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Case Report

A Granulation Polyp in the Colon Masquerading as Metastatic Cancer

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A 60-year-old Caucasian male was diagnosed with lung adenocarcinoma and multiple metastases to the bone, spleen, and brain. He underwent radiotherapy for the brain and lumbar spine metastases, plus chemotherapy (cisplatin and pemetrexed). The chemotherapy was discontinued due to vomiting and hyponatremia, and nivolumab was then administered. Eight months later, 18F-fluorodeoxyglucose positron emission tomography showed tracer uptake in the colon. Colonoscopy revealed a reddish multinodular polyp in the sigmoid colon. The polyp showed irregular microvessels. No colonic mucosal surface structures were observed. Colonic metastasis of the lung carcinoma was highly suspected; the polyp was therefore surgically removed. The histological analysis revealed granulation tissue and suppurative inflammation without neoplastic changes. We diagnosed the lesion as a granulation polyp. Despite the difficulty in diagnosing these lesions due to their rarity and similarity to metastatic colon tumors, we suggest that recognizing the endoscopic features of the polyp surface may allow a preoperative diagnosis.

Key words: colonoscopy, colonic neoplasms, granulation polyp

The ability to promptly differentiate and diagnose adenomas and cancers during colonoscopy has greatly increased over the past two decades with the development of a magnifying endoscopy apparatus and the establishment of a diagnostic system for colorectal neoplasms [1, 2]. The diagnostic approach relies on the evaluation of macroscopic morphology and architectural details of the mucosa as visualized by magnifying endoscopy. However, it remains difficult to diagnose other polypoid lesions in the colorectum, such as metastatic tumor and inflammation-induced lesions, due to the rarity and morphological diversity of these lesions.

Herein, we report the case of a patient with a granulation polyp in the sigmoid colon which was initially suspected to be a metastatic tumor because the patient had been diagnosed with stage IV lung cancer. For this patient, surgical resection was required to reach the final diagnosis of a colonic granulation polyp. This report thus focuses primarily on the morphology of this rare type of colonic polyp, which may be used as a preoperative diagnostic tool.

Case Presentation

A 60-year-old Caucasian male was diagnosed with polymyalgia rheumatica. After treatment with an oral corticosteroid, his myalgia improved and the medication was gradually reduced. During the treatment, a unilateral hilar mass was detected on a chest x-ray. Computed tomography (CT) revealed multiple lung tumors with hilar lymphadenopathies. The patient then underwent endobronchial ultrasound-guided transbronchial needle aspiration and was diagnosed with

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lung adenocarcinoma. 18F-fluorodeoxyglucose positron emission tomography (18F-FDG PET) and magnetic resonance imaging (MRI) revealed metastases to the lumbar spine, spleen, and parietal lobe of the brain. He was treated with radiotherapy for the brain and lumbar spine metastases in addition to chemotherapy consisting of cisplatin and pemetrexed. After the discontinuation of this chemotherapy regimen due to vomiting and hyponatremia, nivolumab was administered. Eight months later, 18F-FDG PET showed tracer uptake in the colon (Fig. 1A). Repeated CT revealed a tumor which was enhanced with contrast media (Fig. 1B). The tumor was not detected during a CT scan performed 15 months earlier; however, diverticula were observed in that area (Fig. 1C). The patient was then referred to our department for further investigation of the colonic lesion.

The patient had been prescribed oxycodone, calcium carbonate, cholecalciferol, and magnesium carbonate. Although he complained of lumbar pain, probably due to lumbar metastasis, abdominal symptoms were absent. Upon physical examination, there were no lymphadenopathies observed in the neck, axillary, or inguinal lymph nodes. No abdominal abnormalities were noted. Laboratory testing revealed an increased level of carcinoembryonic antigen (16.2 ng/mL) and a slightly elevated C-reactive protein (CRP) level (0.42 mg/dL). The CRP level did not increase during the course of the patient's lung cancer treatment. White blood cell and hemoglobin levels were within the normal ranges.

Colonoscopy revealed a reddish multinodular polyp that was approximately 10 mm in diameter in the sigmoid colon (Fig. 2). The periphery of the tumor was elevated and showed a submucosal tumor-like appearance, suggesting the presence of neoplastic cells under the submucosal layer (Fig. 2A, B). Distorted microvessels were observed on the surface of the polyp (Fig. 2B-D). However, pit structure was absent. The presence of multiple diverticula was also noted around the polyp (Fig. 2A).

Biopsy specimens from the polyp contained only granulation tissue. Despite the biopsy results, a colonic metastasis of lung adenocarcinoma was highly suspected, but considering the risk of perforation, endoscopic resection was waived because of the submucosal tumor-like appearance. As of this writing, multiple metastases have responded to treatment with nivolumab, and a complete response was achieved except for the colonic tumor. When the colonic lesion was diagnosed as a newly emerged metastasis, we had to alter the antitumor agent, but the nivolumab was continued when the lesion was non-neoplastic. We therefore performed a partial resection of the sigmoid colon to confirm the diagnosis.

In the resected specimen, a polyp (Fig. 3A, B) was identified adjacent to a diverticulum (Fig. 3B). The approximately 10 mm-diameter polyp was composed of granulation tissue and suppurative inflammation involving the lamina propria, submucosa, and muscular layer; however, epithelial cells and neoplastic changes were absent (Fig. 3C). Substances that appeared to be food residue were also noted in the deep portions of the inflamed area (Fig. 3D). We thus diagnosed the colonic lesion as a granulation polyp that had probably formed subsequent to diverticulitis.

Discussion

Granulation polyps in the colon have rarely been reported. To the best of our knowledge, there are only four previously reported cases (Table 1) [3-6]. Although there are no clear definitions or diagnostic criteria for this disease in light of its rarity, granulation polyps in the colon have been diagnosed when a colonic polyp was composed of inflamed granulation tissue covered by regenerative epithelium without neoplastic cells. In three of the four reported cases, diverticulitis was diagnosed prior to the identification of the granulation polyp in the colon. These lesions were thus thought to have arisen from diverticula resulting from diverticulitis. Similarly, in our patient, we diagnosed a granulation polyp that had probably formed subsequent to diverticulitis, because a diverticulum was observed adjacent to the polyp in the resected specimen, in addition to potential food residue (Fig. 3). Our patient had not reported any symptoms related to diverticulitis, which, we suspect, may have been masked by the administration of oxycodone. Another possible etiology of the polyp is that a metastatic tumor was formed in the sigmoid colon, and the cancer cells subsequently disappeared with the antitumor treatment and were replaced with granulation tissue.

Magnified endoscopic observation revealed distorted microvessels on the surface of our patient's polyp, and pit structure was absent. Generally, the observa-

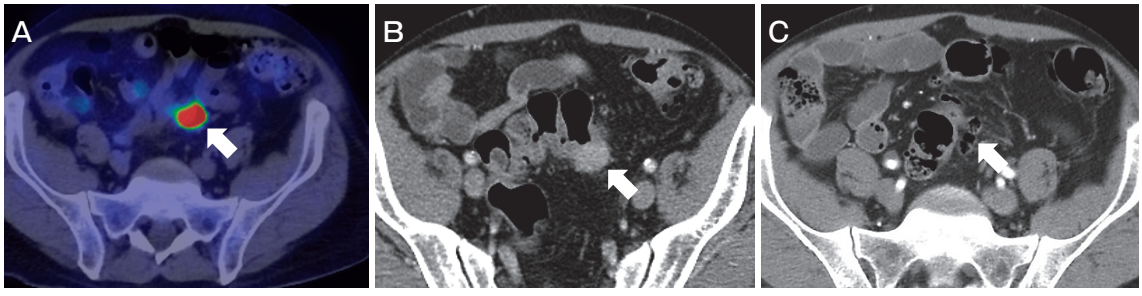

Fig. 1 PET and CT images. Tracer uptake is noted in the colon (**A**, *arrow*). A tumor showing enhancement in the presence of contrast media was observed (**B**, *arrow*). The tumor was not detected 15 months earlier, but diverticula were observed (**C**, *arrow*).

Table 1 Characteristic of cases of granulation polyps in the colon

	Author/Ref.#	Year published	Age	Sex	Location	Diameter (mm)	Pathological diagnosis	Diverticula	Episode of diverticulitis	Underlying disease
1	Hizawa K, *et al.* (3)	2008	73	M	Descending colon	10	EMR	ND	ND	Gastric cancer
2	Mori H, *et al.* (4)	2013	62	F	Sigmoid colon	25	EMR	Present	Present	ND
3	Seo HI, *et al.* (5)	2016	49	M	Ascending colon	10	Biopsy	Present	Present	ND
4	Lee J, *et al.* (6)	2018	39	M	Ascending colon	6	EMR	Present	Present	ND
5	Present case	—	60	M	Sigmoid colon	10	Surgical resection	Present	Absent	Lung cancer

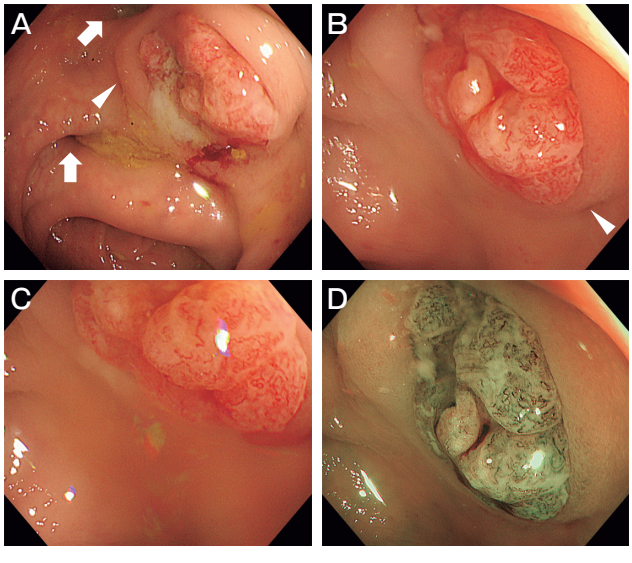

Fig. 2 Colonoscopy images. A reddish multinodular polyp is seen in the sigmoid colon. Multiple diverticula are also noted (**A**, *arrows*). The periphery of the tumor was elevated and showed a submucosal tumor-like appearance (**A**, **B**, *arrowheads*). Distorted microvessels were observed on the surface of the polyp, and pit structures were not observed (**B**, **C**, white light; **D**, narrow-band imaging).

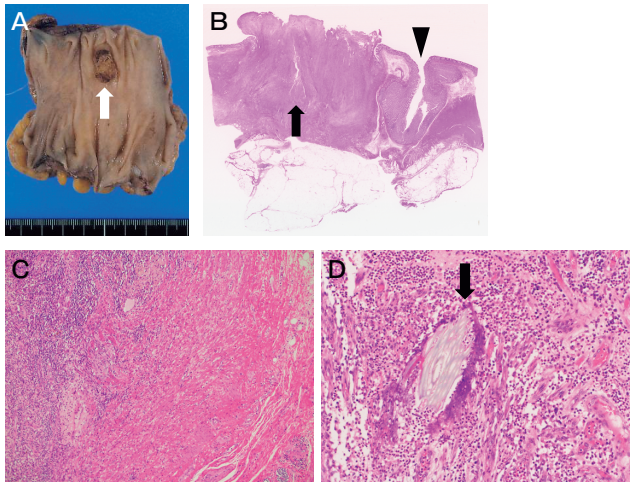

Fig. 3 Images from the pathology evaluation. In the resected specimen (**A**), a diverticulum (**B**, *arrowhead*) was observed adjacent to the polyp (**A**, **B**, *arrow*). The polyp was composed of granulation tissue and suppurative inflammation (**C**), but epithelial cells and neoplastic changes were absent. Substances that appeared to be food residue were also noted in the deep portions of the inflamed area (**D**, *arrow*).

tion of a pit-structure pattern, *i.e.*, crypt opening, is an essential identifying factor for diagnosing colorectal neoplasms [1, 2]. Magnified observation of a pit structure enables the prompt diagnoses of colorectal adenomas, carcinomas without submucosal invasion, and carcinomas with submucosal invasion, because the magnified features reflect structural atypia, crypt destruction, and underlying desmoplastic reaction. However, pit structure was absent throughout the surface of the polyp in our patient's case. Pathologically, although epithelial cells were not identified, granulation tissue composed of inflammatory cells, fibroblasts, and microvessels was present. The magnifying endoscopic features thus corresponded with the patient's pathological features.

Similar endoscopic images were described in a previous report: *i.e.*, a colonic polyp showing irregular microvessels, but no colonic mucosal surface structures [4]. Another report of a colonic granulation polyp presented similar endoscopic images, although diverticulitis was not described [3]. We thus speculate that a colonic polyp showing irregular microvessels without pit structures is a distinct feature of colonic granulation polyps. Although in the previous reports the colonic polyps were resected when neoplasms were suspected, we suggest that in our patient's case, the endoscopic features of the polyp surface may have facilitated an accurate preoperative diagnosis of this lesion.

Polyp-simulating mucosal prolapse syndrome is another category of polypoid lesions associated with diverticular disease [7-9]. This syndrome is characterized by thickened mucosal folds and polypoid lesions with congestion. These lesions are soft, and their surfaces are smooth. The surface pit structure is reportedly similar to that of the surrounding colonic mucosa. Pathological features of this lesion include fibromuscular obliteration, hemosiderin-laden macrophages, capillary thrombi, congestion, telangiectasia, and an infiltration of lymphocytes [7]. The epithelial cells are intact and lack any neoplastic features. A combination of venous obstruction and mucosal redundancy caused by contraction of the muscularis propria has been considered as a possible underlying cause of polyp-simulating mucosal prolapse syndrome in diverticular disease. Distinguishing between this type of polyp and a granulation polyp is not difficult, because their macroscopic and microscopic morphologies differ significantly.

In the present patient, we initially suspected colonic metastasis of lung cancer as the diagnosis of the sigmoid colon polyp. The bone, brain, adrenal glands, and liver are frequently involved organs of lung cancer metastasis, and involvement of the gastrointestinal tract is less common [10-15]. Within the gastrointestinal tract, the small intestine is the most frequently affected area. Although rare, lung cancer metastasizing to the colon has been described. Moreover, it has been reported that lung cancer involving the gastrointestinal tract presents various morphologies — such as a diffuse involvement of the intestinal mucosa or multiple nodules with or without mucosal ulceration — and sometimes even presents as a single ulcerative lesion. In their summary of data from 18 lung cancer patients with gastrointestinal metastasis, Rossi *et al.* found that only half of the cases were correctly diagnosed through endoscopic biopsies [16]. In our patient's case, due to the rarity of this lesion type, its morphological diversity, and the difficulty in making diagnoses based on biopsy specimens, we determined that surgical resection was justified in order to reach the correct diagnosis. However, a better understanding of the endoscopic features of colonic granulation polyps might have led to an accurate preoperative diagnosis.

In conclusion, we experienced the case of a patient with a colonic granulation polyp which was initially misdiagnosed as colonic metastasis of lung cancer. Although further investigation is required, we suggest that the presence of distorted microvessels and lack of pit structure on the surface of a colonic lesion may be specific features indicating a colonic granulation polyp.

References

1. Tanaka S, Hayashi N, Oka S and Chayama K: Endoscopic assessment of colorectal cancer with superficial or deep submucosal invasion using magnifying colonoscopy. Clin Endosc (2013) 46: 138–146.
2. Kudo S, Tamura S, Nakajima T, Yamano H, Kusaka H and Watanabe H: Diagnosis of colorectal tumorous lesions by magnifying endoscopy. Gastrointest Endosc (1996) 44: 8–14.
3. Hizawa K, Nakamori M, Taniguchi M, Matsumoto T and Iida M: Gastrointestinal: inflammatory granulation polyp of the colon. J Gastroenterol Hepatol (2008) 23(8 Pt 1): 1307.
4. Mori H, Tsushimi T, Kobara H, Nishiyama N, Fujihara S, Matsunaga T, Ayagi M, Yachida T and Masaki T: Endoscopic management of a rare granulation polyp in a colonic diverticulum. World J Gastroenterol (2013) 19: 9481–9484.
5. Seo HI: Two hyperemic polypoid lesions in the colon. Intest Res (2016) 14: 379–380.
6. Lee J, Ko Y and Kim Y: Inflammatory granulation polyp caused by diverticulitis with a complication of brisk post-polypectomy bleed-

ing. Int J Clin Exp Med (2018) 11: 6332–6335.
7. Yoshida M, Kawabata K, Kutsumi H, Fujita T, Soga T, Nishimura K, Kawanami C, Kinoshita Y, Chiba T and Fujimoto S: Polypoid prolapsing mucosal folds associated with diverticular disease in the sigmoid colon: usefulness of colonoscopy and endoscopic ultrasonography for the diagnosis. Gastrointest Endosc (1996) 44: 489–491.
8. Mathus-Vliegen EM and Tytgat GN: Polyp-simulating mucosal prolapse syndrome in (pre-) diverticular disease. Endoscopy (1986) 18: 84–86.
9. Kelly JK: Polypoid prolapsing mucosal folds in diverticular disease. Am J Surg Pathol (1991) 15: 871–878.
10. Goh BK, Yeo AW, Koong HN, Ooi LL and Wong WK: Laparotomy for acute complications of gastrointestinal metastases from lung cancer: is it a worthwhile or futile effort? Surg Today (2007) 37: 370–374.
11. Antler AS, Ough Y, Pitchumoni CS, Davidian M and Thelmo W: Gastrointestinal metastases from malignant tumors of the lung. Cancer (1982) 49: 170–172.
12. Burbige EJ, Radigan JJ and Belber JP: Metastatic lung carcinoma involving the gastrointestinal tract. Am J Gastroenterol (1980) 74: 504–506.
13. Stenbygaard LE, Sorensen JB, Larsen H and Dombernowsky P: Metastatic pattern in non-resectable non-small cell lung cancer. Acta Oncol (1999) 38: 993–998.
14. Goh BK, Teo MC, Chng SP, Tan HW and Koong HN: Upper gastrointestinal bleed secondary to duodenal metastasis: a rare complication of primary lung cancer. J Gastroenterol Hepatol (2006) 21: 486–487.
15. Iwamuro M, Miyabe Y, Hanae K, Yoshinari K, Katsuyoshi T, Murakami T, Hirofumi M and Yamamoto K: Regression of metastatic colon tumour from primary adenocarcinoma of the lung due to fistulisation to the bowel lumen. Ecancermedicalscience (2014) 8: 412.
16. Rossi G, Marchioni A, Romagnani E, Bertolini F, Longo L, Cavazza A and Barbieri F: Primary lung cancer presenting with gastrointestinal tract involvement: clinicopathologic and immunohistochemical features in a series of 18 consecutive cases. J Thorac Oncol (2007) 2: 115–120.