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Upper endoscopy is the accepted standard for making the diagnosis of various upper gastrointestinal diseases including esophageal cancers. Morphologically, esophageal cancer can be divided into superficial esophageal cancer and advanced esophageal cancer. Progress in endoscopic diagnostic techniques, such as iodine staining and magnifying endoscopy with narrow band imaging, has led to the detection of increased numbers of superficial esophageal cancer. The chance of recovery improves when doctors detect the cancer at an early stage.

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## 6.1 Superficial Esophageal Cancer

### 6.1.1 Definition

Early esophageal cancer is defined as a cancer confined to mucosa or submucosa irrespective of lymph node metastasis because the clinical prognosis of early esophageal cancer is quite different from that of advanced esophageal cancer. The 5-year survival rate for advanced esophageal cancer is only 10–20 %, but in superficial esophageal cancer, the 5-year survival rate exceeds 90 %.

**Table 6.1** Classification of superficial esophageal cancer

Protruding	Pedunculated	O-Ip
	Sessile	O-Is
Nonprotruding and nonexcavated type	Slightly elevated	O-IIa
	Completely flat	O-IIb
	Slightly depressed	O-IIc
	Elevated and depressed	O-IIc + IIa, O-IIa + IIc
Excavated type	Ulcer	O-III
	Excavated and depressed	O-IIc + III, O-III + IIc

### 6.1.2 Endoscopic Finding

Early lesions of squamous cell carcinoma may appear as minor irregularities of the mucosa, areas of erythema, or depressed, raised, or ulcerative area (Table 6.1) [1]. A high index of suspicion is required, and biopsy specimens should be obtained of any tissue with these abnormalities (Table 6.2).

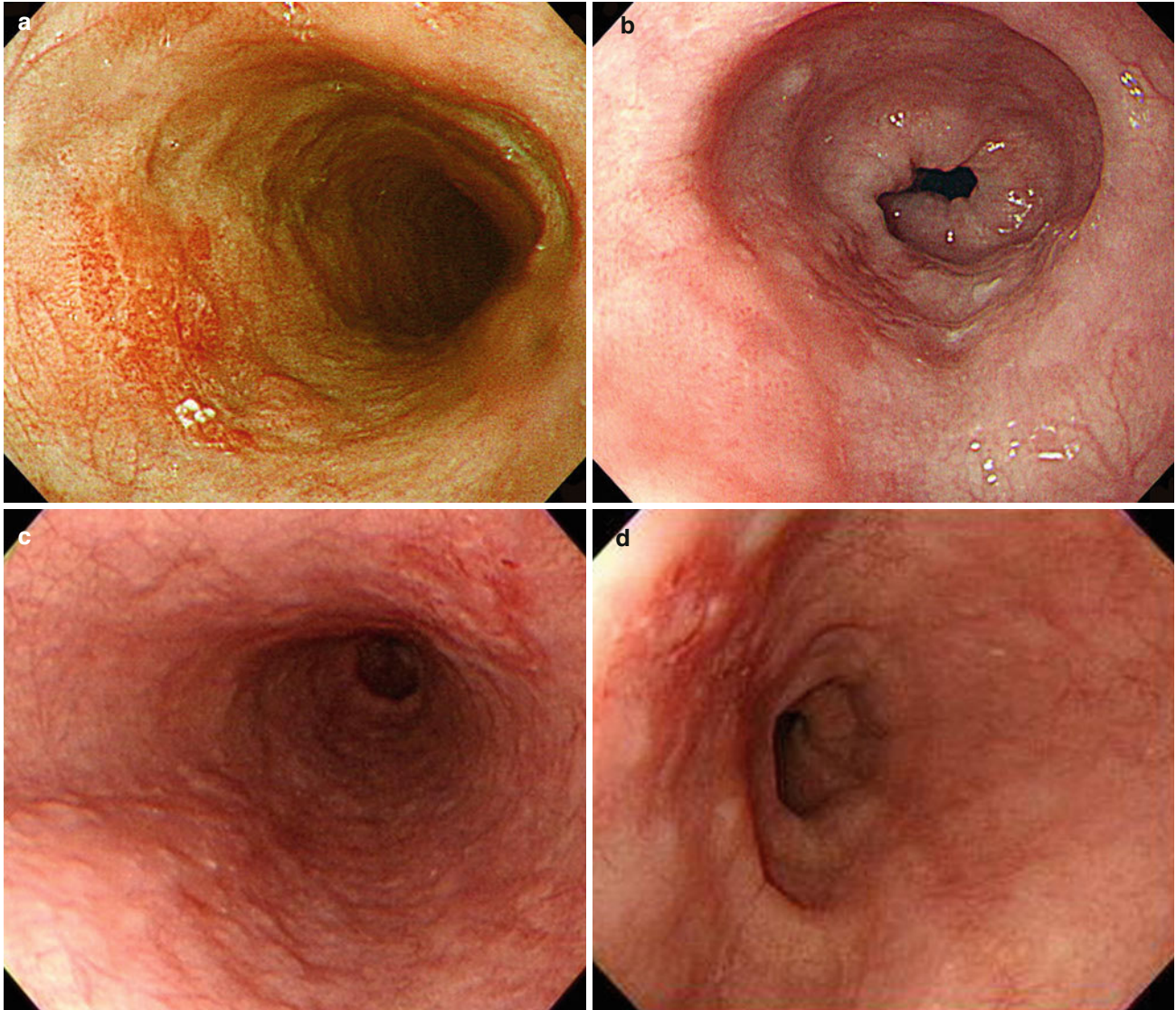
**Table 6.2** Endoscopic findings of superficial esophageal cancer

Key endoscopic findings
Superficial mucosal alteration, discoloration (Fig. 6.1)
Nodular or depressed mucosa (Fig. 6.2)
Erythema, erosion, or ulceration (Fig. 6.3)
Mucosa is friable and bleeds easily on examination and biopsy (Fig. 6.4)

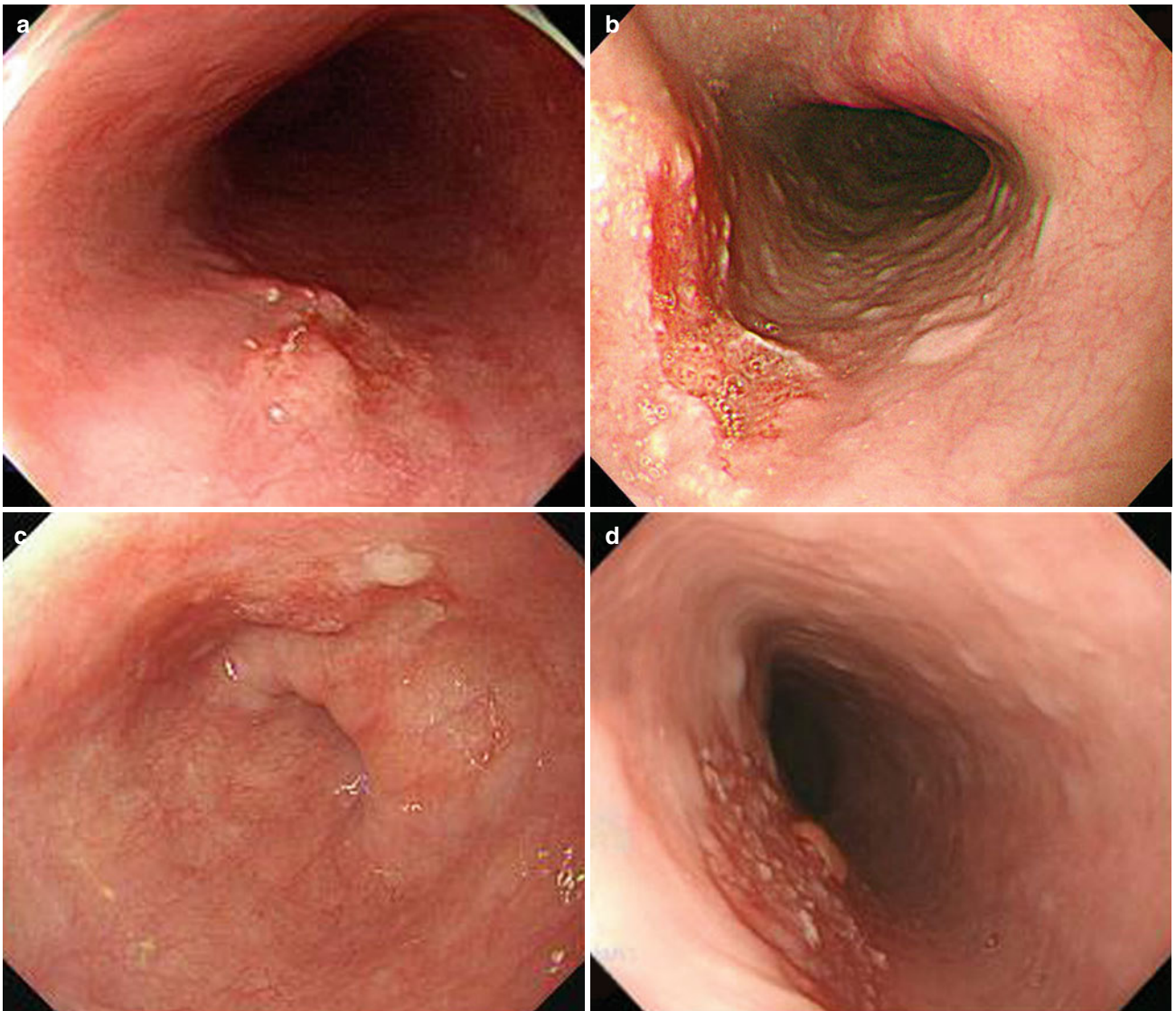
### 6.1.3 Importance of Chromoendoscopy and Narrow Band Image (NBI)

Lugol chromoendoscopy is useful for the detection of superficial esophageal squamous carcinoma. Lugol's solution is useful in determining the exact extent of the lesion. A 1 %

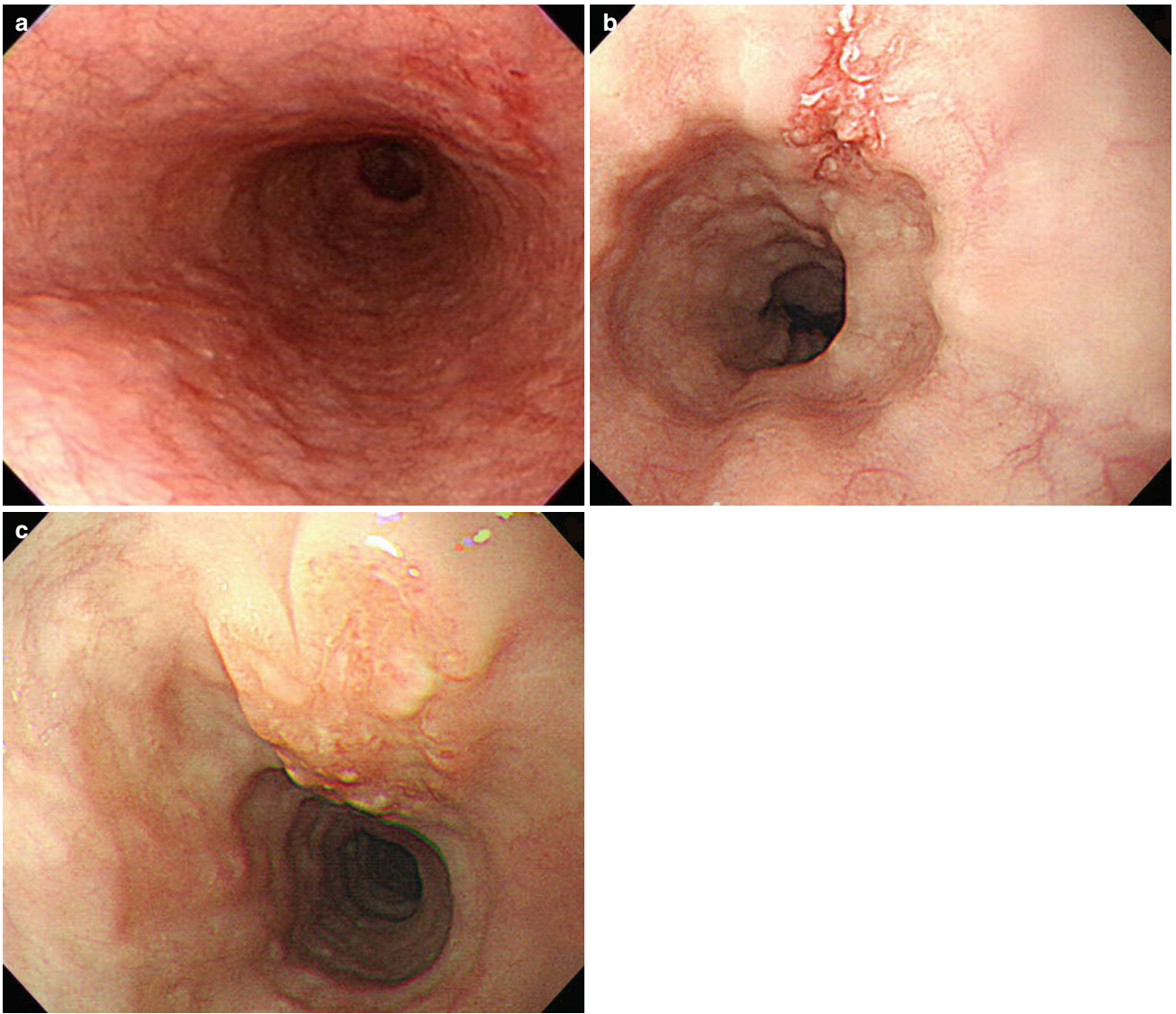
diluted solution is usually sprayed on the entire esophagus, and the abnormal neoplastic epithelium is not stained in a few minutes by not binding with iodine in Lugol's solution. The endoscopic appearance of NBI in superficial esophageal cancer shows a well-demarcated brownish area and an irregular microvascular pattern (Fig. 6.5).



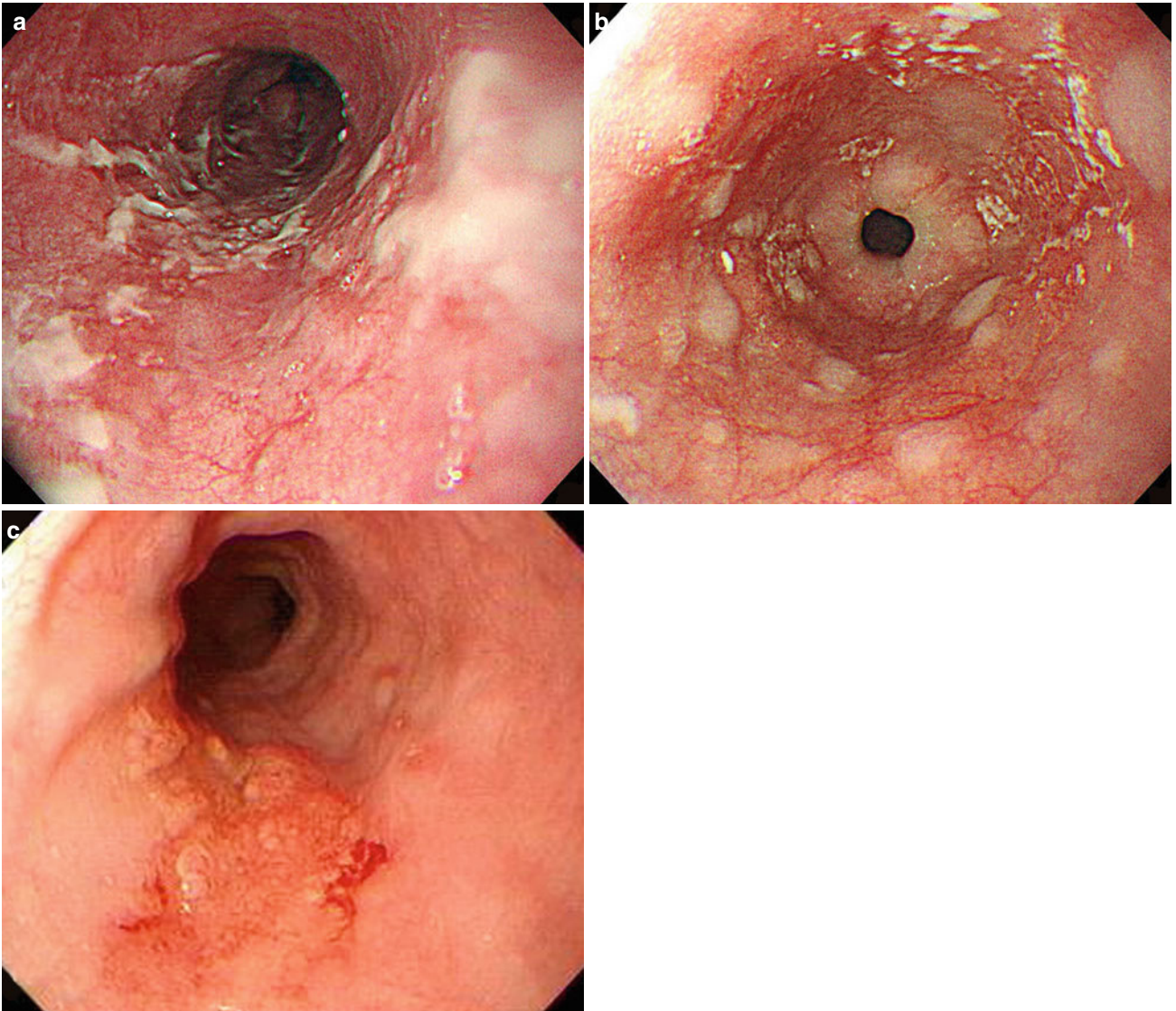
**Fig. 6.1** Superficial esophageal cancers. Superficial mucosal alteration and discoloration are noted



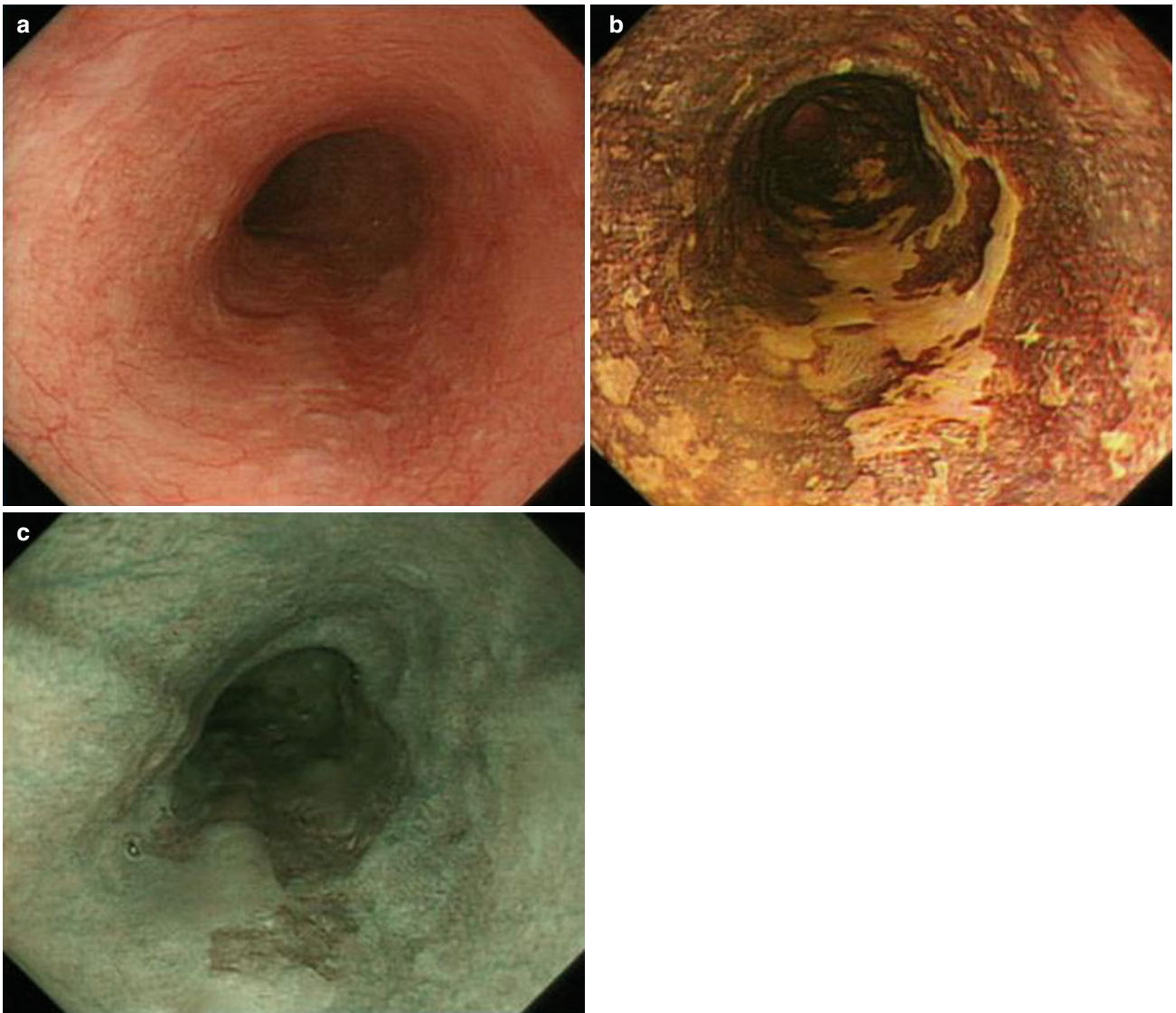
**Fig. 6.2** Examples of superficial esophageal cancers. Nodular or depressed mucosae are shown



**Fig. 6.3** Superficial esophageal cancers. Erythema, erosion, or ulceration



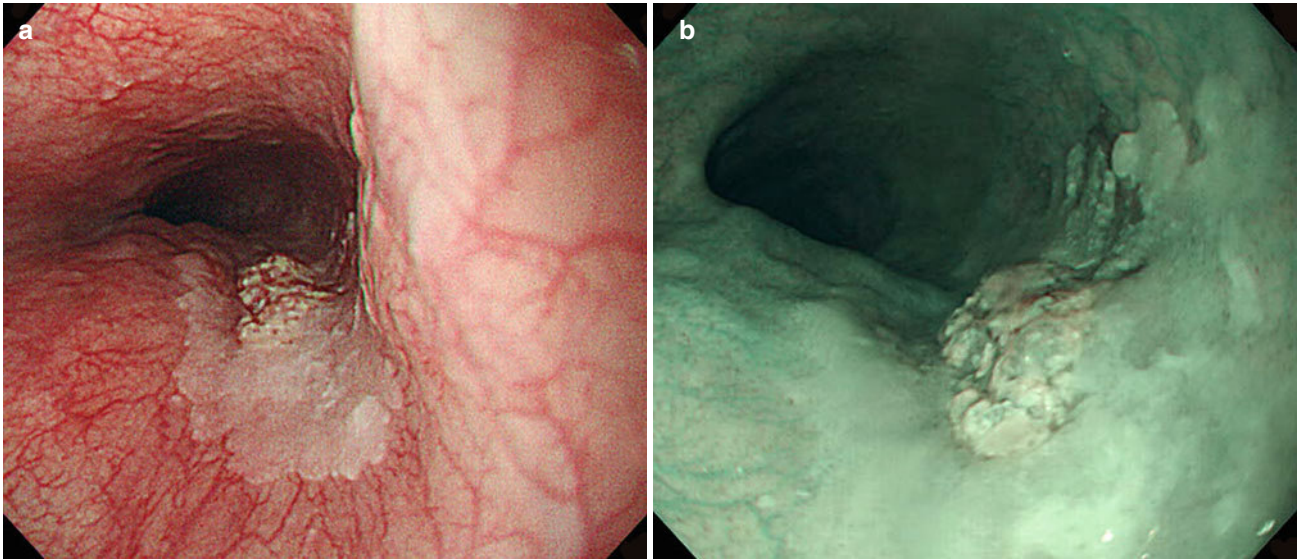
**Fig. 6.4** Superficial esophageal cancers. Mucosa is friable and bleeds easily on examination and biopsy



**Fig. 6.5** Comparison of screening tool for superficial esophageal cancer. A superficial esophageal lesion is prominent after chromoendoscopy and NBI. (a) White light conventional endoscopy, (b) chromoendoscopy with iodine staining, (c) narrow band imaging (NBI)

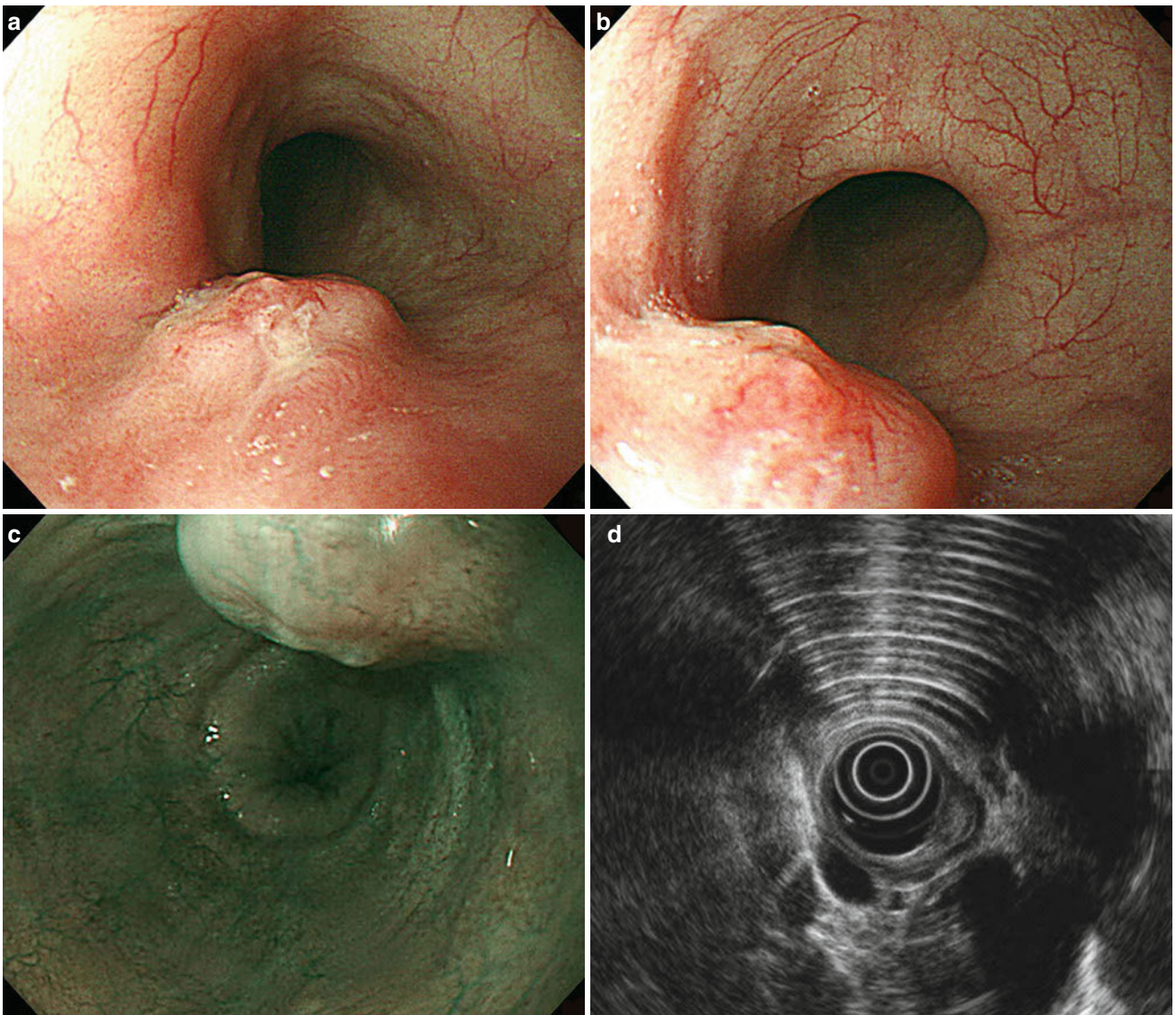
### 6.1.4 Endoscopic Findings of Superficial Esophageal Cancer

Endoscopic findings of superficial esophageal cancer are shown in Figs. 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 6.18, 6.19, and 6.20. They show various features such as subtle discoloration, minute nodularity or depression, erythema, erosion or ulceration, and friable mucosa [2].

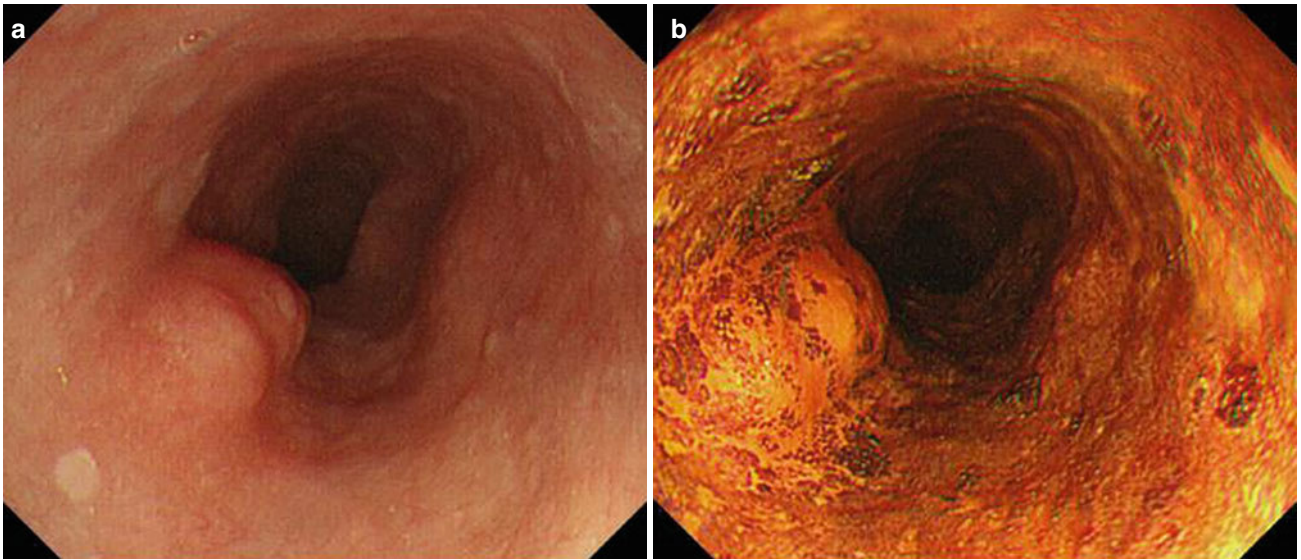


**Fig. 6.6** Superficial esophageal cancer. A sessile elevated lesion (O-Is) with mucosal color change is evident (*left*). The mucosal change is prominent with NBI (*right*). This area was confirmed to be containing squamous epithelial cancer cells

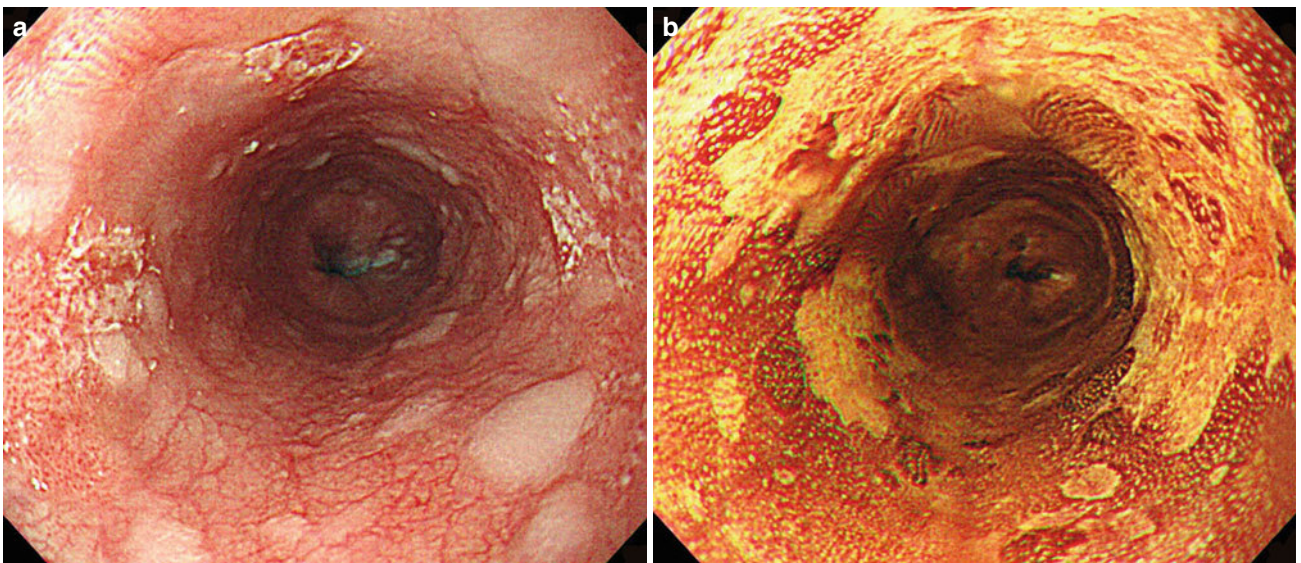




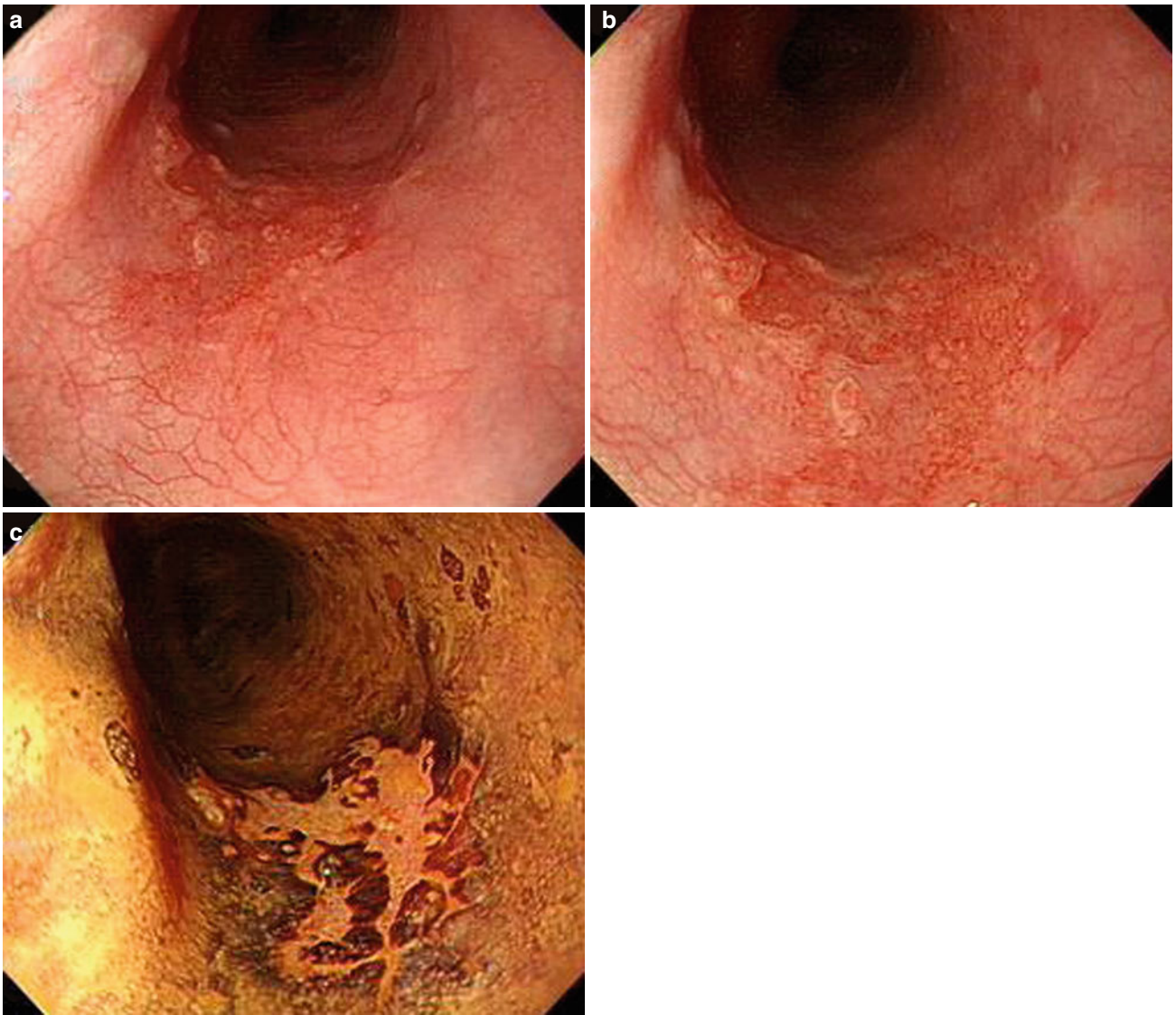
**Fig. 6.7** Superficial esophageal cancer. A submucosal mass-like lesion (O-Is) with central depression is noted at low esophagus (a, b, c). EUS finding shows about 0.7 cm-sized mass on the second layer (d). This area was confirmed to be containing squamous epithelial cancer cells



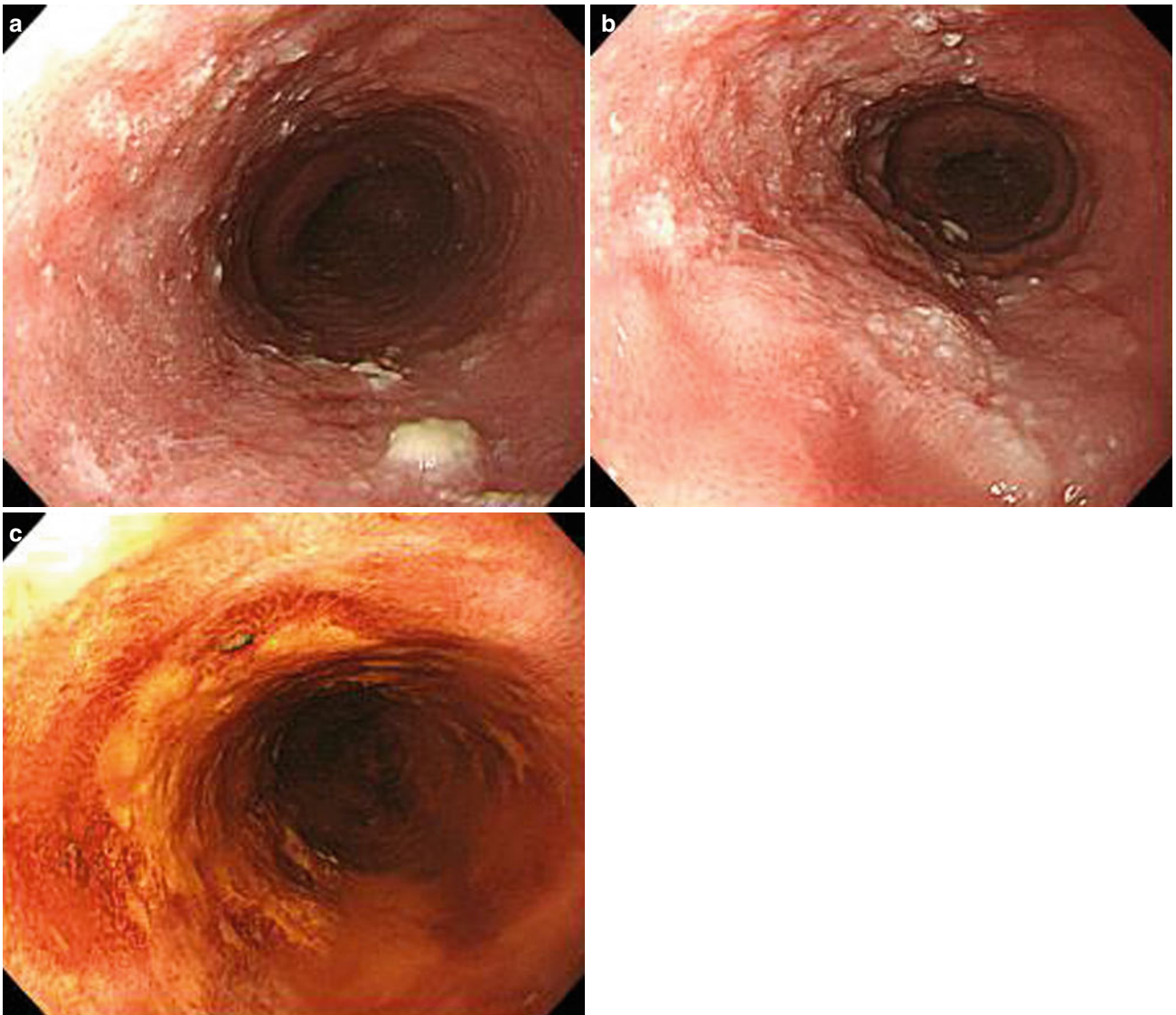
**Fig. 6.8** Superficial esophageal cancer. A submucosal mass-like lesion is noted (a). This lesion does not stain with Lugol's solution (b). It was confirmed to be sessile-type (O-Is) squamous cell carcinoma of the esophagus



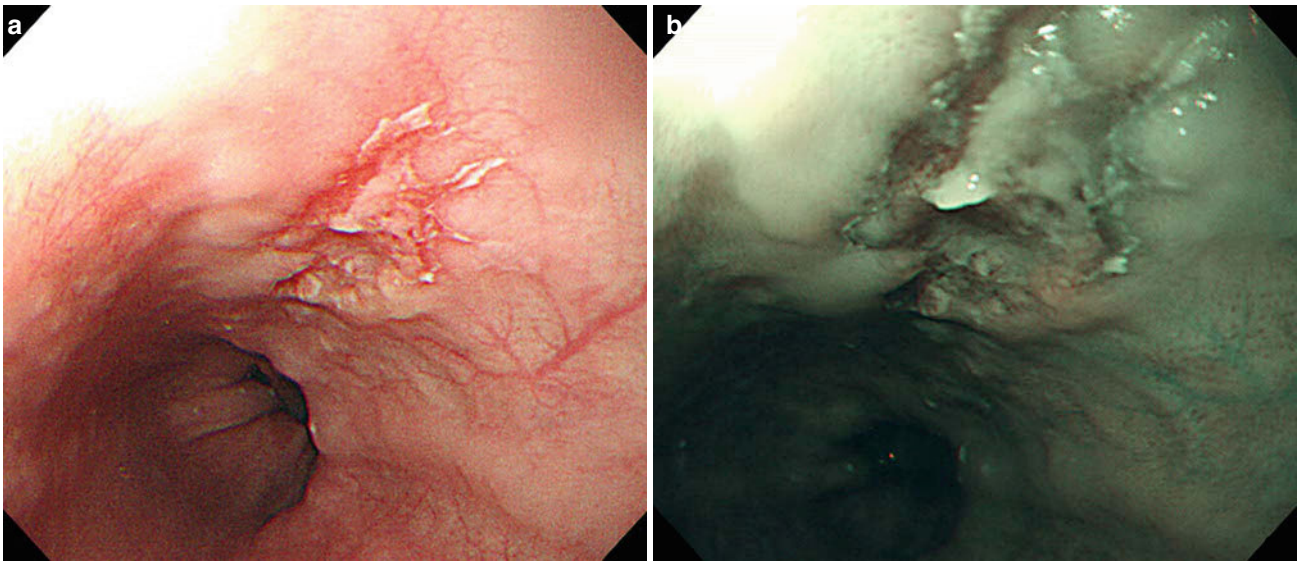
**Fig. 6.9** Superficial esophageal cancer. Multifocal erythematous mucosal change areas without vascularity are noted (a). These areas are not stained with Lugol's solution (b). These lesions were diagnosed as elevated and depressed-type (O-IIa + IIc) squamous epithelial carcinoma



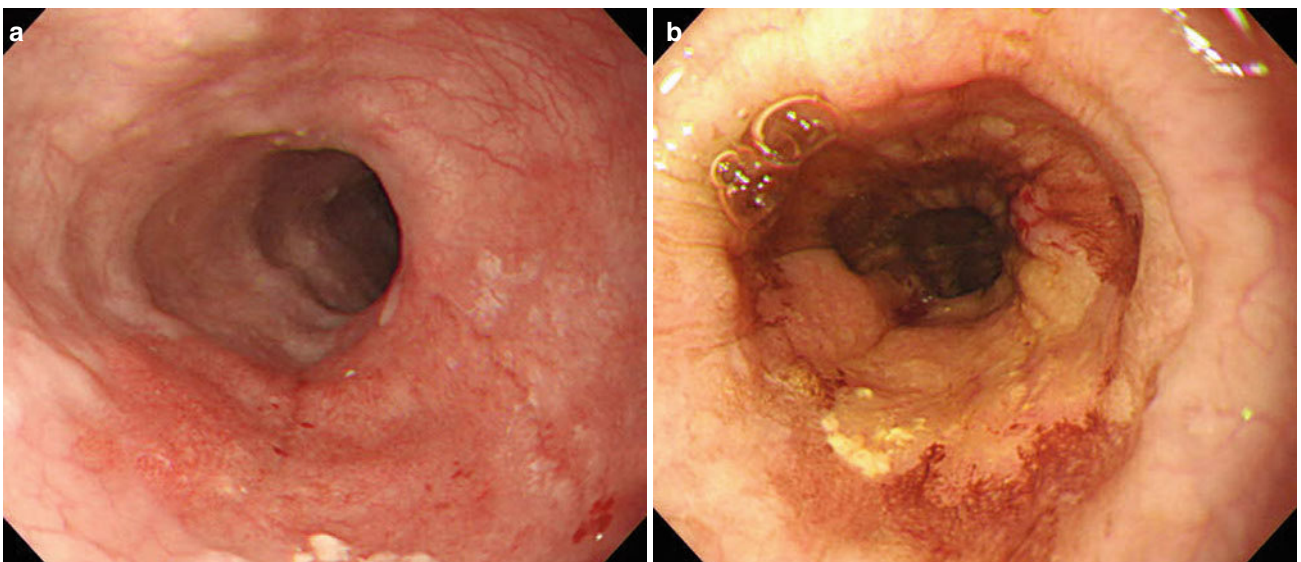
**Fig. 6.10** Superficial esophageal cancer. An irregular-margined mild-depressed lesion with erythematous mucosal change is noted (a, b). This lesion was diagnosed as elevated and depressed-type (O-IIa + IIc) squamous epithelial carcinoma



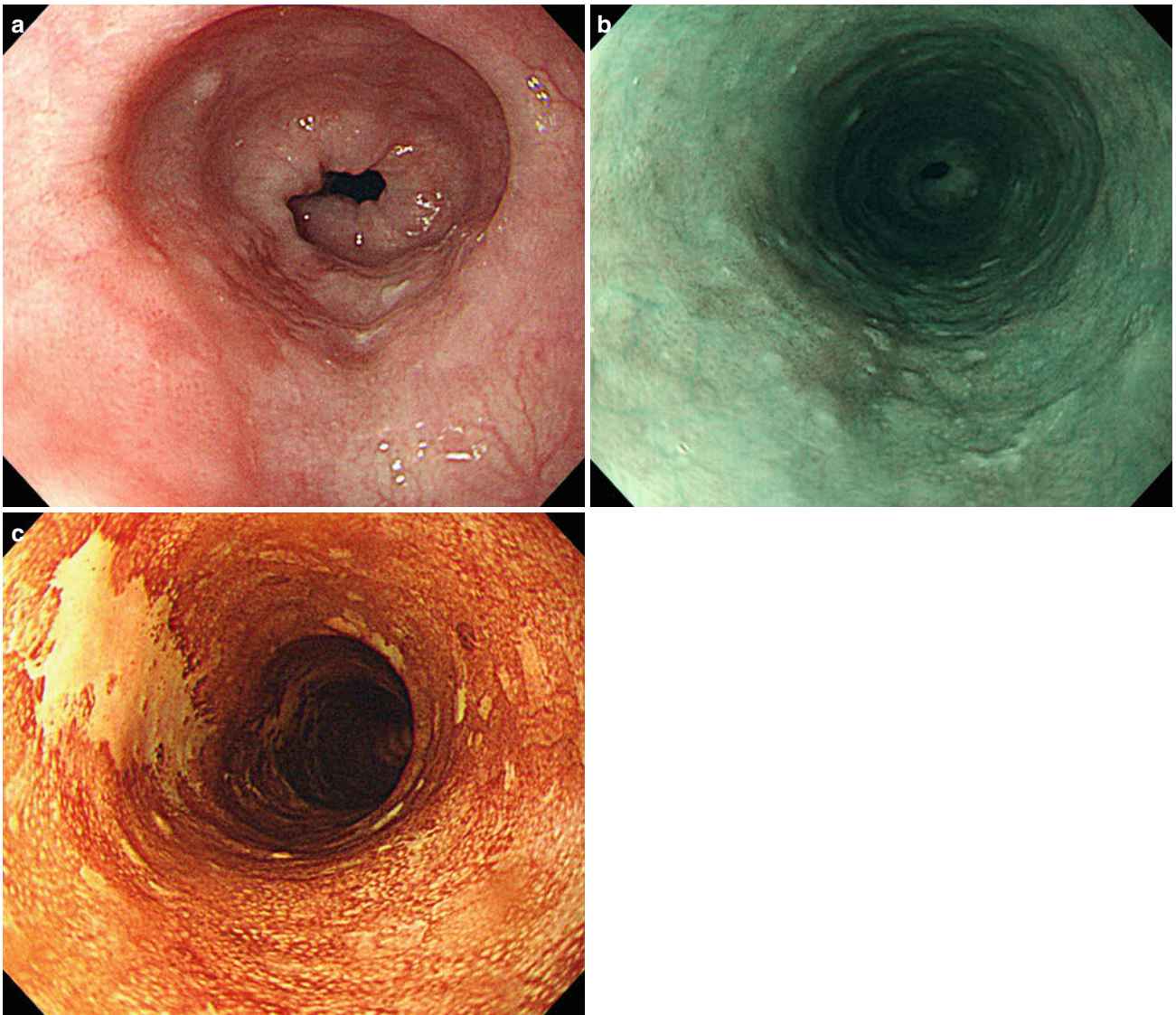
**Fig. 6.11** Superficial esophageal cancer. Some irregular mucosal change with adhesion of whitish exudate is noted (a, b). This lesion is not stained with Lugol's solution (c). It was diagnosed as a slightly depressed-type (O-IIc) squamous epithelial carcinoma



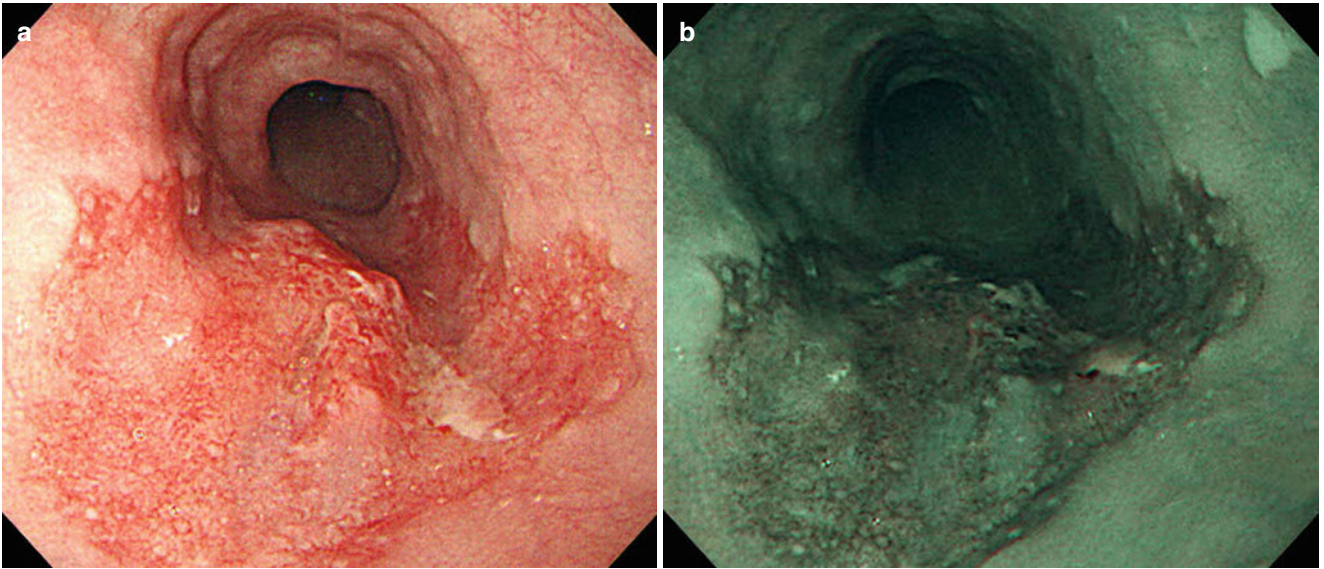
**Fig. 6.12** Superficial esophageal cancer. A linear ulcerative lesion with irregular margin is noted (a). The mucosal change is prominent with NBI (b). It was diagnosed as ulcer-type (O-III) squamous epithelial carcinoma of the esophagus



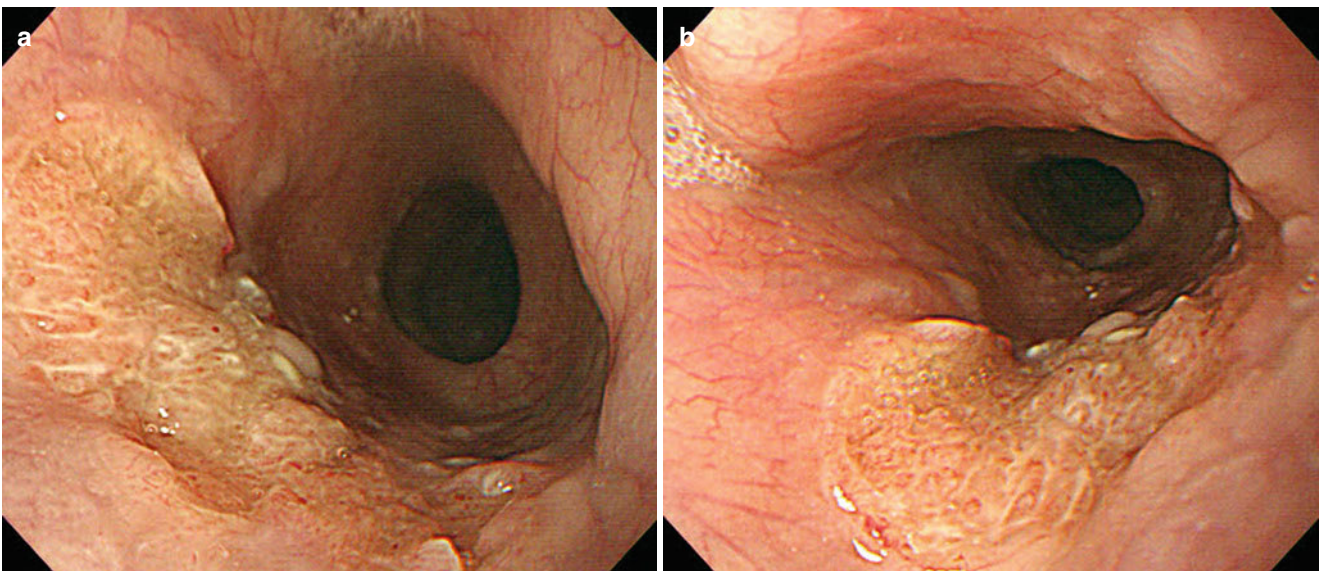
**Fig. 6.13** Superficial esophageal cancer. A round-shaped minimal mucosal change lesion is noted (a). These lesions are not stained with Lugol's solution (b). A completely flat-type (O-IIb) superficial esophageal cancer was diagnosed



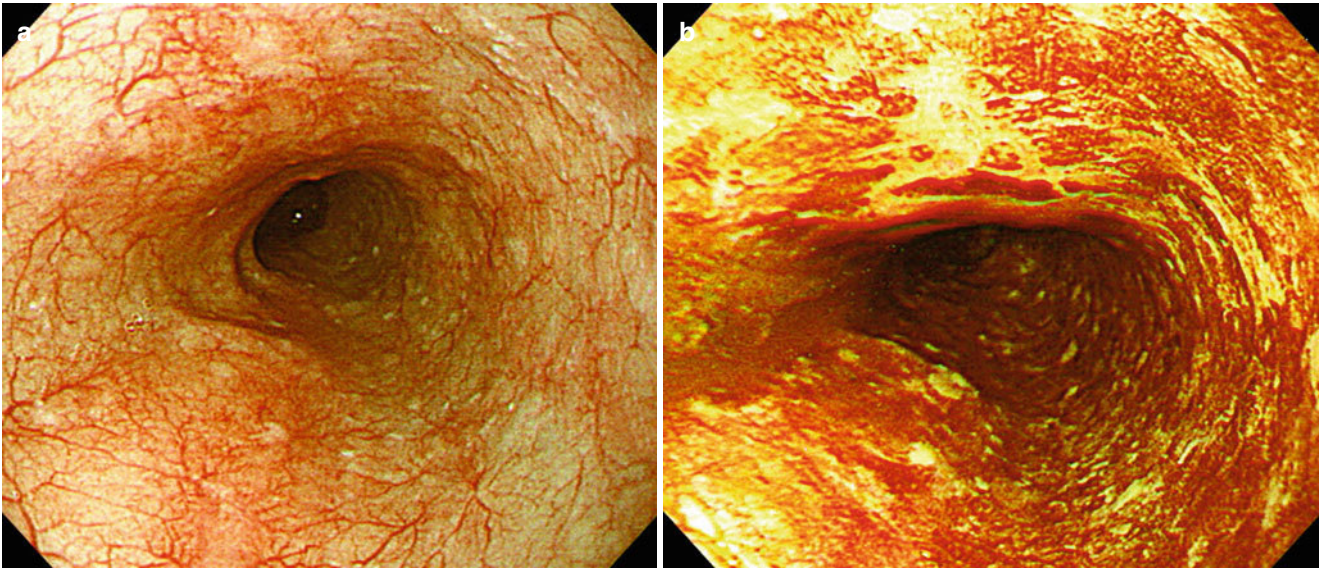
**Fig. 6.14** Superficial esophageal cancer. A round-shaped minimal mucosal color change lesion is noted (a, b: NBI). These lesions are not stained with Lugol's solution (c). A completely flat-type (O-IIb) superficial esophageal cancer was diagnosed



**Fig. 6.15** Superficial esophageal cancer. A round-shaped mucosal change lesion is noted. An elevated and depressed-type (O-IIa + IIc) superficial esophageal cancer was diagnosed

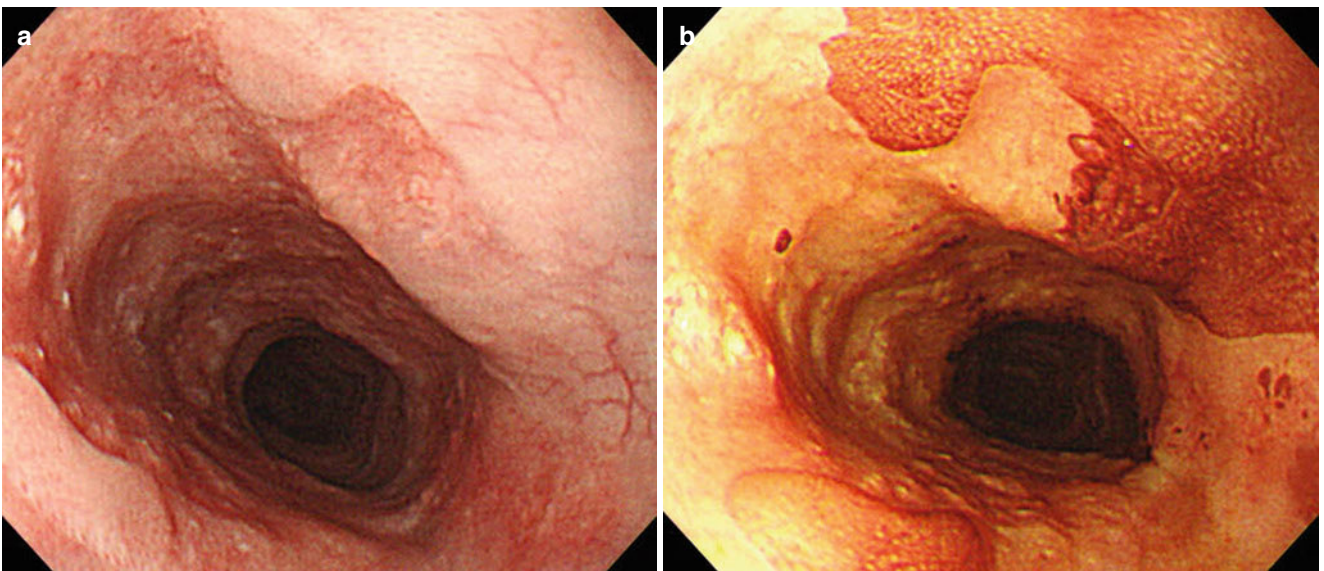


**Fig. 6.16** Superficial esophageal cancer. A slightly depressed-type (O-IIc) lesion on endoscopic examination is evident in the mid-esophagus. A squamous epithelial cell carcinoma was diagnosed through histological examination



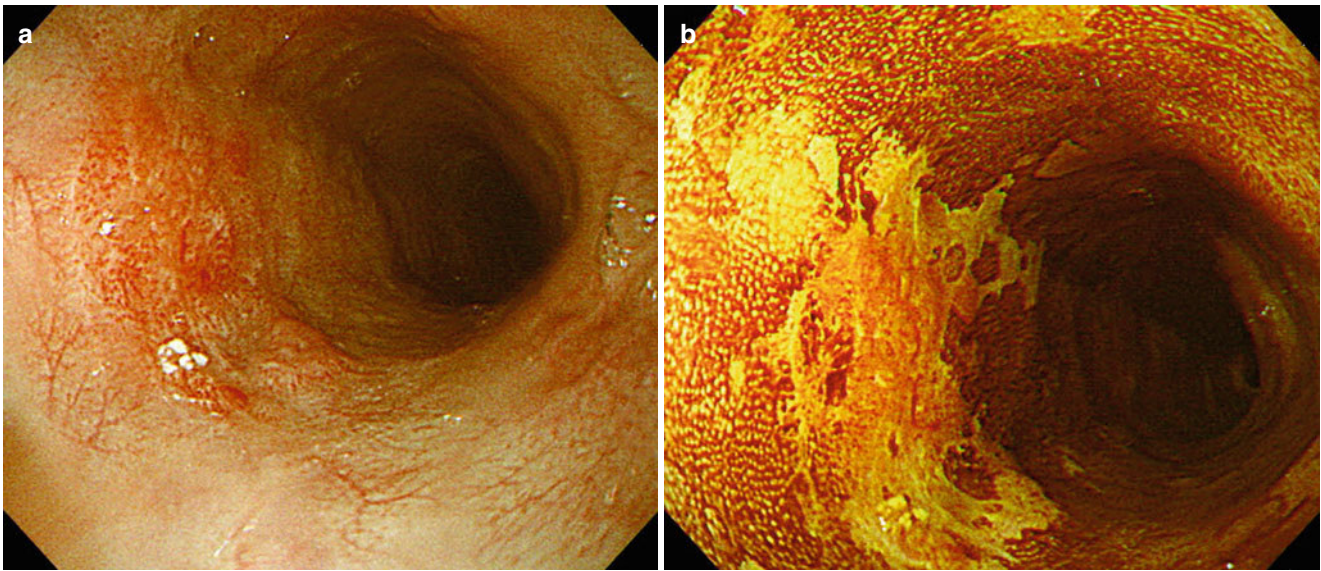
**Fig. 6.17** Superficial esophageal cancer. Minute changes of the mucosa should not be missed. A minimal irregularity of vascular pattern is seen at the 11 o'clock direction (a). It did not stain with Lugol's

solution (b). A completely flat-type (O-IIb) superficial esophageal cancer was diagnosed

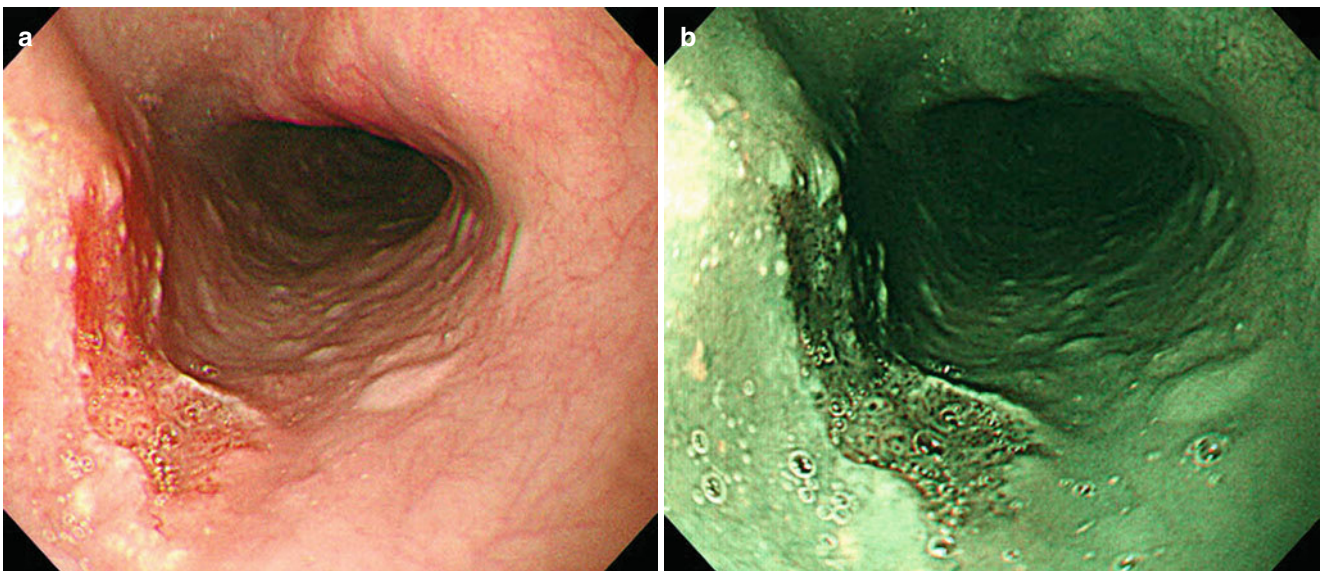


**Fig. 6.18** Superficial esophageal cancer. A circumferential mucosal erythematous change is noted (a). It does not stain with Lugol's solution (b). These lesions were diagnosed as elevated and depressed-type (O-IIa + IIc) squamous epithelial carcinomas





**Fig. 6.19** Superficial esophageal cancer. A mild elevated mucosal change lesion is noted (a). These lesions do not stain with Lugol's solution (b). A slightly elevated-type (O-IIa) superficial esophageal cancer was diagnosed



**Fig. 6.20** Superficial esophageal cancer. A slightly depressed-type (O-IIc) lesion on endoscopic examination is evident in the mid-esophagus (a, b). A squamous epithelial cell carcinoma was diagnosed through histological examination

## 6.2 Advanced Esophageal Cancer

Advanced squamous cell carcinomas can be classified by their morphological types as shown in Table 6.3.

**Table 6.3** Classification of advanced esophageal cancer

Type I	Protruding type
Type II	Ulcerative and localized type
Type III	Ulcerative and infiltrative type
Type IV	Diffusely infiltrative type
Type V	Unclassifiable type

### 6.2.1 Definition

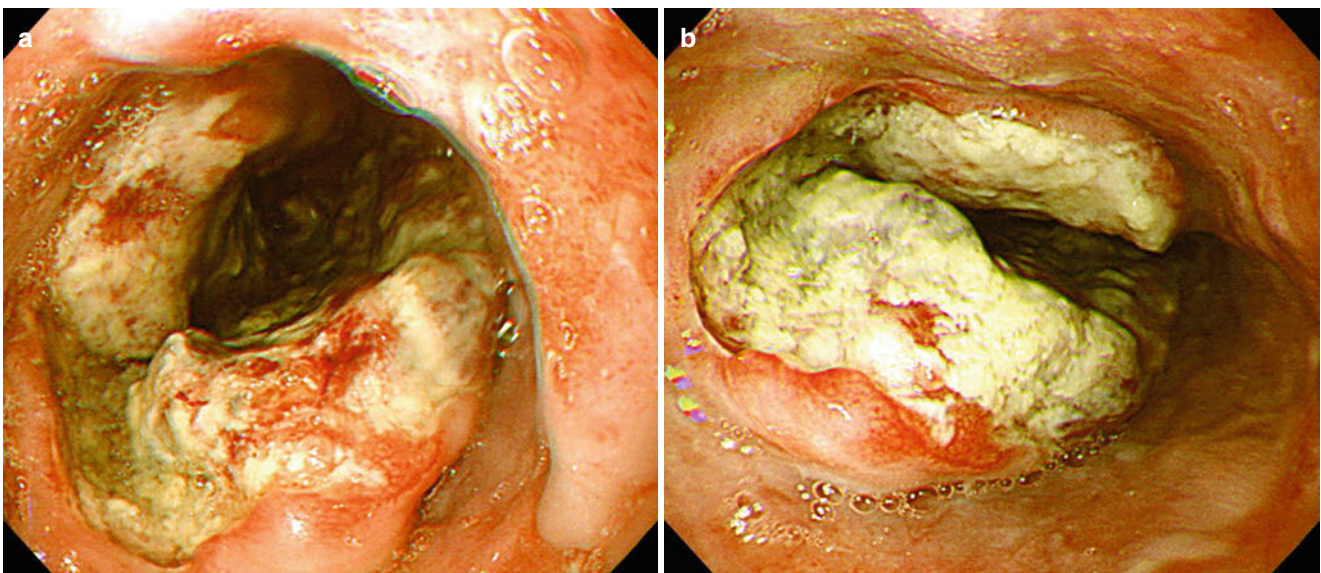
Advanced esophageal cancer is defined as an esophageal cancer invading beyond the proper muscle layer of the esophagus. Typical endoscopic features of advanced esophageal cancers are described in the Table 6.4.

The most common esophageal tumor is squamous cell carcinoma, which occurs predominantly in the middle and

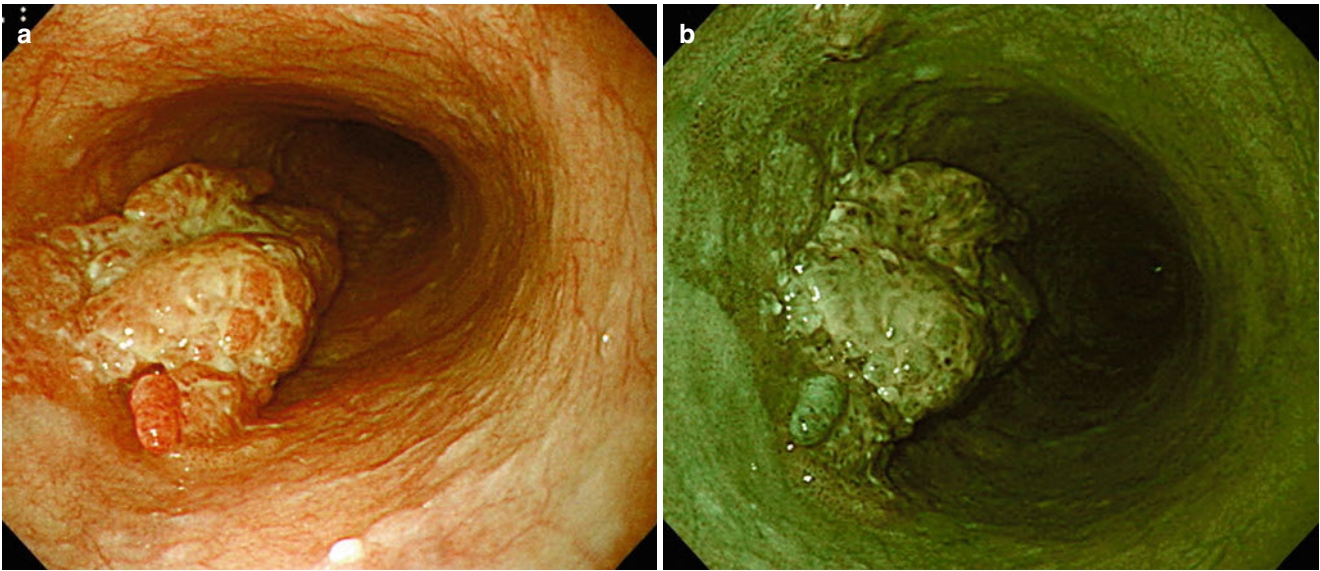
lower third of the esophagus. Adenocarcinomas account for less than 15 % of esophageal cancers, but their incidence is rising sharply. They may arise from ectopic gastric mucosa or columnar-lined esophagus, or they may result from the contiguous spread of a cardia malignancy (Figs. 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, and 6.27).

**Table 6.4** Endoscopic findings of advanced esophageal cancer [3]

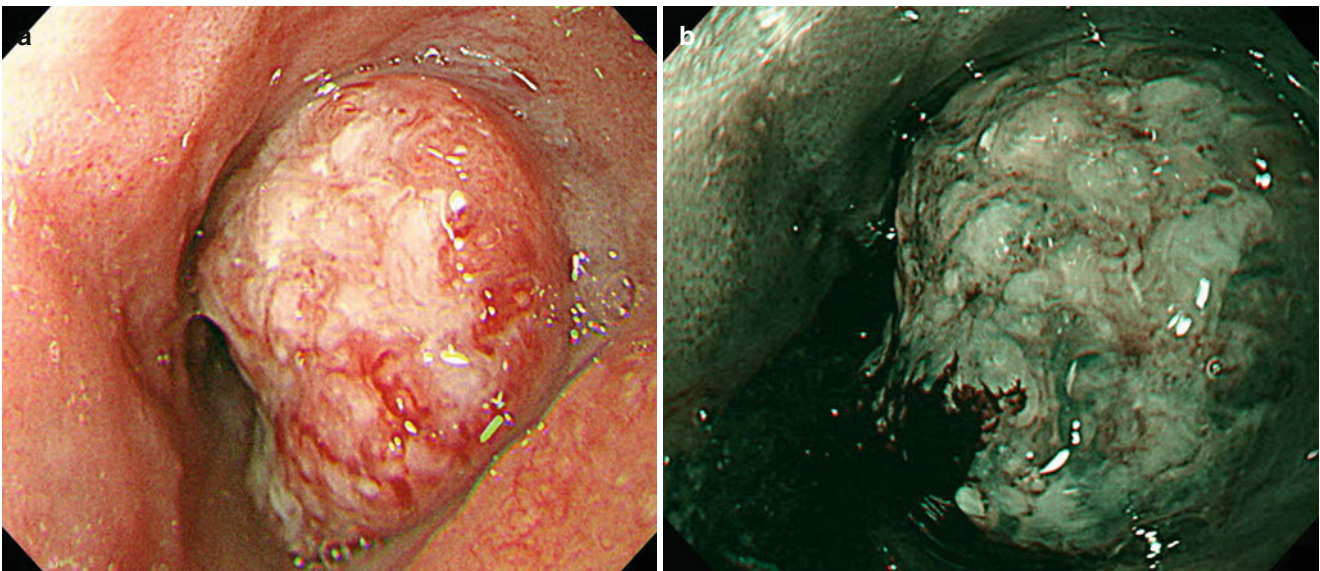
Key endoscopic findings
Exophytic, polypoid mass
Fungiform, clefted surface, sometimes with central excavation
Erythema, erosion, ulceration
Pale gray, sometimes reddish discoloration
Ulcerative carcinoma
Deep ulcer with raised edges that show nodular thickening
Diffusely infiltrating carcinoma
Often shows circumferential growth, occasional submucosal growth
Indurated wall, eccentric luminal narrowing
Surface may be nodular or ulcerated, but the mucosa may appear normal



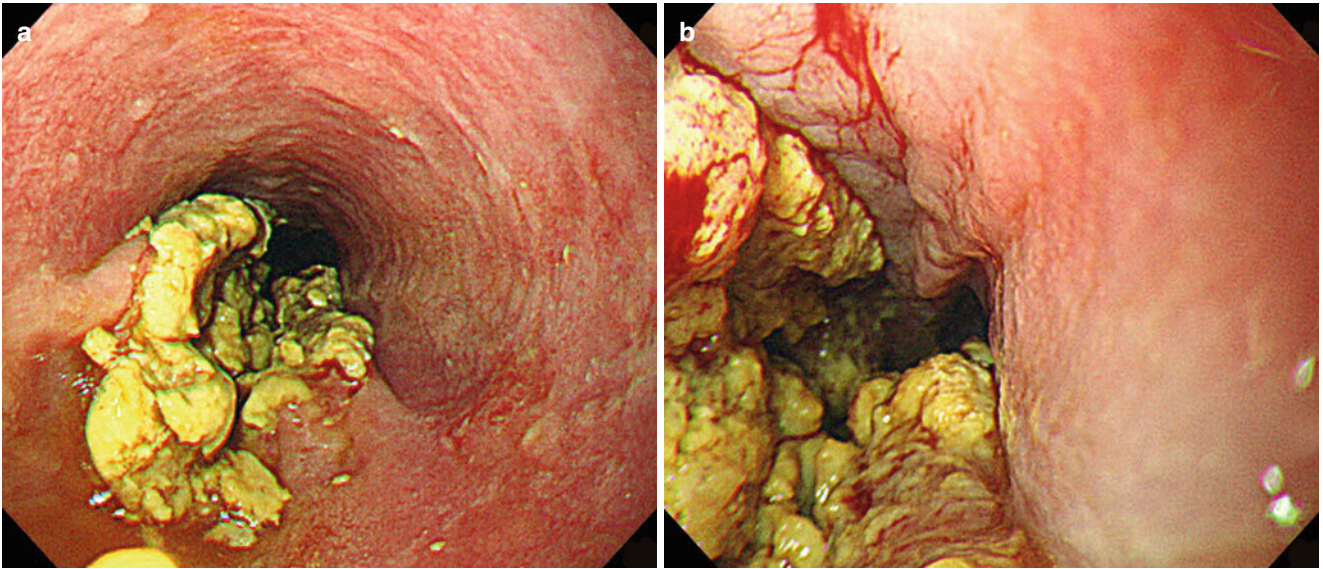
**Fig. 6.21** Advanced esophageal cancer. An ulcerative lesion of the mid-esophagus with heaped up margin. This lesion is an ulcerative and localized-type (type 2) advanced esophageal cancer. It was histologically proven as squamous cell carcinoma



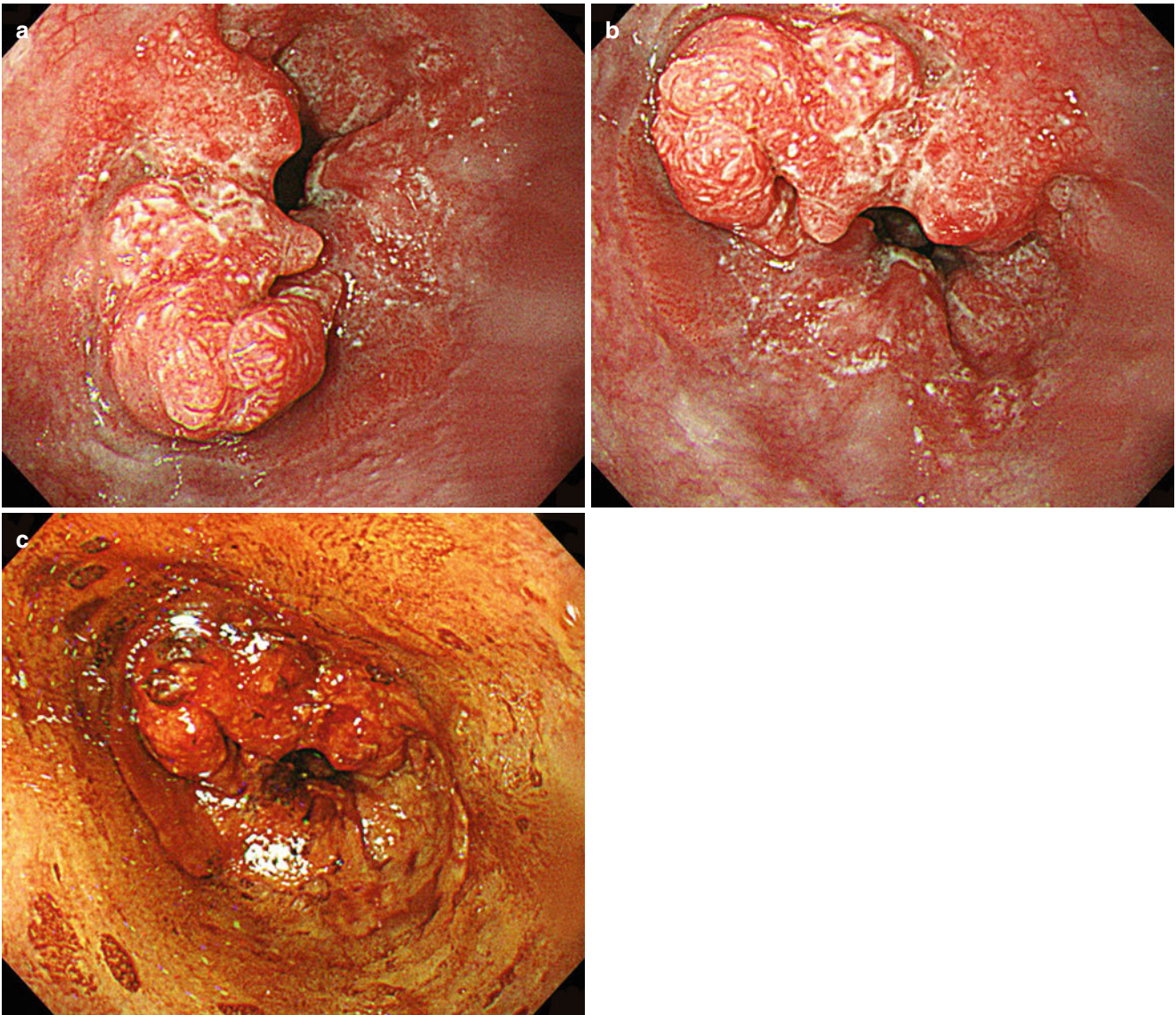
**Fig. 6.22** Advanced esophageal cancer. A protruding-type (type 1) advanced esophageal cancer is noted in the lower esophagus. It was histologically proven as squamous cell carcinoma



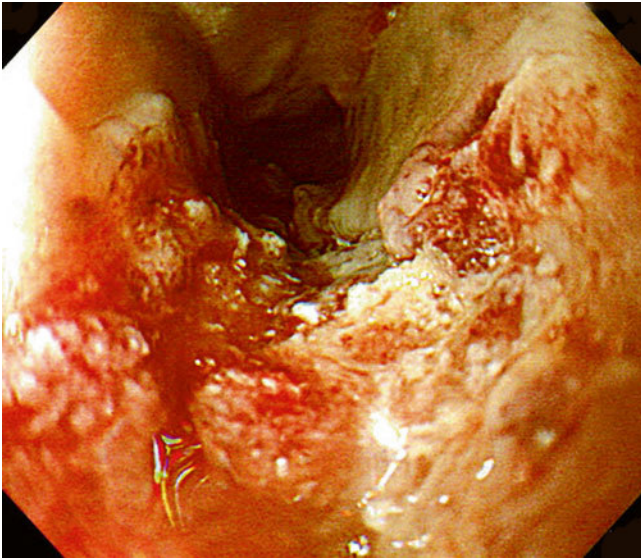
**Fig. 6.23** Advanced esophageal cancer. A subepithelial lesion with central ulceration is noted. It was histologically proven as squamous cell carcinoma



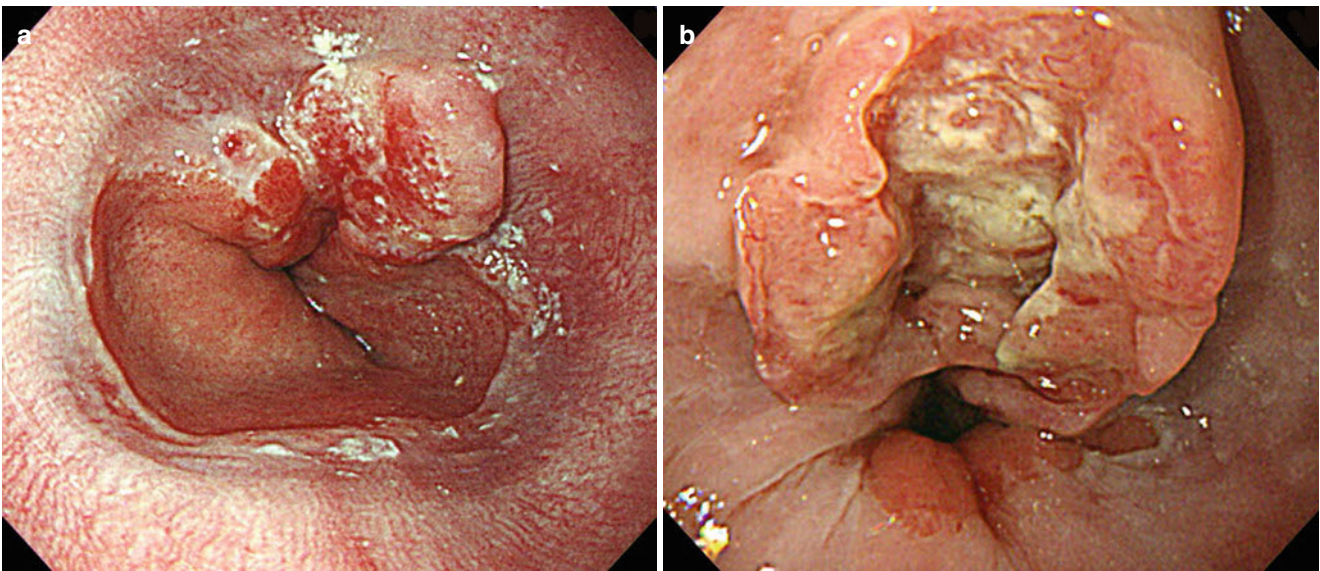
**Fig. 6.24** Advanced esophageal cancer. A hemicircumferential raised ulcerative lesion in the mid-esophagus with heaped up margin. This lesion is an ulcerative and localized-type (type 2) advanced esophageal cancer. It was histologically proven as squamous cell carcinoma



**Fig. 6.25** Advanced esophageal cancer. A luminal encircling ulcerative and infiltrative lesion (type 3) is noted in the lower esophagus. It was histologically proven as squamous cell carcinoma



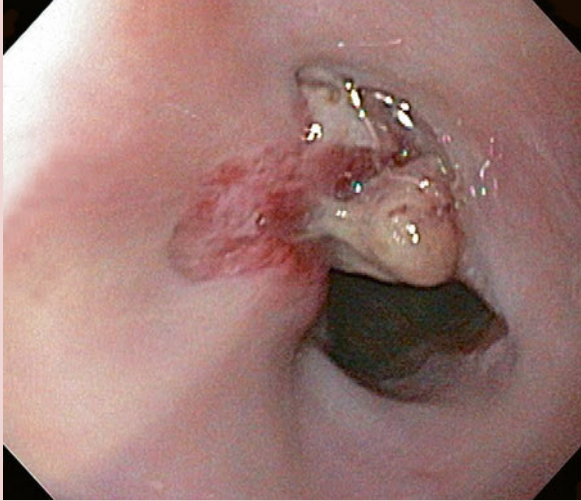
**Fig. 6.26** Advanced esophageal cancer. A diffusely infiltrative-type (type 4) advanced esophageal cancer is noted. It was histologically proven as squamous cell carcinoma



**Fig. 6.27** Advanced esophageal cancer. Esophageal adenocarcinoma cases in the gastroesophageal junction area. An erythematous focal flat-elevated lesion is noted (a). An ulcerative lesion with heaped up margin is noted (b)

**Interesting Case**

A 78-year-old male visited due to esophageal mass. He received a right hemicolectomy due to ascending colon cancer two years ago. The surgical stage was T3N0M0. Upper GI endoscopy showed reddish ulcerative mass at gastroesophageal junction area (Fig. 6.28). Endoscopic biopsy revealed an adenocarcinoma with moderate differentiation. So we performed an esophagogastrectomy. Final pathologic report was a metastatic adenocarcinoma from colon cancer.



**Fig. 6.28** Metastatic adenocarcinoma from colon cancer. Upper GI endoscopy shows an ulcerative mass at the gastroesophageal junction area



## References

1. Participants in the Paris Workshop. The Paris endoscopic classification of superficial neoplastic lesions: esophagus, stomach, and colon. *Gastrointest Endosc.* 2003;58(Suppl 6):3–43.
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