Terminology

10

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A standard terminology is essential if the reporting of endoscopic finding is to be reproducible, internationally uniform, and compatible with electronic data processing. A standard terminology has been developed for video capsule endoscopy (VCE) [1], following the model of the Minimal Standard Terminology (MST) created by a collaboration between the European, American, and Japanese Endoscopy Societies under the sponsorship of the Organisation Mondiale d'Endoscopie Digestive (OMED), now World Endoscopy Organisation (WEO), for the fields of esophagogastroduodenoscopy (EGD), endoscopic retrograde cholangiopancreatography (ERCP), and colonoscopy [2–4]. In 2008, the MST 3.0 version was released [5], which also includes small bowel lesions and the enteroscopy procedure. The Capsule Endoscopy Structured Terminology (CEST) has been developed following the rules established for MST and adapted to the specific needs for the reporting of findings and diagnoses in capsule endoscopy findings. The CEST has been published for an open-access use in software and scientific applications [6]. It was validated in a retrospective trial [7] showing that the majority of terms used to describe VCE findings were included in the CEST. Prospective testing resulted in a moderate interobserver agreement, with kappa values of 0.44 regardless of experience and consecutive training [8]. Others also found agreement, but with better results for experienced examiners [9, 10], suggesting a need for training as well as for regular updating of the CEST.

The CEST supports the structured reporting of all data necessary for an examination, including pathological findings. This chapter provides an overview and examples of the use of the CEST for reporting a VCE examination.

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10.1 Structured Documentation of an Examination

The VCE examination report follows the general MST structure for endoscopic reporting to provide the necessary documentation of the procedure.

Documentation of a VCE examination:

- Patient data
- Procedural data (date, examiner)
- Reason (indication) for the examination
- Limitations (viewing conditions, completeness of the examination)
- Complications
- Description of findings
- Localization
- Diagnosis
- Recommendations

10.2 Findings

The "Findings" section is based on a hierarchy of descriptive levels that starts with categories of findings called "Headings" (see below). Below the headings are "Terms," followed by "Attributes" and "Attribute values."

The following headings are used for the structured description of findings in the small bowel:

- Normal
- Lumen
- Contents
- Mucosa
- Flat lesions
- Protruding lesions
- Excavated lesions

For example, fresh blood in the bowel lumen due to active bleeding is described as follows: contents (heading) – blood (term) – kind of blood (attribute) – red (attribute value). In some cases, a finding is an aggregate of different observations described under multiple headings. A stenosing tumor, for instance, is described as tumor (protruding lesion) and stenosis (lumen). Similarly, diverticulitis can be described as diverticulum (excavated lesion), ulcer (excavated lesion), and erythema (mucosa).

10.3 Localization

Localization of VCE images can be identified by time, organ, or through localization software:

- Localization by time is divided into the proximal, middle, or distal third of the small bowel. The time between the initial images of the duodenum and of the cecum is divided into three equal segments. Any delay of the capsule in the duodenum or terminal ileum and any variations in transit speed are ignored.
- Localization by organ can include the esophagus, stomach, duodenum, small bowel, terminal ileum, and colon or can be designated by anatomic landmarks such as the Z-line, pylorus, papilla, and ileocecal valve.
- Localization software shows an abdominal-wall projection of the capsule location (Fig. 10.1).

10.4 Lumen

Described under the Lumen heading are several terms, as listed in Table 10.1. Figure 10.2 illustrates various forms of stenosis and dilatation, and Fig. 10.3 shows some signs of previous surgery.

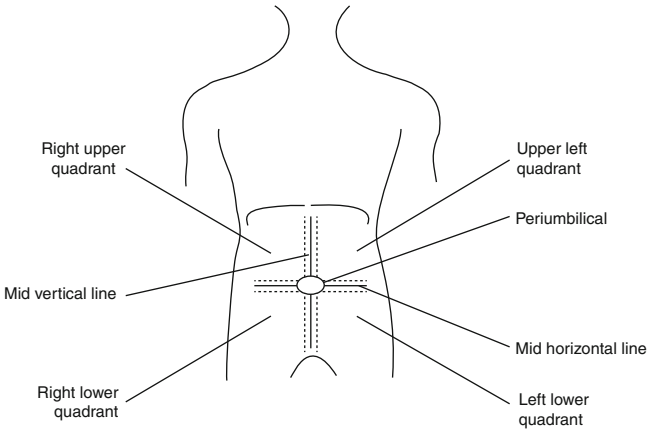


Fig. 10.1 Capsule localization based on four quadrants, the periumbilical area, a vertical line through the umbilicus (*right/left*), and a horizontal line through the umbilicus (*upper/lower*)

Table 10.1 Description of findings related to the lumen

Term	Attribute	Attribute values
Normal		
Stenosis	Type	Extrinsic compression
		Intraluminal (intrinsic) benign
		Intraluminal (intrinsic) malignant
	Traversed	Yes/no
Dilated	Longitudinal extent	Short segment/long segment/whole organ
	Wall contractions	Present/absent
Evidence of previous surgery	Type	Specify
	Suture material	Yes/no

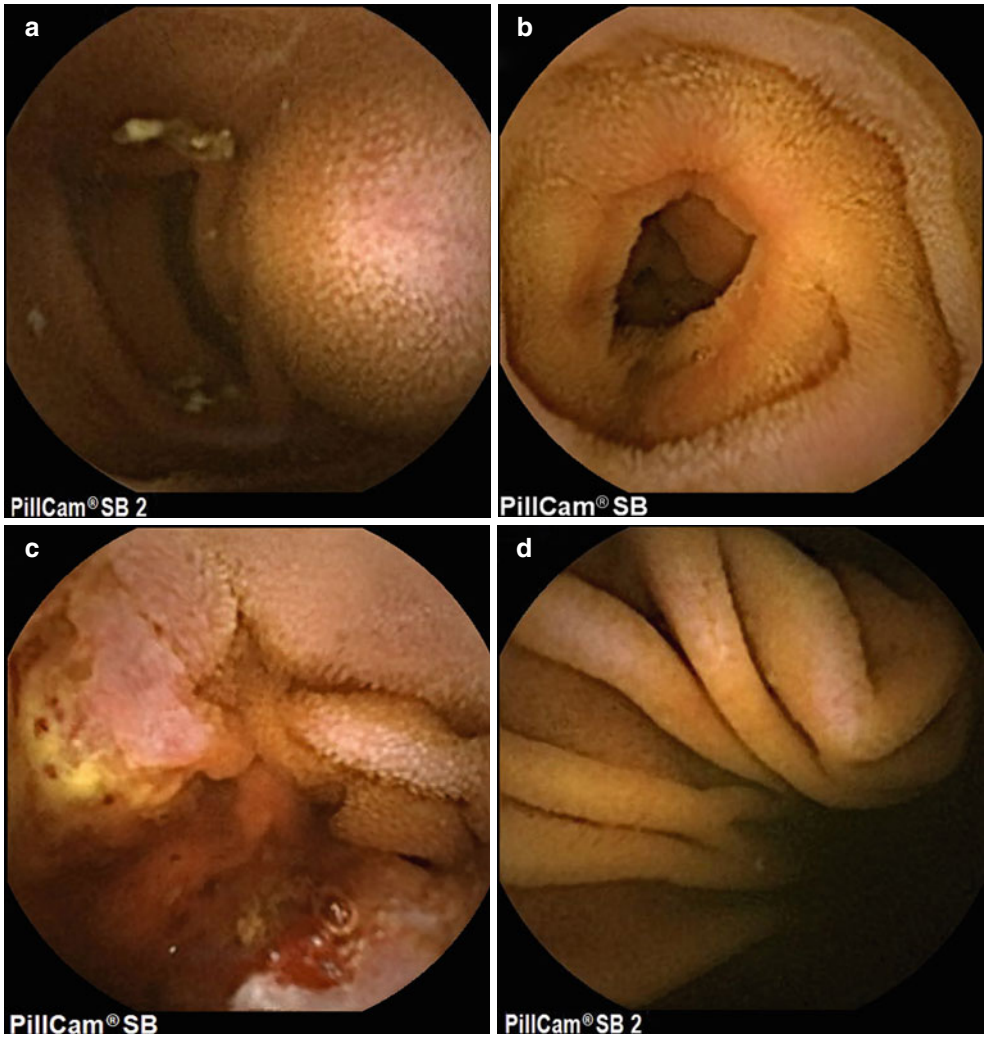


Fig. 10.2 Stenosis/dilatation. (**a**) Extrinsic stenosis. (**b**) Intrinsic benign stenosis. (**c**) Intrinsic malignant stenosis. (**d**) Dilatation

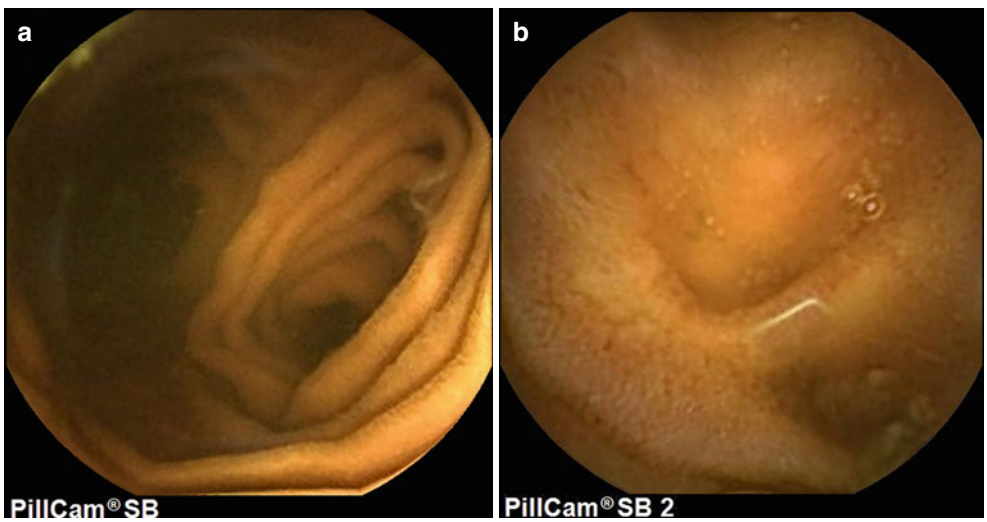


Fig. 10.3 Signs of previous surgery: anastomosis (**a**); scar and staple material (**b**)

10.5 Contents

Described under the Contents heading are several terms, as listed in Table 10.2. Figures 10.4 and 10.5 illustrate several types of these findings.

Table 10.2 Description of content findings

Term	Attribute	Attribute values
Blood	Type	Red/clot/hematin
Bile		
Parasites	Type	Specify
Foreign body	Type	Specify
Food	Type	Specify
Feces		

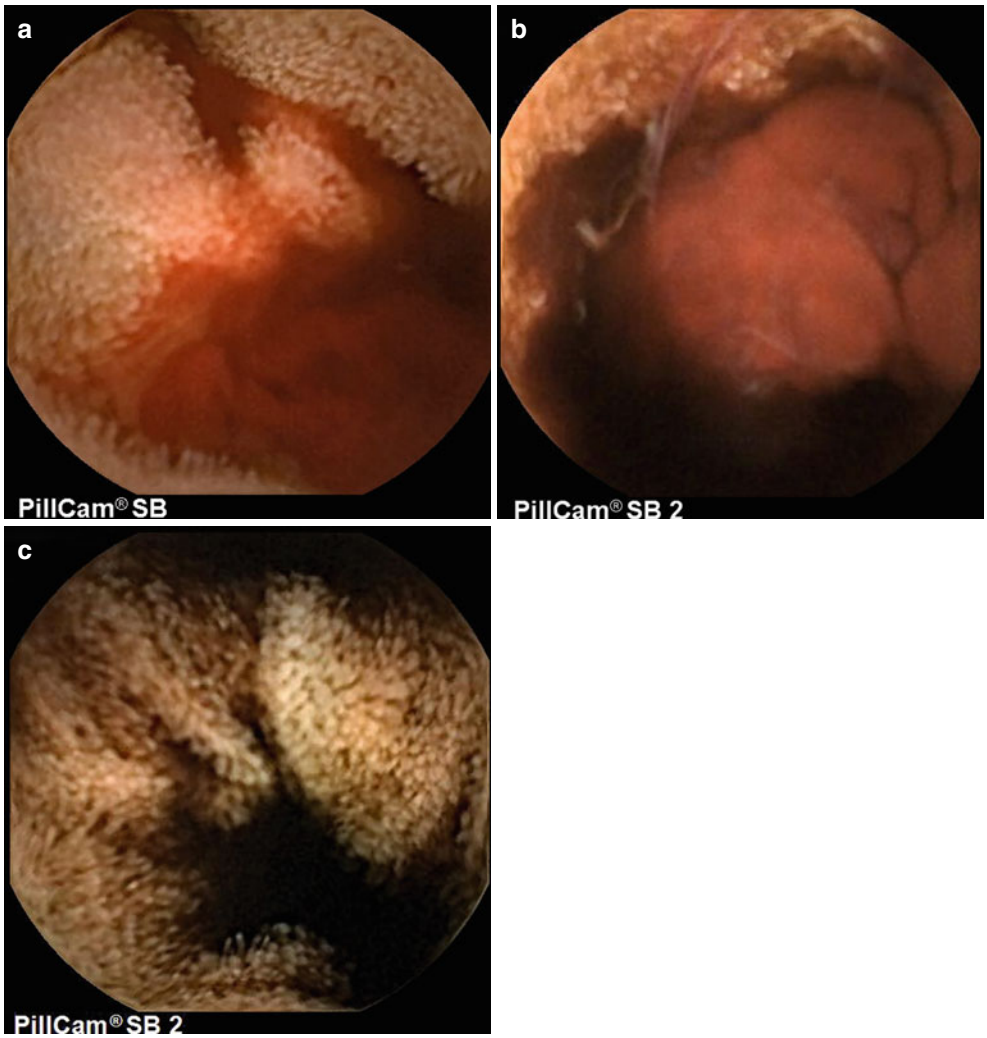


Fig. 10.4 Description of contents: (**a**) red blood. (**b**) Clot. (**c**) Hematin

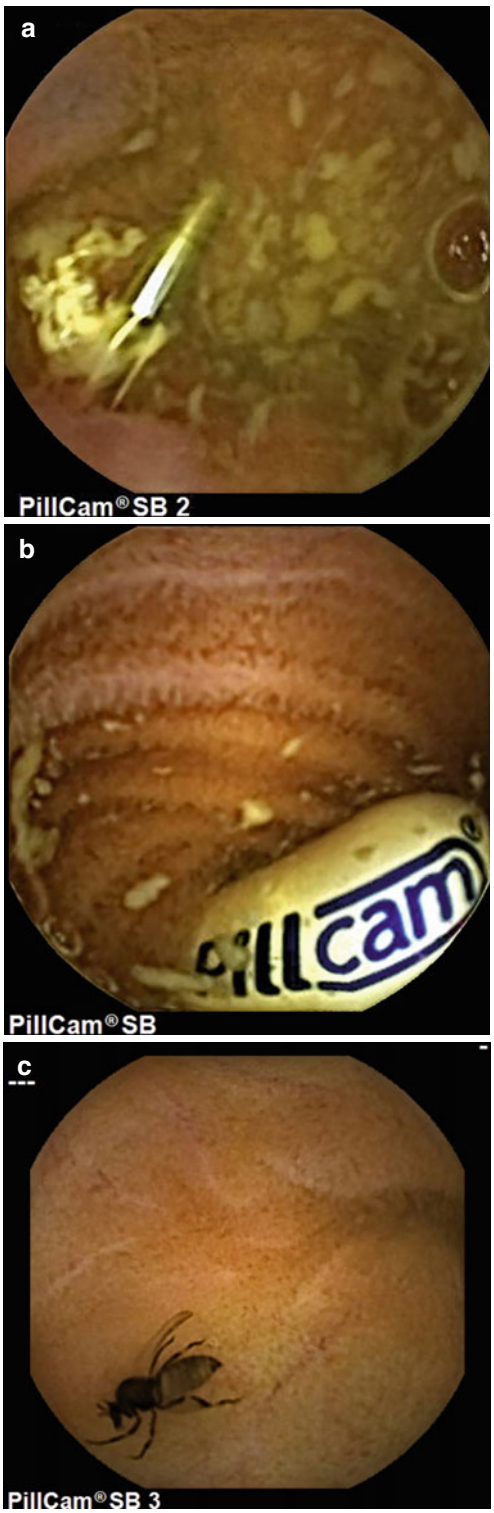


Fig. 10.5 Description of contents: (**a**) feces and foreign body (clip). (**b**) Foreign body (video capsule). (**c**) Insect (Courtesy of Thomas Teuber, MD)

10.6 Mucosa

Described under the Mucosa heading are a number of terms, as listed in Table 10.3. Figures 10.6, 10.7, and 10.8 illustrate the appearance of various types of abnormal mucosa and villi.

Table 10.3 Description of mucosa findings

Term	Attribute	Attribute values
Erythematous	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Pale	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Edematous (congested)	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Granular	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Nodular	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Atrophic	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Abnormal villi	Shape	Convoluted/swollen/blunted/absent
	Color	Whitish/yellow
	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ

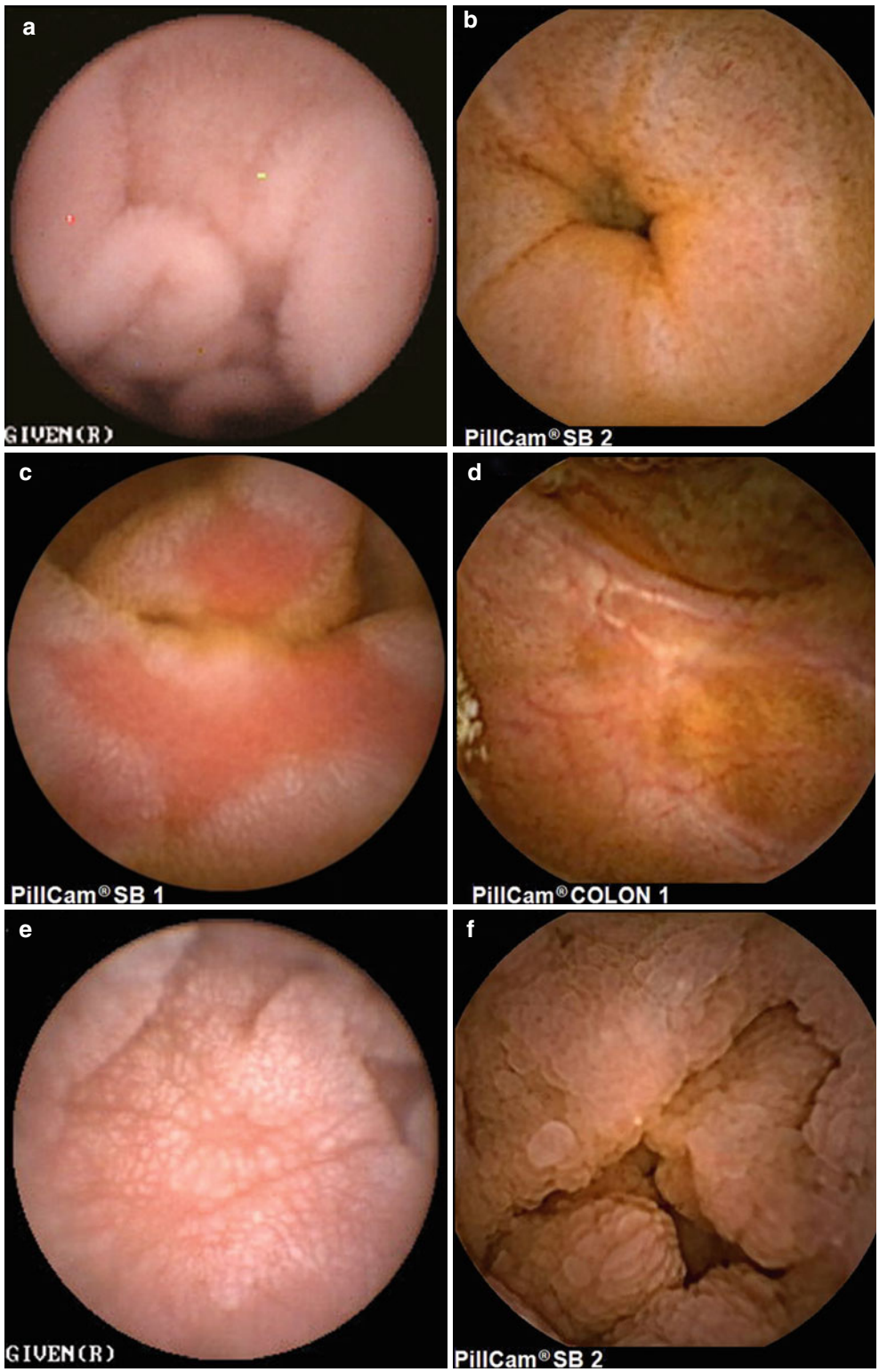


Fig. 10.6 Abnormal mucosa: pale (**a**), edematous (**b**), erythematous (**c**), atrophic (**d**), granular (**e**), nodular (**f**)

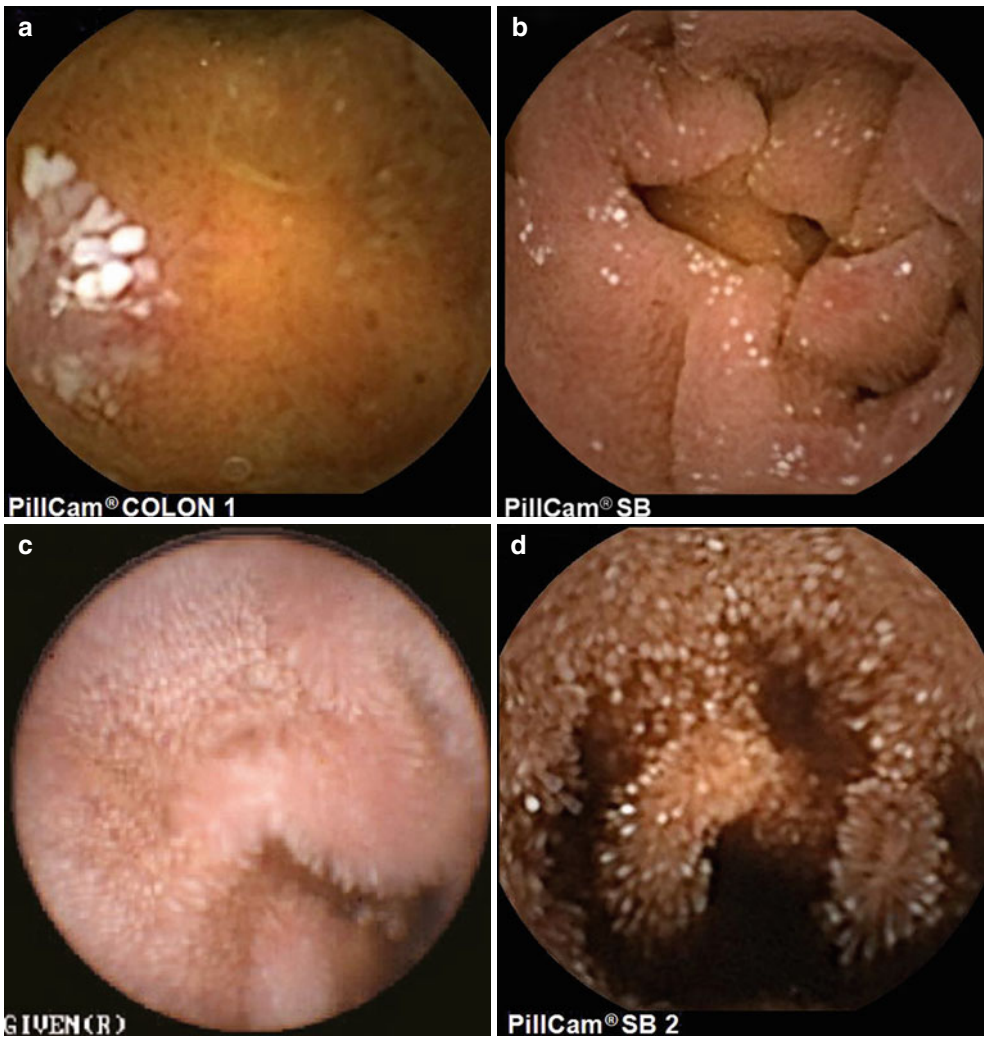


Fig. 10.7 White villi: localized and blunted (**a**), patchy (**b**), diffuse (**c, d**)

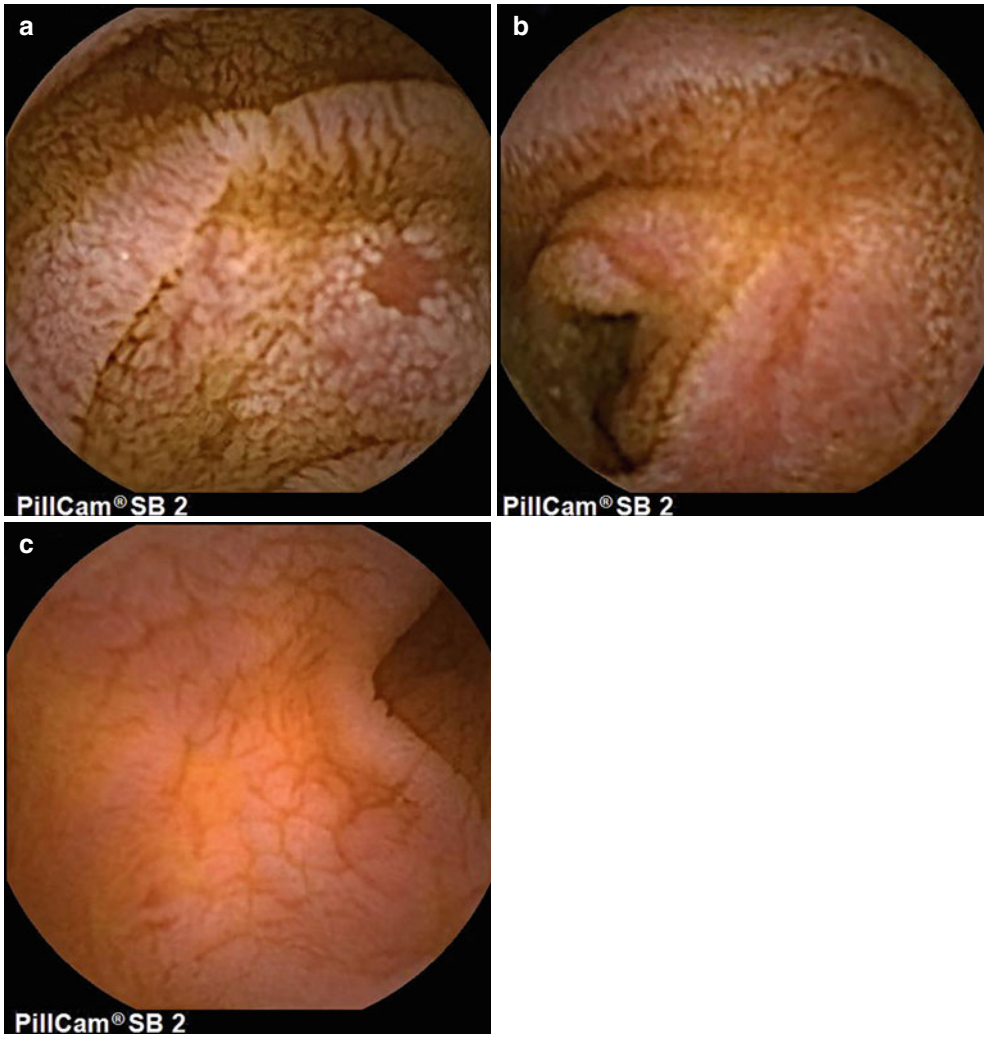


Fig. 10.8 Missing villi. Focal (**a**), patchy (**b**), diffuse (**c**)

10.7 Flat Lesions

The Flat Lesions heading includes the terms *angiectasias* (Fig. 10.9), *spots* (Fig. 10.10), and *plaques*, as listed in Table 10.4.

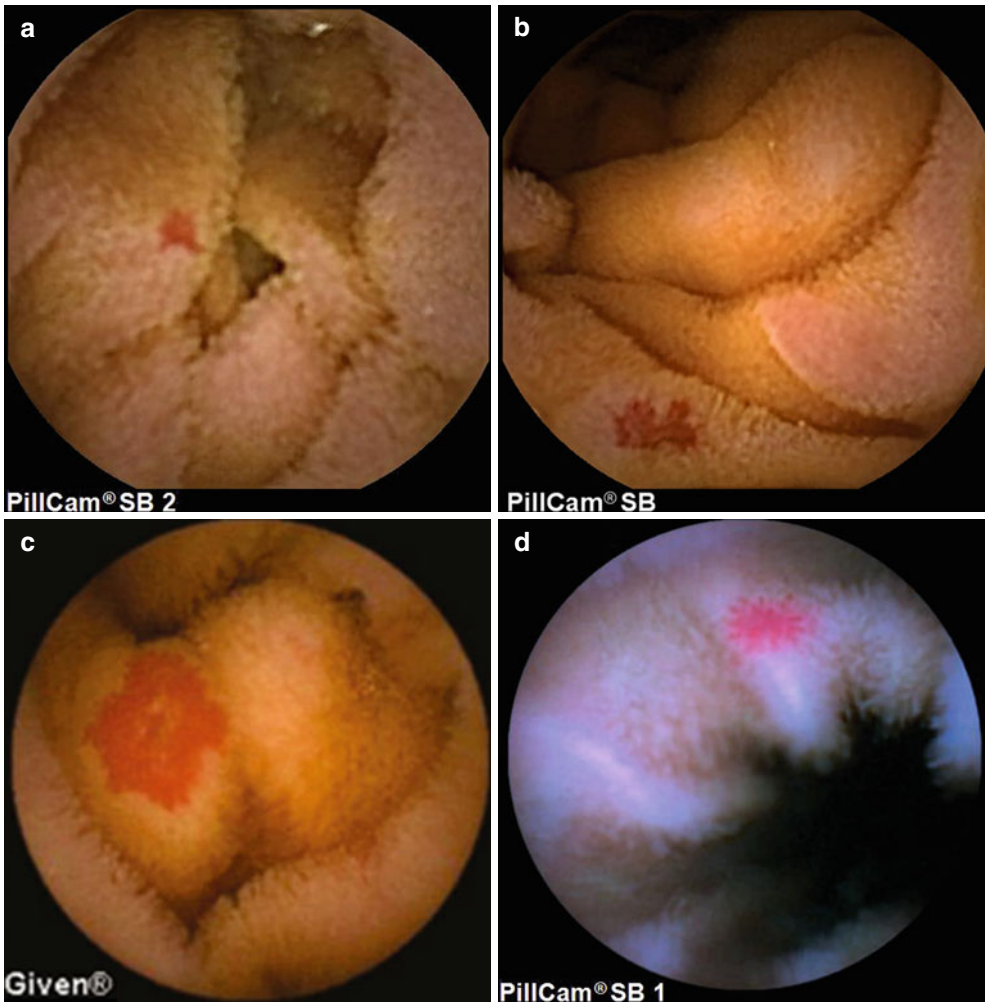


Fig. 10.9 Angiectasias: small (**a**), medium (**b**), large (**c**), with arborization (**d**; image in blue mode)

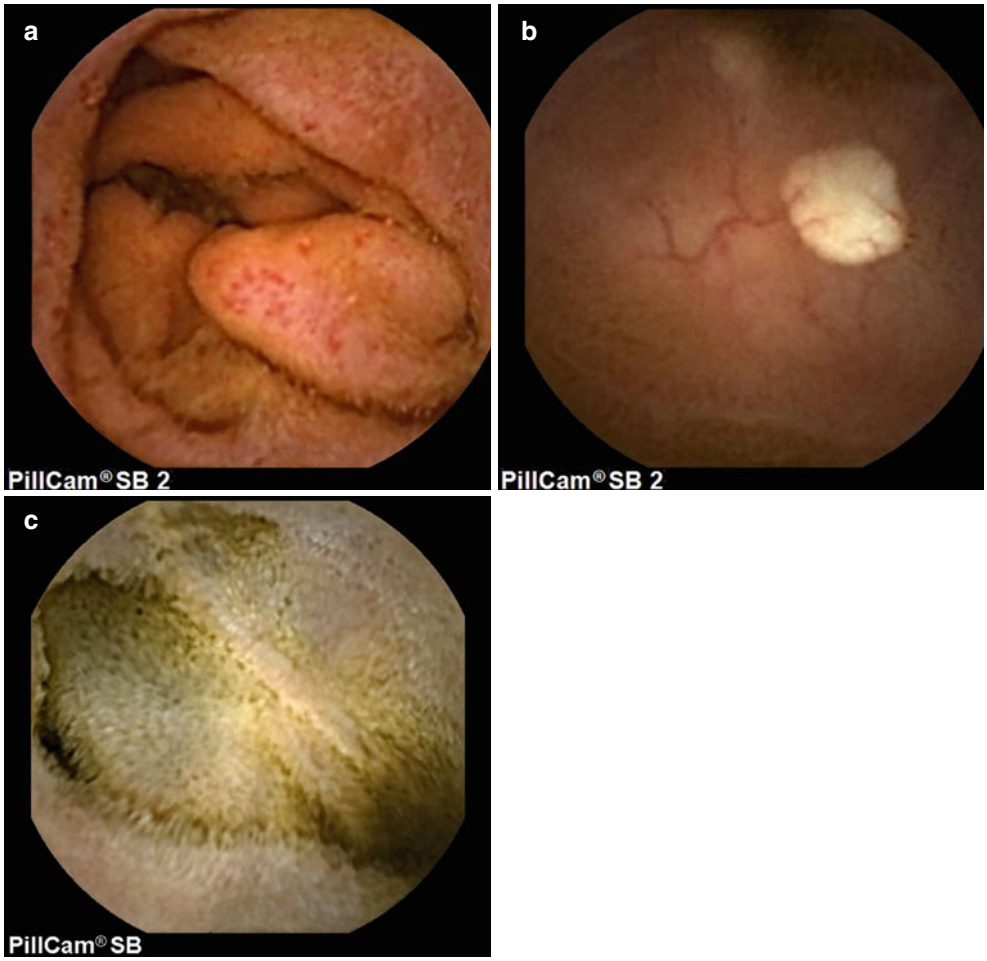


Fig. 10.10 Spots: red spot (**a**), white spot (**b**), black spot (**c**; ink mark)

Table 10.4 Description of flat lesions

Term	Attribute	Attribute values
Spot	Number	Single/multiple
	Type	Red/white/black
	Bleeding	Yes/no
	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Plaque	Number	Single/multiple
	Type	Red/white/black
	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Angiectasia	Number	Single/multiple
	Size	Small/medium/large
	Arborization	Yes/no
	Bleeding	Yes/no
	Stigmata of bleeding	Yes/no
	Bleeding potential	Yes/possible/no
	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ

10.8 Protruding Lesions

Under the Protruding Lesions heading (Table 10.5) are venous structures (Fig. 10.11), nodules and polyps (Figs. 10.12 and 10.13), and tumors (Fig. 10.14).

Table 10.5 Description of protruding lesions

Term	Attribute	Attribute values
Nodules	Number	Single/few/multiple
	Bleeding	Yes/no
	Stigmata of bleeding	Yes/no
	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Polyps	Number	Single/few/multiple
	Size	Small/medium/large
	Pedicle	Sessile/pedunculated/unknown
	Bleeding	Yes/no
Mass/tumor	Size	Small (<5 mm)/medium (5–20 mm)/large (>20 mm)
	Type	Submucosal/fungating/ulcerated/frond like/villous
	Bleeding	Yes/no
	Stigmata of bleeding	Yes/no
Venous structure	Type	Venous lake/bleb/varix
	Number bleeding	Single/few/multiple
	Bleeding	Yes/no
	Stigmata of bleeding	Yes/no
	Bleeding potential	Yes/possible/no
	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ

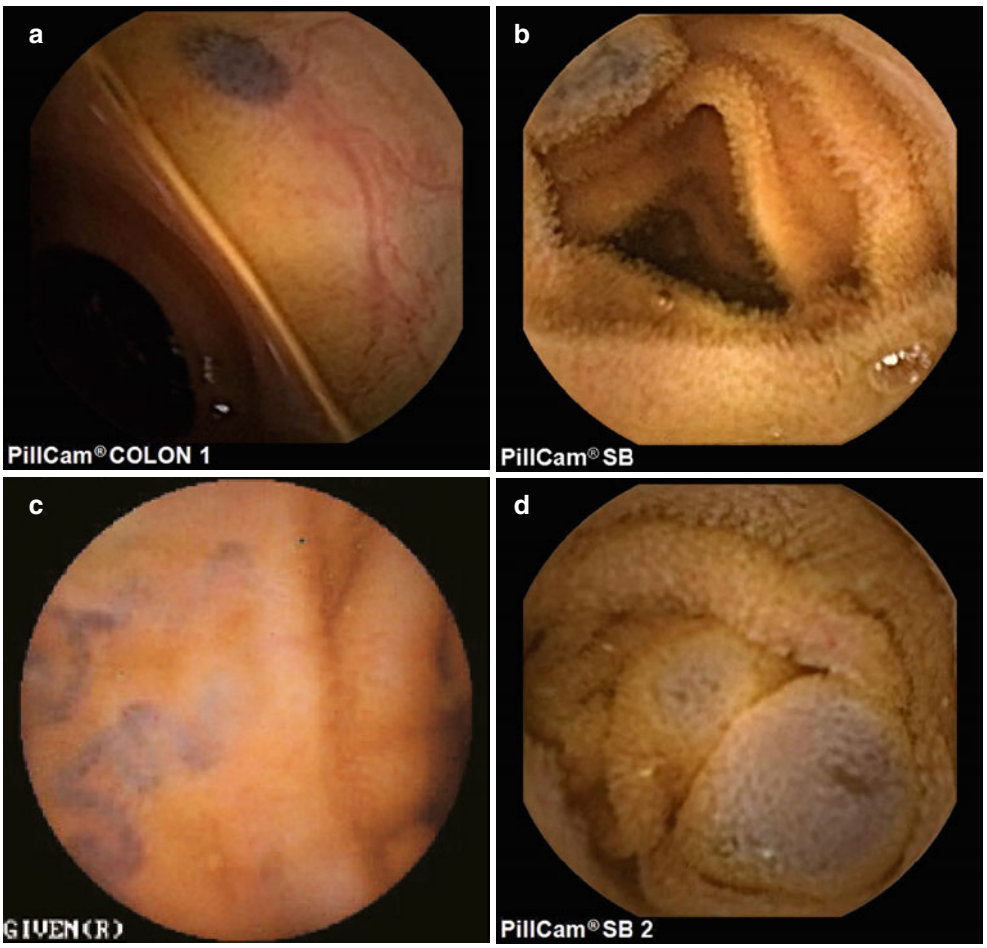


Fig. 10.11 Veins: venous lake (**a**), bleb (**b**), varix (**c**), bleeding potential present (**d**; eroded surface)

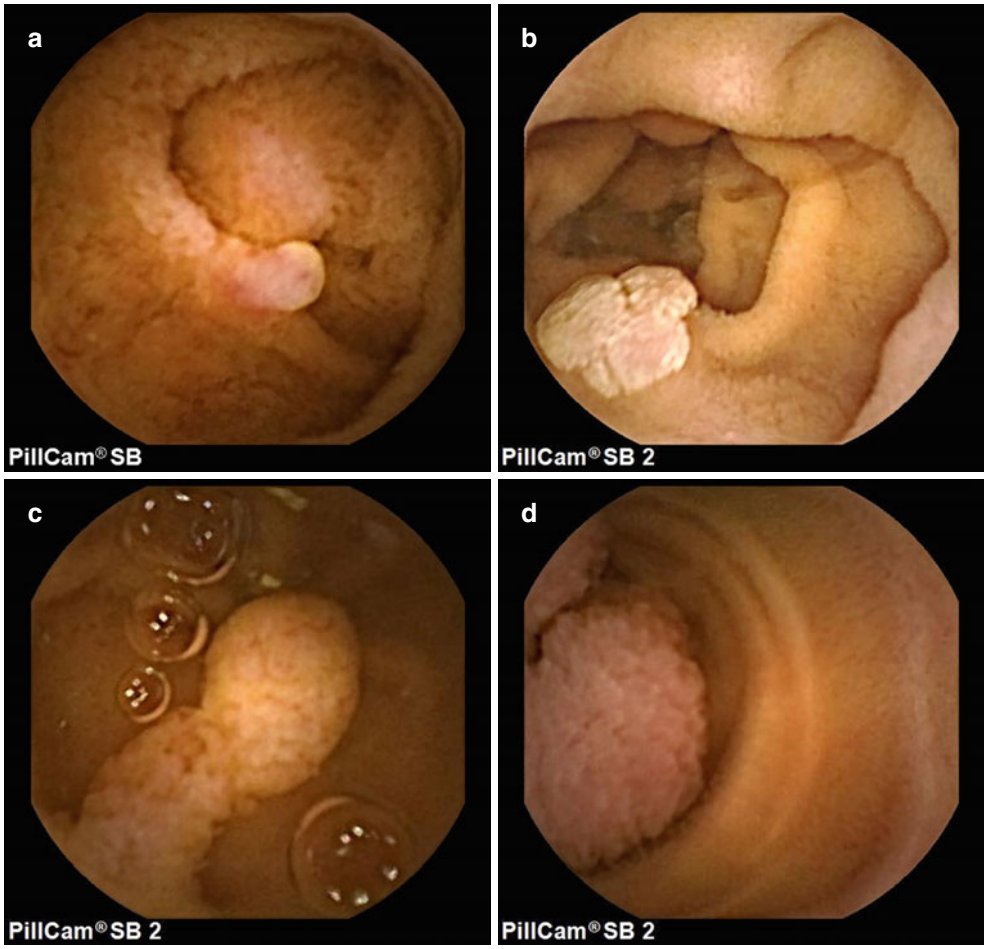


Fig. 10.12 Nodule and polyps: nodule (**a**), sessile polyp (**b**), pedunculated polyp (**c**), possibly pedunculated polyp (**d**)

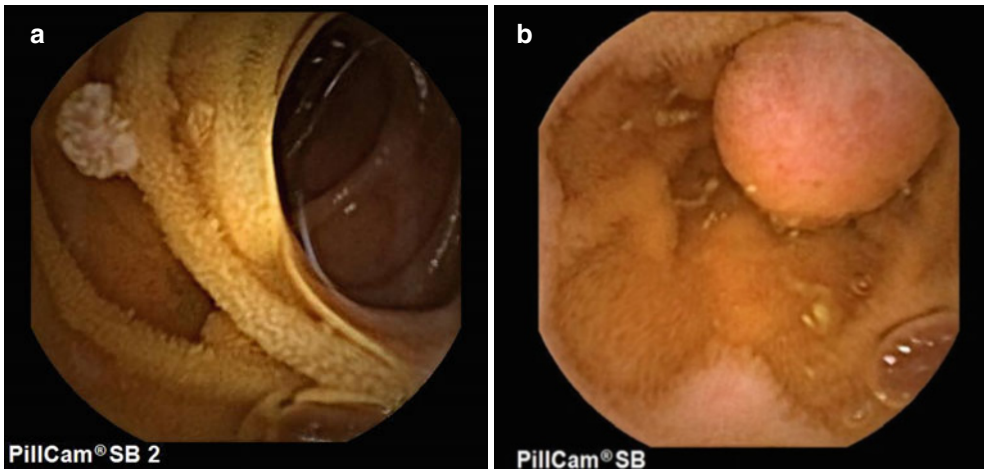
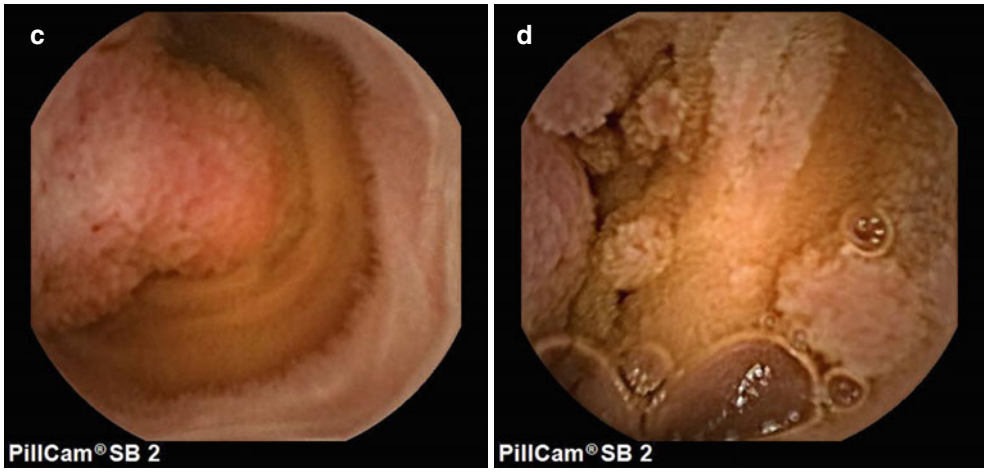


Fig. 10.13 Polyps: small (**a**), medium (**b**), large (**c**), multiple small- to medium-sized polyps (**d**)

Fig. 10.13 (continued)



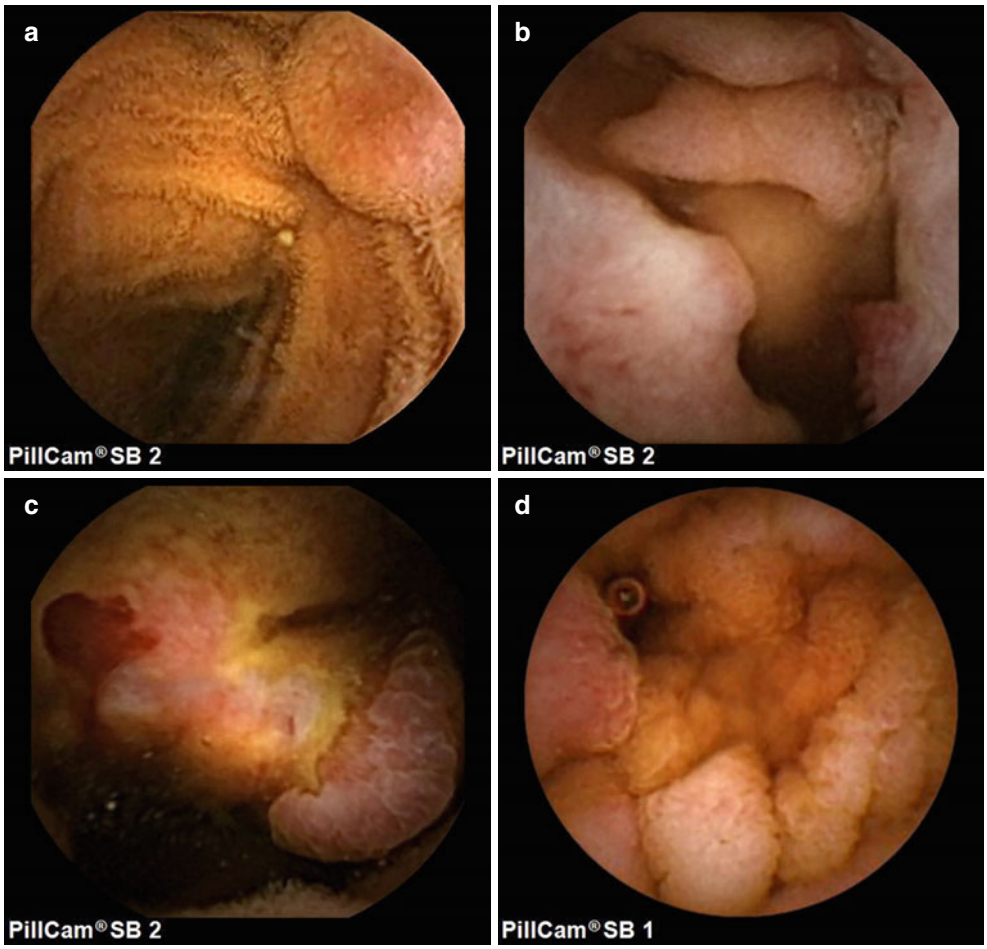


Fig. 10.14 Tumors: submucosal, medium sized (**a**); fungating, large (**b**); exulcerated, large (**c**); villous, large (**d**)

10.9 Excavated Lesions

Table 10.6 lists the various types of excavated lesions, several of which are illustrated in Fig. 10.15.

Table 10.6 Description of excavated lesions

Term	Attribute	Attribute values
Aphtha	Number	Single/few/multiple
	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Erosion	Number	Single/few/multiple
	Bleeding	Yes/no
	Stigmata of bleeding	Yes/no
	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Ulcer	Number	Single/few/multiple
	Bleeding	Yes/no
	Stigmata of bleeding	Yes/no
	Distribution pattern	Localized/patchy/diffuse
	Longitudinal extent	Short segment/long segment/whole organ
Scar		
Diverticulum		Single/multiple

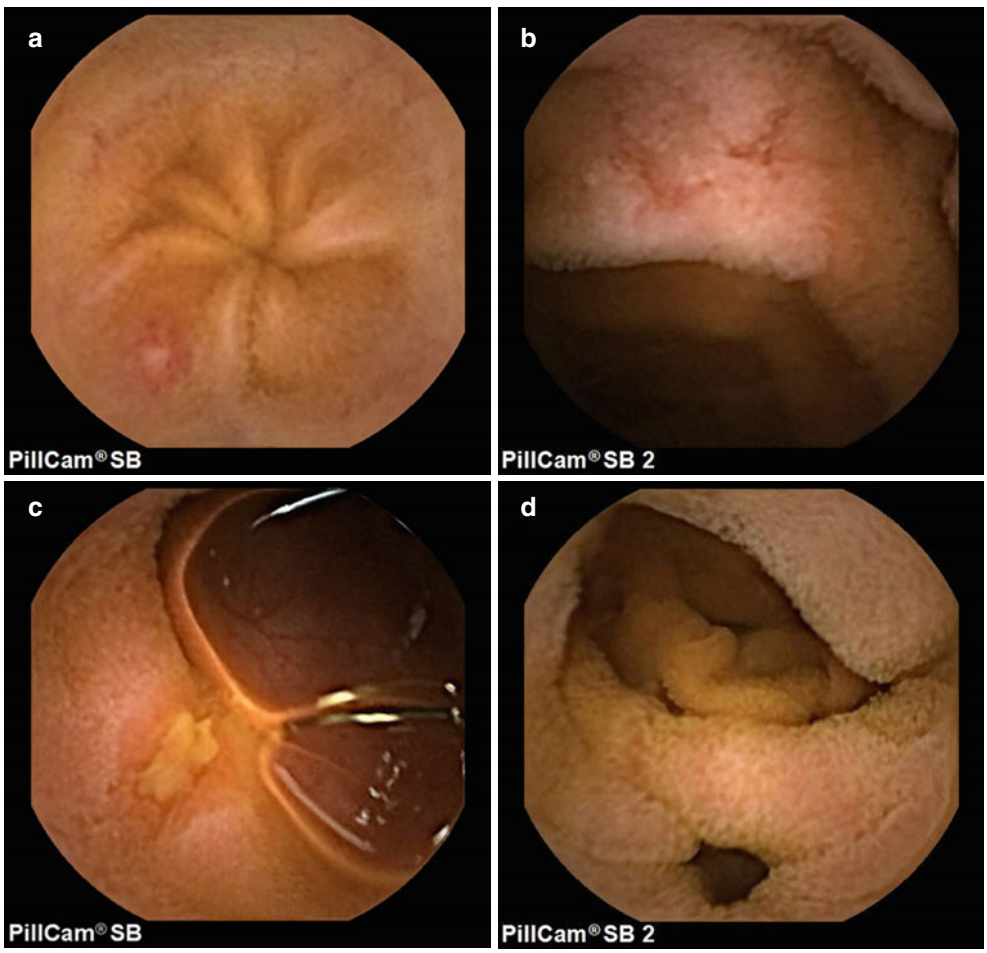


Fig. 10.15 Excavated lesions: aphtha (**a**), a few erosions (**b**), ulcer (**c**), small diverticulum (**d**)

10.10 Diagnoses

The diagnosis represents the opinion of the examiner based on clinical history and findings. The examiner should try to distinguish the diagnosis from the findings. For example, small bowel erosions can be found in both nonsteroidal anti-inflammatory drug (NSAID)-induced enteropathy and Crohn's disease. The examiner should select the diagnoses from the following list, which represents the range of common and rare small bowel diagnoses. The list of diagnoses, as proposed by the CEST, is divided into two lists of terms, the main diagnoses and other diagnoses, classified according to their frequency in clinical practice.

10.10.1 Main Diagnoses

- Normal
- Angiectasia
- Erosion
- Ulcer
- Crohn's disease
- Celiac disease
- NSAID enteritis
- Tumor
  - Benign
  - Malignant
- Bleeding of unknown origin

10.10.2 Other Diagnoses

- Diverticulum
- Tropical sprue
- Parasites
- Dieulafoy's lesion
- Hemobilia
- Phlebectasia
- Varices
- Intestinal lymphangiectasia
- Ischemic enteritis
- Vasculitis
- Radiation enteritis
- Posttransplant lymphoproliferative disorder
- Graft-versus-host disease
- Enteropathy
  - Erosive
  - Erythematous
  - Congestive
  - Hemorrhagic
- Brunner's gland hyperplasia
- Lipoma
- Xanthelasma
- Neuroendocrine tumor
- Melanoma
- GIST (gastrointestinal stromal tumor)
- Kaposi's sarcoma
- Lymphoma
- Polyp
- Juvenile polyposis
- Familial adenomatous polyposis
- Peutz-Jeghers syndrome

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