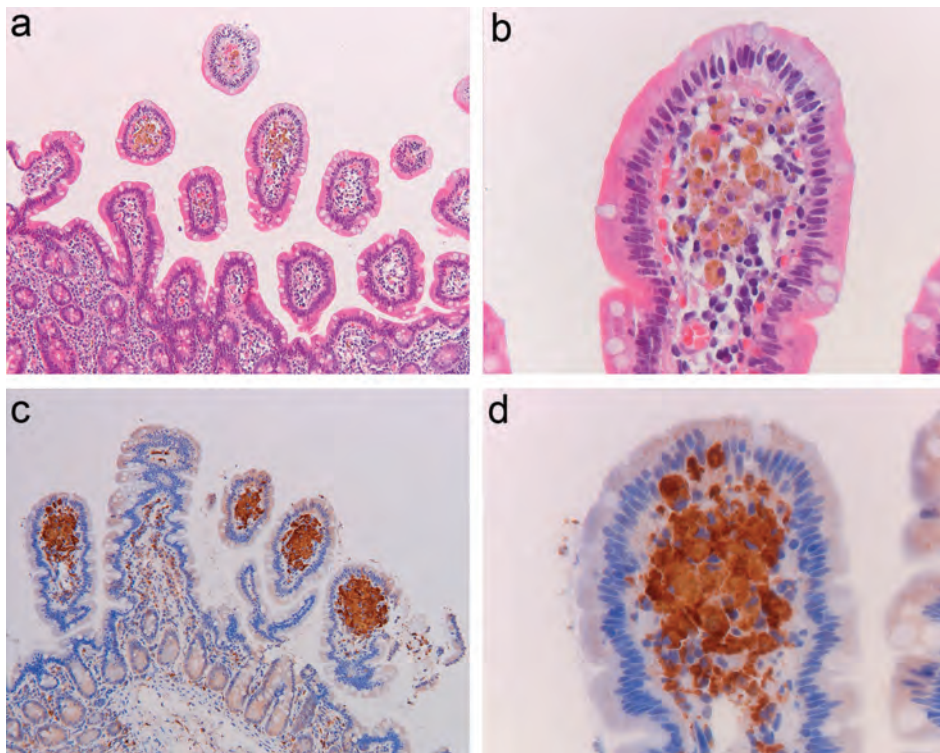
A 91-year old man with chronic renal failure attributed to longstanding hypertension presented with rectal blood loss and haemodynamic instability. Medications included furosemide and hydrochlorothiazide. Oesophagogastroduodenoscopy was normal and ileocolonoscopy showed fresh blood in the colon and terminal ileum, without a focus being identified. Because of suspected midgastrointestinal bleeding, video capsule endoscopy (VCE) was carried out. VCE depicted a speckled pattern of brownish hyperpigmentation, beginning shortly after the pylorus and extending into the deep jejunum (*figure A3.1*). The caecum was not reached during battery lifetime, and no bleeding source was observed. Per-oral double-balloon endoscopy (DBE) was performed. The findings observed with VCE were confirmed and extended up to 1.5 meter in the mid jejunum (*figure A3.2*). Jejunal biopsy specimens showed brown pigment deposition within the apical part of otherwise normal villi, consistent with a diagnosis of jejunal pseudomelanosis (*figure A3.3*). Immediately after per-oral DBE, per-anal DBE was performed, which revealed arterial bleeding from apparent normal mucosa in the distal ileum. This suspected Dieulafoy's lesion was successfully treated with endoclips, after which no further bleeding was observed. Pseudomelanosis of the small intestine is a very rare, but harmless condition, characterized by pigment depositions, which are often



**Figure A3.1:** VCE images. (a–c) Speckled hyperpigmentation in the jejunum.



**Figure A3.2:** DBE images. (a) Overview of the jejunal hyperpigmentation. (b) Mucosal detail.



**Figure A3.3:** Histopathology images. (a) H&E stain of jejunal biopsy specimens show brown pigment deposition within the apical part of otherwise normal villi. (b) H&E stain detail. (c) CD68-stain show the pigment is included in macrophages. (d) CD68-stain detail.

attributed to oral iron therapy or anthraquinone laxatives.<sup>1</sup> Our patient never used either of these, but pseudomelanosis is also associated with sulphur-containing antihypertensive drugs and end-stage renal disease, although the exact cause of this relationship is not clear. There is no relation between the observed bleeding in the terminal ileum and the proximal small-intestinal pseudomelanosis.

## Reference

- 1 Giusto D, Jakate S. Pseudomelanosis duodeni: associated with multiple clinical conditions and unpredictable iron stainability - a case series. *Endoscopy*. 2008;40(2):165-7.





# Appendix A4

## Video capsule endoscopy in a patient with a retained blister pack — a pill for cholesterol and a capsule for bleeding

Brendan P. Halloran<sup>1</sup>, Fred J. Stam<sup>2</sup>, Stijn J. B. Van Weyenberg<sup>2</sup>

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*Dig Liver Dis 2012;44:e20.*

## Abstract

Foreign body ingestion can be either intentional or accidental. Often, problems occur when the foreign body is still in the upper part of the gastrointestinal tract. However, sometimes symptoms only develop when the foreign body is already in the small intestine. A case of unintentional foreign body ingestion, of which the patient had not been aware and that led to small-intestinal bleeding, is presented.

A 77-year old male patient was admitted with melaena and fatigue. Past medical history included hypertension-related chronic renal failure and sick sinus syndrome with pacemaker insertion. Medication use included simvastatin and acenocoumarol. At admittance, haemoglobin was 3.1 mmol/L and INR was > 7.5. Conventional upper and lower endoscopy did not reveal the bleeding source. Therefore video capsule endoscopy was performed to evaluate the small intestine.

Two hours after passage of the pylorus, a tablet still within its blister packing was visualised (*figure A4.1*). From a different angle, the lettering of the blister pack showed it contained a tablet of simvastatin 40 mg (*figure A4.2*).

Since it was not clear whether or not the blister packing was lodged in the small bowel wall, bi-directional double-balloon endoscopy was performed, which revealed no retention of the blister pack or any other obvious source of gastrointestinal bleeding.

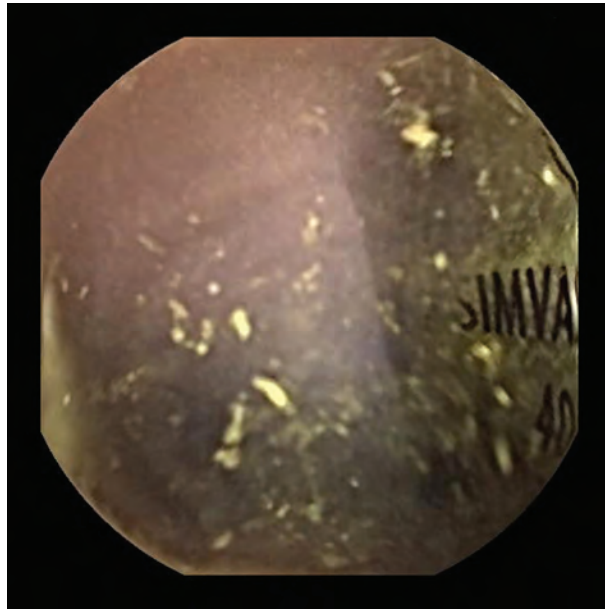
The patient could not remember ingesting a blister pack. Probably, this foreign body resulted in midgastrointestinal bleeding due to over-anticoagulation. During admission, no further bleeding occurred. He was discharged in a good clinical condition, with a haemoglobin level of 6.4 mmol/L and a cholesterol level of 5.1 mmol/L.

Small-intestinal complications resulting from ingested blister packs have been reported earlier.<sup>1</sup> Capsule endoscopy findings from blister pack ingestion have not been reported previously.



**Figure A4.1:** VCE image shows a tablet still within its blister packing.





**Figure A4.2:** VCE image shows the blister pack contained a tablet of simvastatin 40 mg.

## Reference

- 1 Fulford S, Tooley AH. Intestinal perforation after ingestion of a blister-wrapped tablet. *Lancet*. 1996;347(8994):128-9.





# Appendix A5

## Video capsule endoscopy in lymphoid hyperplasia of the terminal ileum

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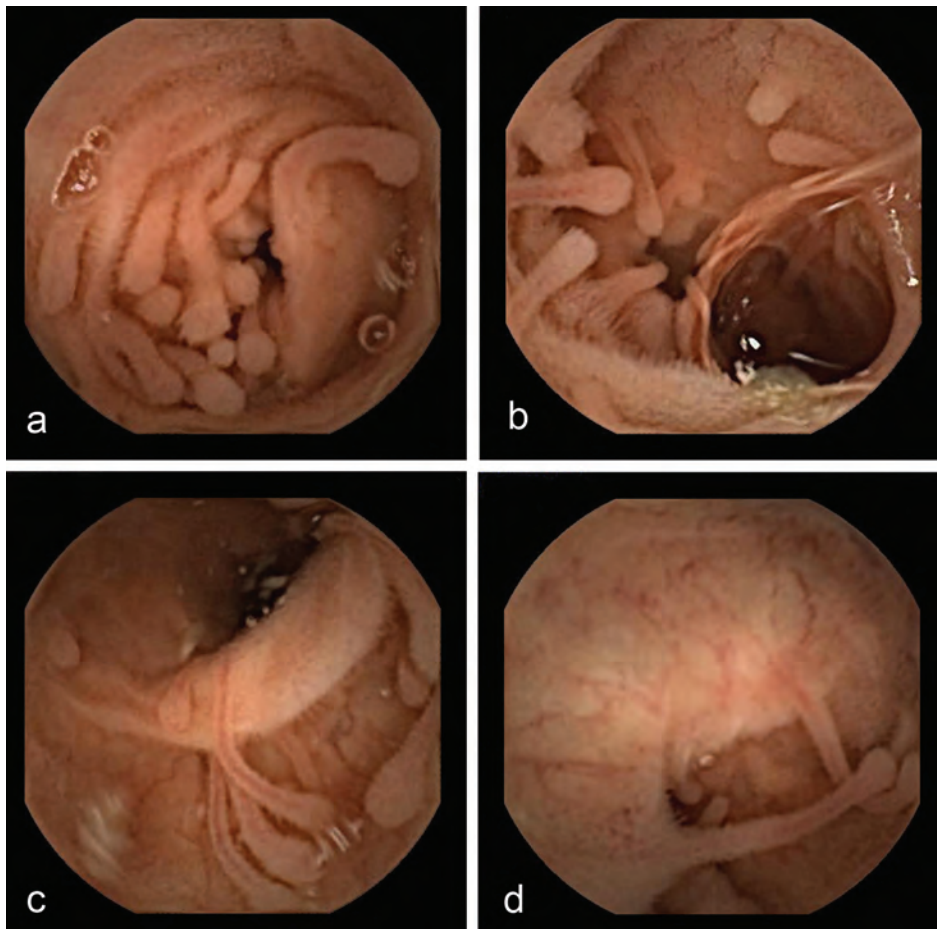
*VJGIE 2013;1:268.*

## Abstract

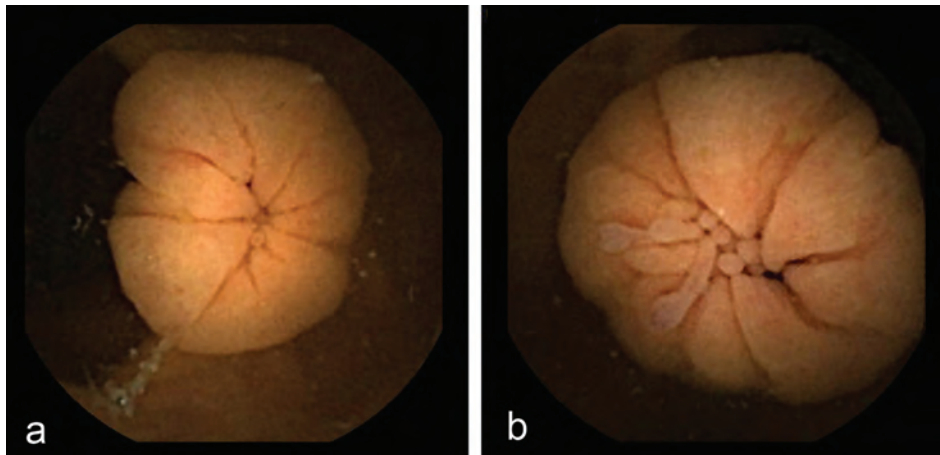
The terminal ileum contains lymphoid structures such as Peyer's patches and small lymphoid aggregations which can be quite prominent, especially in children and young adults. There is no widespread definition of the normal appearance of lymphoid tissue or what is the upper limit of normal size. Additionally, the clinical significance of apparent hyperplasia is not clear. A case of polypoid lymphoid hyperplasia of the terminal ileum detected by video capsule endoscopy is presented.

A 80-year old male patient with intermittent rectal bleeding was referred for capsule endoscopy of the colon after conventional colonoscopy had failed to reach the caecum. In the terminal ileum, many small polypoid lesions could be observed (*figure A5.1*). After the capsule entered the colon, there was a clear view of the ileocaecal valve. At some moment, the polypoid lymphoid tissue could be observed bulging through the valve into the colon (*figure A5.2*). Additionally, an adenomatous polyp was detected in the ascending colon. Double-balloon colonoscopy was performed, during which the adenoma was resected and biopsy specimens of the terminal ileum were obtained. These specimens confirmed the benign lymphoid nature of the ileal lesions depicted.

The gut-associated lymphoid tissue is composed of specialized lymphoid structures. In the ileum, these aggregations are present in both the lamina propria and submucosa. Larger aggregations are known as Peyer's patches, while smaller ones are referred to as



**Figure A5.1:** VCE images of the terminal ileum. (a–d) Images show the elongated lymphoid follicles.



**Figure A5.2:** VCE images of the ileocaecal valve seen from the colon. (a) Normal appearance of the ileocaecal valve. (b) At some moment, the hyperplastic lymphoid follicles bulge through the valve.

isolated lymphoid follicles.. Their main function is to accomplish tolerance to both foreign antigens as well as to the commensal microbiota.<sup>1</sup>

During endoscopy of the terminal ileum, lymphoid follicles are usually visible as yellowish, approximately 1 millimetre small, round and sessile structures. Recently, it was suggested that up to eight structures per endoscopic view, should be considered normal.<sup>2</sup> An increase of the number of lymph follicles in the terminal ileum has been reported in children and patients with gastrointestinally mediated allergy, but often no cause can be established. Additionally, there is little known on the variation in size of these follicles. Therefore, the question remains where the dividing line between physiologic nodules and lymphoid hyperplasia should be drawn.<sup>3</sup>

## References

- 1 Mescher AL. Junqueira's basic histology. Columbus, OH: McGraw-Hill; 2010.
- 2 Krauss E, Konturek P, Maiss J, Kressel J, Schulz U, Hahn EG, et al. Clinical significance of lymphoid hyperplasia of the lower gastrointestinal tract. *Endoscopy*. 2010;42(4):334-7.
- 3 Mukhopadhyay S, Harbol T, Floyd FD, Sidhu JS. Polypoid nodular lymphoid hyperplasia of the terminal ileum. *Arch Pathol Lab Med*. 2004;128(10):1186-7.







# Appendix B

## List of Abbreviations

|         |   |
|---------|---|
| APC     | argon plasma coagulation                            |
| aSCT    | autologous haematopoietic stem cell transplantation |
| AUC     | area under the curve                                |
| CABG    | coronary artery bypass graft                        |
| CAC     | computed assessment of cleansing                    |
| CCD     | charge-coupled device                               |
| CD      | coeliac disease                                     |
| CECDAI  | capsule endoscopy Crohn's disease activity index    |
| CI      | confidence interval                                 |
| CMOS    | complementary metal–oxide–semiconductor             |
| CT      | computed tomography                                 |
| CVA     | cerebrovascular accident                            |
| DBE     | double-balloon endoscopy                            |
| DVT     | deep venous thrombosis                              |
| EATL    | enteropathy-associated T-cell lymphoma              |
| EPROM   | erasable programmable read-only memory              |
| FDG-PET | fluoro-deoxyglucose positron emission tomography    |
| FISP    | fast imaging with steady-state precession           |
| GTT     | gastric transit time                                |
| HASTE   | half-Fourier acquisition single-shot fast spin-echo |
| H&E     | haematoxylin and eosin                              |
| ICC     | intraclass correlation coefficient                  |
| IEL     | intraepithelial lymphocyte                          |
| INR     | international normalized ratio                      |
| IQ      | interquartile                                       |
| LED     | light emitting diode                                |
| MGIB    | midgastrointestinal bleeding                        |
| MR      | magnetic resonance                                  |
| mSv     | miliSievert   |
| NSAID   | non-steroidal anti-inflammatory drug                |
| OAO     | overall assessment of adequacy                      |
| OGD     | oesophagogastroduodenoscopy                         |
| OGIB    | obscure gastrointestinal bleeding                   |
| PPI     | proton pump inhibitor                               |
| PTCA    | percutaneous transluminal coronary angioplasty      |
| QE      | qualitative evaluation                              |

## Abbreviations

|        |   |
|--------|---|
| QI     | quantitative index                              |
| RCD I  | refractory coeliac disease type I               |
| RCD II | refractory coeliac disease type II              |
| RGB    | red-green-blue                                  |
| ROC    | receiver operating characteristic               |
| SBE    | single-balloon endoscopy                        |
| SBFT   | small-bowel follow through                      |
| SBTT   | small-bowel transit time                        |
| SD     | standard deviation                              |
| T      | tesla   |
| TCR    | T-cell receptor                                 |
| TIA    | transient ischemic attack.                      |
| VCE    | video capsule endoscopy                         |
| VIBE   | volumetric interpolated breath hold examination |

# Appendix C

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Note: all positions are current positions

# Appendix D

## List of Publications

Publications marked with an asterisk are included in this thesis

Van Weyenberg SJB, Stam FJ, Marsman W. Successful endoscopic closure of spontaneous esophageal rupture (Boerhaave syndrome). *Gastrointest Endosc* 2014;80:162.

Van Weyenberg SJB. Esophageal intramural pseudodiverticulosis. *Dig Liver Dis* 2014;46:87.

Van Weyenberg SJB. Grading the quality of bowel preparation. *VJGIE* 2014;1:615-618.

Oterdoom LH, van Weyenberg SJB, de Boer NK. Double-duct sign: do not forget the gallstones. *J Gastrointest Liver Dis* 2013;22:447-50.

Van Weyenberg SJB, De Boer NK. Enterobiasis vermicularis. *VJGIE* 2013;1:359-360.

Van Weyenberg SJB, De Boer NK. NSAID colopathy. *VJGIE* 2013;1:386-387.

Van Weyenberg SJB, Lely RJ. Arterial hemorrhage due to a buried percutaneous endoscopic gastrostomy catheter. *Endoscopy* 2013;45 Suppl 2:E261-2.

Van Weyenberg SJB. Diagnosis and grading of sliding hiatal hernia. *VJGIE* 2013;1:117-119.

Van Weyenberg SJB, Pohl J. Gastric gastrointestinal stromal tumor. *VJGIE* 2013;1:168-169.

Van Weyenberg SJB, Pohl J. Gastric neuroendocrine tumors. *VJGIE* 2013;1:176-177.

Van Weyenberg SJB. Hemorrhagic gastropathy. *VJGIE* 2013;1:185-186.

Tushuizen ME, Van Weyenberg SJB. Large jejunal diverticulum. *VJGIE* 2013;1:252-253.

\* Van Weyenberg SJB, Jacobs MA. Polypoid lymphatic hyperplasia of the ileum. *VJGIE* 2013;1:268.

Van Weyenberg SJ, de Boer NK, Zonderhuis BM, van der Peet DL. Endoscopic closure of transmural esophageal perforation after balloon dilation for achalasia. *Endoscopy*. 2013;45 Suppl 2:E88.

Ligthart-Melis GC, Weijs PJ, Te Boveldt ND, Buskermolen S, Earthman CP, Verheul HM, de Lange-de Klerk ES, Van Weyenberg SJB, van der Peet DL. Dietician-delivered intensive nutritional support is associated with a decrease in severe postoperative complications after surgery in patients with esophageal cancer. *Dis Esophagus* 2013;26(6):587-93.

\* Van Weyenberg SJB, Smits F, Jacobs MAJM, Van Turenhout ST, Bouma G, Mulder CJ. Video capsule findings in patients with nonresponsive celiac disease. *J Clin Gastroenterol* 2013;47:393-9.

De Boer NK, Van Grieken NC, Van Weyenberg SJB. Duodenal lymphoid nodularity in common variable immunodeficiency. *Dig Liver Dis* 2013;45:e5.

\* Van Weyenberg SJB, Bouman K, Halloran BP, Jacobs MAJM, Mulder CJ, Van Kuijk C, Van Waesberghe JHTM. Comparison of MR enteroclysis with video capsule endoscopy in the investigation of small-intestinal disease. *Abd Imaging* 2013;38:42-51.

\* Van Weyenberg SJB, Van Grieken NC, Van Waesberghe JHTM. Iron deficiency after non-small cell lung cancer. Ileal polypoid angiodysplasia. *Gastroenterology* 2012;142:e3-4.

\* Halloran BP, Stam F, Van Weyenberg SJB. A pill for cholesterol and a capsule for bleeding. *Dig Liver Dis* 2012;44:e20.

\* Van Weyenberg SJB, Van Turenhout ST, Bouma G, Jacobs MAJM, Mulder CJ. Video capsule endoscopy for previous overt obscure gastrointestinal bleeding in patients using anti-thrombotic drugs. *Dig Endosc* 2012;24:247-254.

Wonders J, De Boer NK, Van Weyenberg SJB. Spot diagnosis: eruptive melanocytic naevi during azathioprine therapy in Crohn's disease. *J Crohn Colitis* 2012;6:636.

Jharap B, LG Koudstaal, Neefjes-Borst AE, Van Weyenberg SJB. Colonic telangiectasias in progressive systemic sclerosis. *Endoscopy* 2012;44:E42-43.

\* Van Weyenberg SJB, Van Grieken NC. Jejunal pseudomelanosis. *Dig Liver Dis* 2012;44:355.

Van Weyenberg SJB. To snare a snare, or not to snare? *Gastroenterology* 2012;142:e1-2.

Terhaar sive Droste JS, Van Weyenberg SJB. Ischemic colitis with diverticular sparing. *Gastrointest Endosc* 2012;75:424.

Van Weyenberg SJB. Hoentjen F, Thunnissen F, Mulder CJ. Pseudomelanosis coli and adenomatous polyps. *J Gastrointest Liver Dis*. 2011;20:233.

Van Weyenberg SJB. Patient identification data on medical images. *Eur J Radiol* 2011;79:337.

\* Van Weyenberg SJB, De Leest HJTI, Mulder CJ. Description of a novel grading system to assess the quality of bowel preparation in video capsule endoscopy. *Endoscopy* 2011;43:406-411.

\* Van Weyenberg SJB, Meijerink MR, Jacobs MAJM, Van Kuijk C, Mulder CJ, Van Waesberghe JHTM. Magnetic resonance enteroclysis in celiac disease: proposal and validation of a MR-score for RCD II. *Radiology* 2011;259:151-161.

Uiterwaal MT, Mooi WJ, Van Weyenberg SJB. Metastatic melanoma of the ampulla of Vater. *Dig Liver Dis* 2011;43:e8.

Biere SSAY, Van Weyenberg SJB, Verheul HMW, Mulder CJ, Cuesta MA., van der Peet DL. Niet-gemetastaseerd oesofaguscarcinoom [Non-metastasized oesophageal cancer]. *Ned Tijdschr Geneesk* 2010;154:A820.

Hartemink KJ, Hepp SM, Pieters-van den Bos IC, Van Weyenberg SJB. Gallstone ileus: correlation between computed tomography, double-balloon enteroscopy and surgical findings. *Wien Klin Wochenschr* 2010;122:720-722.

\* Van Weyenberg SJB, Mulder CJ, Van Waesberghe JHTM. Small intestinal diverticulitis. *Clin Gastroenterol Hepatol* 2010;8:e123.

Van Turenhout ST, Jacobs MAJM, Van Weyenberg SJB, Herdes E, Stam F, Mulder CJ, Bouma G. Diagnostic yield of capsule endoscopy in a tertiary hospital in patients with obscure gastrointestinal bleeding. *J Gastrointestin Liver Dis* 2010;19:141-145.

Jellema P, van der Windt DAWM, Bruinvels DJ, Mallen CD, van Weyenberg SJB, Mulder CJ, de Vet HCW. Value of symptoms and additional diagnostic tests for colorectal cancer in primary care: systematic review and meta-analysis. *BMJ* 2010;340:c1269.

Mulder CJ, Van Weyenberg SJB, Jacobs MAJM. Coeliac disease is not yet mainstream in endoscopy. *Endoscopy* 2010;42:218-219.

\* Van Weyenberg SJB, Van Turenhout ST, Bouma G, Van Waesberghe JHTM, van der Peet DL, Mulder CJ, Jacobs MAJM. Double-balloon endoscopy as the primary method for small bowel video capsule endoscope retrieval. *Gastrointest Endosc* 2010;71:535-541.

\* Van Weyenberg SJB, Meijerink MR, Jacobs MAJM, Van der Peet DL, Van Kuijk C, Mulder CJ, Van Waesberghe JHTM. MR enteroclysis in the diagnosis of small-bowel neoplasms. *Radiology* 2010;254:765-773.

\* Van Weyenberg SJB, Van Waesberghe JHTM, Ell C, Pohl J. Enteroscopy and its relationship to radiological small bowel imaging. *Gastrointest Endosc Clin N Am* 2009;19:389-407.

Manner H, Pech O, Henrich R, Van Weyenberg SJB, Löhr C, Manner N, Ell C. Prevention of feeding tube dislodgement with the Wiesbaden rein: a case series. *Endoscopy* 2009;41:377-9.

Pohl J, Nguyen-Tat M, Manner H, Pech O, Van Weyenberg SJB, Ell C. Dry biopsies by diluted epinephrine spraying optimize biopsy mapping of long segment Barrett's esophagus. *Endoscopy* 2008;40:883-7.



Jarbandhan SVA, Van Weyenberg SJB, van der Veer WM, Heine GDN, Mulder CJ, Jacobs MAJM. Double-balloon endoscopy associated pancreatitis. Description of six cases. *World J Gastroenterol* 2008;14:720-724.

Van Weyenberg SJB, Jarbandhan SVA, Mulder CJ, Jacobs MAJM. Double balloon endoscopy in celiac disease. *Tech Gastrointest Endosc* 2008;10:87-93.

### **Book chapters**

Van Bodegraven AA, Van Weyenberg SJB, Wierdsma NJ, de Wit NJ, Brouwers JRBJ. Maag- Darm- en Leverziekten. In: Van Everdingen JJE, Glerum JH, ed. *Diagnose en therapie 2013–2014*. Houten, The Netherlands: Bohn Stafleu van Loghum, 2012.

Van Weyenberg SJB, Mulder CJ. Zenker's diverticulum. In: Rose BD, ed. *UpToDate*, Waltham MA, United States of America: UpToDate, 2007, 2008, 2009, 2010, 2011, 2012, 2013.

Van Bodegraven AA, Van Weyenberg SJB, de Wit NJ, Brouwers JRBJ. Maag- Darm- en Leverziekten. In: Van Everdingen JJE, Glerum JH, ed. *Diagnose en therapie 2011*. Houten, The Netherlands: Bohn Stafleu van Loghum, 2010.

Van Bodegraven AA, Van Weyenberg SJB, de Wit NJ, Brouwers JRBJ. Maag- Darm- en Leverziekten. In: Van Everdingen JJE, Glerum JH, ed. *Diagnose en therapie 2010*. Houten, The Netherlands: Bohn Stafleu van Loghum, 2009.

Van Weyenberg SJB, Jacobs MAJM, Mulder CJ. Total villous atrophy. In: Mulder CJ, ed. *Atlas of double-balloon endoscopy*. Munich, Germany: Medconnect, 2007: 6-7.

Van Weyenberg SJB, Van Waesberghe JH, Jacobs MAJM. Endoscopic dilatation of ileal strictures in Crohn's disease. In: Mulder CJ, ed. *Atlas of double-balloon endoscopy*. Munich, Germany: Medconnect, 2007: 28-30.

Van Weyenberg SJB, Al-Toma A, Schreuder TCMA, Jacobs MAJM. Portal hypertensive enteropathy. In: Mulder CJ, ed. *Atlas of double-balloon endoscopy*. Munich, Germany: Medconnect, 2007: 61-62.

Van Weyenberg SJB, Jacobs MAJM. Small-bowel neuroendocrine tumour. In: Mulder CJ, ed. *Atlas of double-balloon endoscopy*. Munich, Germany: Medconnect, 2007: 86-87.

Van Weyenberg SJB, Jacobs MAJM. Melanoma and lungcancer metastases. In: Mulder CJ, ed. *Atlas of double-balloon endoscopy*. Munich, Germany: Medconnect, 2007: 102-104.

Van Weyenberg SJB, Jacobs MAJM. Radiation injury. In: Mulder CJ, ed. *Atlas of double-balloon endoscopy*. Munich, Germany: Medconnect, 2007: 119-120.

Jacobs MAJM, Jarbandhan SVA, Van Weyenberg SJB, Mulder CJ. Overview of double-balloon endoscopy. In: Mulder CJ, ed. *Atlas of double-balloon endoscopy*. Munich, Germany: Medconnect, 2007: 141-147.

# Appendix E

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...Krone des Lebens, Glück ohne Ruh, Liebe, bist du!

— Johann Wolfgang von Goethe, *Rastlose Liebe*

# Appendix F

## About the author

Stijn Van Weyenberg was born in Hoorn, the Netherlands, in 1974. He attended pre-university education at the OSG West-Friesland in Hoorn. In 1993 he started his medical studies at the University of Amsterdam / Academic Medical Centre and received his medical degree in 2001. In 2002 he started his three-year residency in internal medicine at the VU University Medical Centre, supervised by Professor S. A. Danner and Professor C. D. A. Stehouwer. He started his residency in gastroenterology at the Medical Centre Alkmaar in 2005, under supervision of Dr. H. A. R. E. Tuynman, and continued his training at the VU University Medical Centre, supervised by Professor C. J. J. Mulder. In 2008, he was clinical fellow in advanced therapeutic endoscopy at the department of Endoscopy of the Horst Schmidt Kliniken in Wiesbaden, Germany, supervised by Professor C. Ell.

The firm belief that the enigmas most small-intestinal conditions usually are, can only be unravelled through a multidisciplinary approach, resulted in the close collaboration with radiologist Dr. Jan Hein T. M. Van Waesberghe. The fruits of this cooperation lay the foundations for this thesis.

After his registration in gastroenterology in September 2008, he joined the medical staff at the department of Gastroenterology and Hepatology at the VU University Medical Centre. His main interests, both in patient care and research, are minimally-invasive small-bowel imaging, small-bowel endoscopy, colorectal cancer screening, and therapeutic endoscopic oncology. Additionally, he has a keen interest in medical education and training. In august 2013, he joined the medical staff of the department of Gastroenterology and Hepatology at Leiden University Medical Centre. Stijn lives in Haarlem with his wife-to-be Minne Staverman and their daughter Wende and son Kasper.