

## Unusual Findings in the Small Bowel



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### Abstract

Small bowel endoscopy has now become a routine investigation. The most common methods to visualize the small bowel are balloon-assisted enteroscopy and capsule endoscopy. Currently, the most common indications for small bowel endoscopy are obscure gastrointestinal bleeding and suspected or established Crohn's disease. Common findings of small bowel endoscopy include arteriovascular malformations, erosions, ulcers, and edema in the mucosa. However, there are myriad uncommon small bowel conditions which can now be visualized endoscopically. These include vasculitis, neuroendocrine tumors, familial polyposis syndromes such as Peutz–Jeghers syndrome; ulcerative celiac disease; enteropathy-associated T-cell lymphoma; and infections such as Whipple's disease, tuberculosis, and blastomycosis. The aim of this video is to demonstrate the endoscopic characteristics of various unusual but very important small bowel diseases. This article is part of an expert video encyclopedia.

### Keywords

Capsule endoscopy; Celiac disease; Double-balloon enteroscopy; Enteroscopy; Neuroendocrine carcinoma; Obscure gastrointestinal bleeding; Single-balloon enteroscopy; Small bowel infections; Small bowel tumors; Ulcerative jejunitis; Video; Whipple's disease.

### Video Related to this Article

Video available to view or download at doi:10.1016/S2212-0971(13)70125-0

### Techniques

- Double- and single-balloon enteroscopy.
- Capsule endoscopy.

### Background and Endoscopic Procedure

Small bowel endoscopy is now an essential tool for the investigation of patients with suspected small bowel disorders.<sup>1</sup> The current endoscopic methods to investigate the small bowel lumen are video capsule endoscopy (VCE) and device-assisted enteroscopy. Currently, the most common indications for small bowel endoscopy are obscure gastrointestinal bleeding and suspected or established Crohn's disease (Table 1). Common findings of small bowel endoscopy include arteriovascular malformations, erosions, ulcers, and edema in the mucosa. However, there are myriad uncommon small bowel conditions which can now be visualized endoscopically. These include vasculitis, neuroendocrine tumors,

familial polyposis syndromes such as Peutz–Jeghers syndrome; ulcerative celiac disease; enteropathy-associated T-cell lymphoma; amyloidosis; and infections such as Whipple's disease, tuberculosis, and blastomycosis.<sup>2–4</sup>

Capsule endoscopy is performed with various capsule endoscopes. Currently the two most commonly used VCE are Given Imaging (Given Imaging Ltd., Yokneam, Israel) and Olympus VCE (Olympus EndoCapsule; Olympus, Tokyo, Japan). The main advantage of VCE is its 'noninvasiveness.' The patient just swallows the VCE, which then captures thousands of picture signals, which are transmitted to the belt sensor. After downloading the data the computer software creates a video sequence of these images. A major disadvantage of VCE is its inability to obtain tissue for analysis. This may become crucial for diagnosing uncommon small bowel disorders. Nevertheless, a well-trained endoscopist is crucial for detecting usual and unusual small bowel findings and then determining whether biopsies are necessary. Balloon-assisted enteroscopy is most commonly performed using the Fujinon enteroscope (Fujinon FN 450P 5/20, EN-450T5, Fuji; Fujinon Corp., Saitama, Japan) and the Olympus single-balloon enteroscope SIF-Q180 (Olympus, Tokyo, Japan). Whereas the Fujinon FN 450P enteroscope has a 2.2-mm channel, the Olympus SIF-Q180 and the Fujinon 450T5 both have a 2.8-mm accessory channel. This larger channel allows for utilization of standard biopsy forceps and a large variety of therapeutic accessories, which are useful for hemostasis, stricture dilation, foreign body extraction, and stent insertion.

Undoubtedly the major endoscopic breakthrough of the past decade, VCE and balloon-assisted enteroscopy have

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**Table 1** Indications of capsule endoscopy and balloon-assisted enteroscopy

Small bowel bleeding (obscure gastrointestinal bleeding)
Angiodysplasias and other vascular deformations and malformations (e.g., Dieulafoy, venectasias, and varices)
Erosions and ulcers
Tumors and polyps
Ulcerative small bowel diseases
Crohn's disease
Nonsteroidal anti-inflammatory drugs enteropathy
Vasculitis (Churg–Strauss arteritis and polyarteritis nodosa)
Small bowel ischemia
Celiac disease
Lymphomas (enteropathy-associated T-cell lymphoma)
Nonspecific ulcers
Infections (tuberculosis and blastomycosis)
Common variable immunodeficiency
Malabsorption
Celiac disease
Lymphomas
Lymphangiectasias
Polyposis syndromes
Peutz–Jeghers syndrome
Balloon dilation of strictures
Polyps, pseudopolyps and tumors
Adenocarcinoma
Neuroendocrine tumors
Gastrointestinal stromal tumor
Infections
Tuberculosis
Blastomycosis
Lymphangiectasias
Primary
Secondary

contributed to better diagnosis and understanding of diseases of the small bowel, opening up this obscure part of the gastrointestinal tract to visualization.<sup>1–4</sup> The diagnosis of common diseases is relatively easy. The recognition and diagnosis of uncommon conditions is more challenging. Therefore, the aim of this video is to demonstrate the endoscopic characteristics of various unusual but very important small bowel diseases. Only the 'trained eye' will be capable of recognizing common and uncommon disease processes.

### Key Learning Points/Tips and Tricks

- The advent of small bowel endoscopy has expanded the ability to visualize the small bowel.
- The spectrum of small bowel diseases is very broad.
- Knowledge of unusual diseases affecting the small bowel is mandatory.
- Knowledge of the endoscopic appearance of unusual small bowel diseases is important.
- Many unusual disorders do not affect the small bowel diffusely, but only in segments, thus mandating a complete small bowel examination.
- It is important to remember that one condition can present with various endoscopic appearances. For example, celiac

disease can present with villous atrophy, erosions, and ulcers; common variable immunodeficiency can present with pseudopolyps, lymphangiectasias, erosions, and ulcers.

### Alternatives

- Push enteroscopy.
- Intraoperative enteroscopy.
- Small bowel follow through X-rays.
- Computed axial tomography scan.
- Magnetic resonance imaging.

### Scripted Voiceover

<i>Time (min:sec)</i>	<i>Voiceover text</i>
00:00–00:12	The aim of this video is to demonstrate the endoscopic characteristics of various unusual, but very important, small bowel diseases.
00:13–01:22	The most common ulcerative diseases affecting the small bowel are NSAID-enteropathy and Crohn's disease. The diagnosis of Crohn's disease, especially in cases of isolated small-bowel involvement, remains challenging. This video demonstrates a case of severe Crohn's disease of the ileum. The mucosa is massively swollen and erythematous leading to stenosis of the lumen. In addition, there are pseudopolyps, small ulcers and erosions. By using the "under water" immersion technique these findings become more evident. The immersion technique is most useful to evaluate the integrity of the villi, thus it plays an important role in the evaluation of celiac disease.
01:23–01:35	The presence of ulcerative jejunitis in celiac disease should raise the suspicion of enteropathy-associated small T-cell lymphoma.
01:35–01:54	The ulcers due to EATL are oval shaped, irregular, superficial and often involve the small bowel folds. Histology is important to secure the diagnosis.
01:55–02:20	B-cell lymphomas can present with edema of the mucosa, erosions and lymphangiectasias. Advanced disease leads to stenosis and large ulcers. Occasionally, the mucosal changes may be a very subtle circular swelling and erythema such as in this video capsule endoscopy.
02:21–02:31	In amyloidosis the mucosa shows multiple irregular, deep and shallow ulcers.
02:32–02:47	Eosinophilic enteritis has a broad spectrum of presentation, ranging from edema,

	erythema to frank destruction of the mucosa with large ulcers.		diffuse pseudopolyposis from immunoproliferative small intestinal disease (IPSID). IPSID represents a spectrum of clinicopathological entities including alpha-chain disease and other types of lymphoplasmacytic proliferations of the lamina propria of the small intestine, presenting with severe malabsorption.
02:48–03:09	Behçet disease can affect any part of the luminal gastrointestinal tract. Note the multiple raised ulcers, erosions and vesicles. The “volcano-like” lesions can be more clearly demonstrated using chromoendoscopy.		
03:10–03:29	Cytomegalovirus enteritis should always be suspected in patients with immunosuppression. The mucosa is edematous with occasional ulcers and erosions, mainly affecting the duodenal and jejunal folds.	06:26–06:53	Another classic disease presenting with small bowel pseudopolyposis is common variable immunodeficiency (CVID). But CVID can also present with ulcers, erosions and aptoid lesions mimicking Crohn’s disease. Histology often reveals nodular lymphoid hyperplasia.
03:30–04:00	There are a large variety of disorders resulting in small bowel lymphangiectasias. Lymphangiectasias can be primary or secondary. This capsule endoscopy video shows diffuse involvement by primary lymphangiectasia, also called Waldmann’s disease, in a young patient with malabsorptive symptoms due to protein-losing enteropathy. Histology shows typical lymphangiectasias.	06:53–07:14	Most patients with Peutz-Jeghers syndrome have multiple sessile and pedunculated hamartomatous polyps of the small bowel. Nevertheless, large polyps and tumors can also occur in Peutz-Jeghers syndrome, including adenocarcinoma.
		07:15–07:35	Neuroendocrine tumors rarely erode and bleed such as this case of ileal carcinoid. The presence of multiple nests of cells and positive chromogranin A staining supports the diagnosis of NET.
04:01–04:22	Whipple’s disease often presents as secondary lymphangiectasias involving the villi due to lymphatic drainage blockage due to bacterial debris. The periodic acid Schiff stain shows the massive infiltrates of foamy macrophages.	07:35–07:50	Although formerly considered uncommon, portal hypertensive jejunopathy should be now considered as a possible source of GI bleeding in patients with liver cirrhosis.
04:23–05:15	Several other infectious conditions such as tuberculosis and blastomycosis can lead to lymphangiectasias. The lymphangiectasias can involve only the villi. However, in the presence of massive lymph node drainage obstruction such as in this patient with blastomycosis, the mucosa shows massive fold thickening and cord-like structures and formations. The lymph-node obstruction may also lead to massive swelling and erythema of the mucosa, resulting in mucosal exfoliation and significant blood loss such as this patient with jejunal tuberculosis.	07:51–08:03	Intramural small bowel bleeding due to coumadin. Note the diffuse segmental jejunal mucosal thickening.
		08:04–08:35	The expanded reach of the enteroscope now allows us to extract lodged foreign bodies from the small bowel such as these cases of swallowed dentist’s needle and tooth prosthesis, both of which were successfully removed using a Dormia basket and a snare, respectively.
05:16–05:41	The spectrum of jejunitis is broad. Unusual causes of jejunitis are vasculitis such as Churg-Strauss and Henoch Schönlein purpura. Common endoscopic presentation of these conditions includes diffuse edema and erythema, subepithelial hemorrhages and friability of the mucosa.		
05:42–06:25	Whereas the appearance of common small bowel polyps and tumors is easy to recognize, the presence of diffuse intestinal polyposis or pseudopolyposis may pose a diagnostic challenge. This patient had		

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