A case of multiple carcinoid tumors of the small intestine

Fig. 1 **a** Capsule endoscopy showing smooth protrusions covered by normal-appearing mucosa. **b** Some of the tumors have a central depression on the top.

Fig. 2 Intraoperative enteroscopy showing multiple smooth protrusions.

Fig. 3 Macroscopic examination of the resected segment of the small intestine. There were 111 protrusions ranging from 1 mm to 13 mm in size. The tumors had a smooth surface with an occasional ulcer in the center and were located predominantly in the antimesenteric surface of the intestine.

A 56-year-old man was referred to our institution with hematochezia and general fatigue. Esophagogastroduodenoscopy, total colonoscopy, and angiography failed to identify the source of bleeding. We then examined the patient with capsule endoscopy, which revealed multiple elevated lesions in the middle of the small intestine (Fig. 1). The tumors were yellowish in color and were covered with mucosa of normal appearance.

Intraoperative enteroscopy carried out during a laparotomy also revealed numerous protrusions (Fig. 2). A 97-cm segment of the middle part of the small intestine was resected. On macroscopic examination, 111 protrusions were noted in the resected segment (Fig. 3). The size of the tumors ranged from 1 mm to 13 mm. Microscopically, the tumors were composed of uniform cells, with a round to oval nucleus and eosinophilic cytoplasm, proliferating in a solid, trabecular, or glandular fashion. Two tumors had invaded the muscularis propria and the serosa (Fig. 4). The patient has been metastasis-free for 4 years since the surgery.

Approximately 30% of carcinoid tumors of the small bowel occur as multiple tumors [1,2]. However, there have been few reports of more than 10 carcinoid tumors of the small intestine in one patient. Yan-tiss et al. [3] reported that patients with

multiple carcinoid tumors were usually younger, had more frequent vascular invasion, and had a poorer prognosis than patients with a single tumor.

With the widespread use of capsule endoscopy and double-balloon endoscopy, enteroscopic findings of gastrointestinal polyposis have become clearer [4,5]. On the basis on our experience, we recommend considering multiple carcinoids as a possible diagnosis in patients with numerous polypoid lesions in the small intestine.

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Fig. 4 a The tumor cells, showing a round or oval nucleus and eosinophilic cytoplasm, are arranged in a solid, trabecular, or glandular pattern.

b Microscopic section from the largest tumor showing that the tumor cells had invaded the muscularis propria.

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