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REVIEW

Tumors of the jejunum and ileum: a pattern-based imaging approach on CT

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Abstract

Since a broad spectrum of tumors can occur in the small bowels, it is not easy to make a correct differential diagnosis among small bowel tumors on CT findings. Therefore, once a mass is detected on CT, the radiologist needs to analyze the mass based on presenting patterns such as location, multiplicity, morphology, and enhancement patterns. In this article, we will illustrate various kinds of small bowel tumors based on imaging patterns at CT to facilitate making a correct diagnosis.

Keywords Small bowel tumors · Jejunum and ileum · Computed tomography

Introduction

Neoplasms are not common in the small bowel, and represent up to 5% of all gastrointestinal neoplasms [1, 2]. Furthermore, because small bowel malignancies are quite infrequent, neoplasms of the small bowel are relatively unfamiliar to radiologists, as compared to those of the stomach and large bowel. Among small bowel neoplasms detected at autopsy, approximately 75% are benign; on the other hand, the majority of small bowel neoplasms with symptoms such as abdominal pain, gastrointestinal bleeding, nausea, or vomiting are malignant [3]. Hence, accurate and prompt diagnosis of tumors in the small bowel is critical for these symptomatic patients. Neoplasms can develop anywhere in the long small bowel with various numbers, sizes, and diverse appearances. As a consequence, correct and early imaging diagnoses of small bowel tumors are always challenging for radiologists.

Therefore, we classify and illustrate small bowel tumors based on their presenting patterns upon CT, such as their location propensity (jejunum vs. ileum), multiplicity, enhancement patterns, and morphology, to facilitate differential diagnoses among them. In this review, we focus on tumors arising in the jejunum and ileum.

CT technique

For high-quality images that allow detection of small tumors in the small bowel, 16-slice and higher multidetector CT machines, that allow for thin slice thickness and multiplanar reformation, are required [4, 5]. Multiphasic dynamic study, including enteric (scan acquisition between arterial and venous phases, approximately 30–40 s delay using a bolus-triggered method) and venous phases, is helpful for diagnosing hypervascular small bowel tumors [2, 4]. CT enterography increases the conspicuity of small bowel masses by oral administration of neutral contrast agent that induces adequate small bowel distention. Because a large volume (total amount, between 1 and 2 L) of oral contrast agent should be ingested within an hour, divided into several portions before CT examination, patient cooperation is important for adequately distended small bowel. Because the jejunum is the least well-distended segment in CT enterography, MR enterography or small bowel follow through may be more suitable for diagnosing jejunal lesions [5].

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Preferential site of small bowel tumors

Except for adenoma, adenocarcinoma, and neuroendocrine tumor that arise from the epithelial layer, most tumors originating from the small bowel develop in the submucosal layer, including lymphoma, lipoma, hemangioma, inflammatory fibroid polyp, and malignant gastrointestinal neuroectodermal tumor. In addition, gastrointestinal stromal tumor originates from the muscularis propria. Metastasis can involve the various layers of the small bowel according to spreading mechanism.

Some small bowel tumors occur more frequently in the jejunum rather than in the ileum, whereas other tumors are more commonly found in the ileum. Small bowel adenocarcinoma, one of the most common malignant tumors along with neuroendocrinetumors in the small bowel, more commonly involves the jejunum rather than the ileum, though the most commonly involved site is the duodenum [1, 6]. Known risk factors for small bowel adenocarcinoma include familial adenomatous polyposis, Lynch syndrome, Peutz-Jeghers syndrome, Crohn's disease, celiac disease, alcohol consumption and smoking [6]. This tumor shows short-segmental, irregular, circumferential wall thickening of the small bowel, appearing as apple core lesions (Fig. 1). However, in patients with Crohn's disease, which is one of the risk factors for small bowel adenocarcinoma, the tumor usually occurs in the ileum, where Crohn's disease is prevalent [6].

B cell lymphoma, especially diffuse large B-cell lymphoma (DLBL), is the most common type of primary gastrointestinal lymphoma, of which primary non-Hodgkin lymphoma (NHL) of gastrointestinal tract accounts for 10–15% of NHLs; the most commonly involved site of DLBL is the ileum of the small bowel [1, 7]. T-cell lymphoma, which occurs much less frequently than B-cell lymphoma, tends to develop in the proximal portion of the small bowel, such as the jejunum or proximal ileum [7]. Perforation is observed in 16–33% of patients with T-cell lymphoma at the time of clinical presentation, and this is attributed to transmural involvement and necrosis [7]. Additionally, T-cell lymphoma is more likely to be multifocal disease than is B-cell lymphoma (Fig. 2) [7]. In patients with celiac disease, there is an increased incidence of T-cell lymphoma in the small bowel, especially jejunum [8].

Gastrointestinal stromal tumors (GISTs), arising from interstitial cells of Cajal, are the most common mesenchymal tumor involving the gastrointestinal tract. The jejunum (60%) is more common than ileum (40%) as an involved site for GIST [6]. These tumors may have an intramural, endoenteric, exoenteric, or endoexoenteric growth pattern, and sometimes present with complications such as tumor-bowel fistula, bowel obstruction, or rupture [4, 9].

Small bowel lipomas commonly occur in the ileum, especially in the terminal ileum [10]. They usually appear as well-defined, intraluminal masses with lipid attenuation (−100 to −50 HU) without apparent enhancement (Fig. 3). While most small lipomas (less than 1 cm) are asymptomatic, patients with larger tumors may present with various degrees of abdominal pain, gastrointestinal bleeding, or palpable abdominal masses [10]. Some of the patients have abdominal pain resulting from small bowel or ileocolic intussusception due to lipoma as a leading cause.

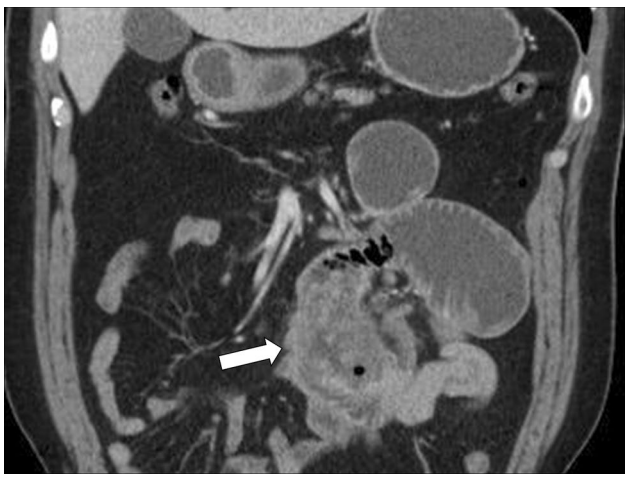

Fig. 1 A 47-year-old man presenting with nausea, vomiting and epigastric pain. Enhanced CT coronal image shows low-attenuated, annular wall thickening of the jejunum, manifesting as apple-core lesion (arrow). Bowel proximal to the small bowel mass is dilated. This mass was confirmed to be mucinous adenocarcinoma in the jejunum

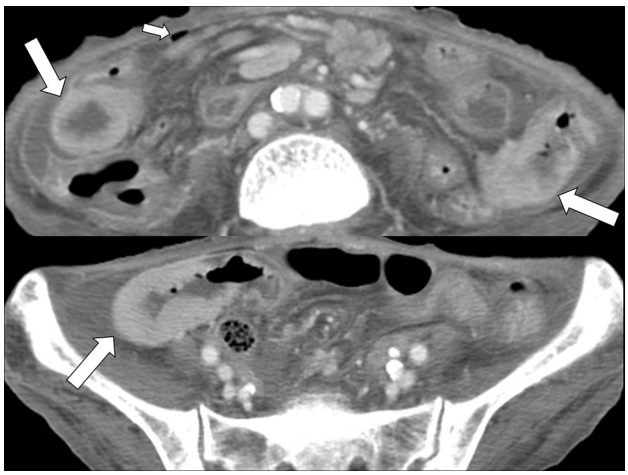

Fig. 2 A 78-year-old woman presenting with acute abdominal pain. Enhanced CT images show multifocal, enhanced wall thickening of the jejunum and proximal ileum (arrows). In addition, note free air (small arrow, upper), peritoneal fat strandings, peritoneal thickening, and fluid collections, indicating perforation with peritonitis. This was confirmed as peripheral T-cell lymphoma

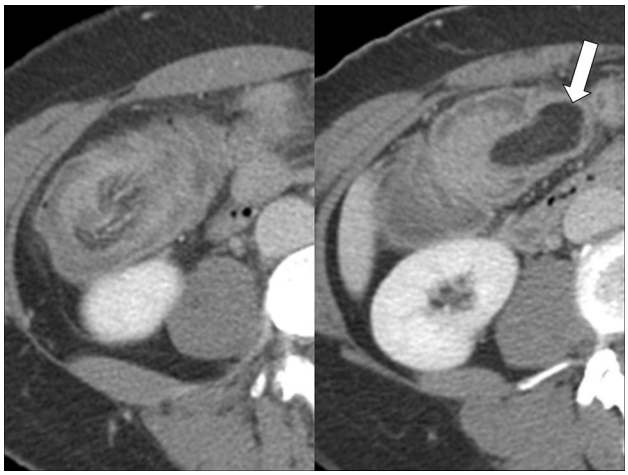

Fig. 3 A 41-year-old woman with intussusception. Enhanced CT shows a bowel-in-bowel appearance in the right abdomen (left). An ovoid, slightly lobulated, lipid-attenuated mass is seen within the bowel as a leading cause (arrow, right). This mass was a lipoma in the ileum, causing ileocolic intussusception

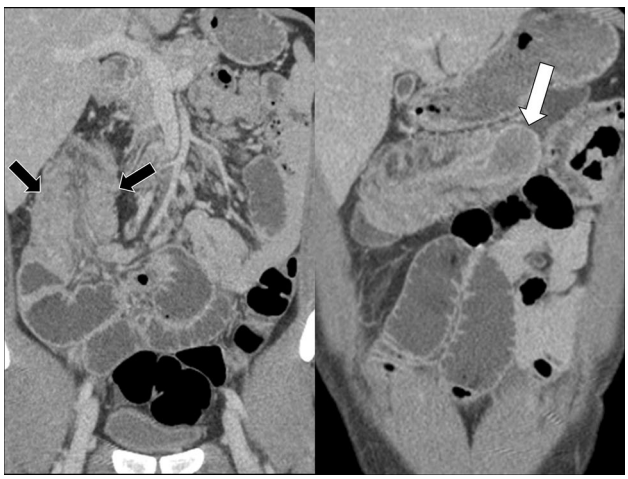

Fig. 4 A 37-year-old man with intussusception. Enhanced coronal CT shows mesentery invaginated into the bowel, indicating ileocolic intussusception in the right abdomen (black arrows, left). There is a small, well-defined, endoluminal, low-attenuated mass with overlying mucosal hyperenhancement within the level of the mid transverse colon (arrow, right). This mass was proven to be an inflammatory fibroid polyp in the terminal ileum after surgery

Inflammatory fibroid polyps (IFPs) are rare non-neoplastic lesions, characterized by fibrovascular stroma with eosinophilic infiltrations. These lesions tend to exhibit well-defined, lobulating endoluminal masses with overlying mucosal enhancement [11]. IFPs are found most frequently in the stomach, whereas the ileum is the commonly involved site for intestinal IFPs. The intestinal IFPs cause intussusceptions and obstructions more frequently than the gastric IFPs do (Fig. 4) [11].

Some nonneoplastic diseases that occur in the proximal portion of the small bowel occasionally appear as focal wall thickening and may require differentiation from tumorous conditions. Eosinophilic gastroenteritis, characterized by eosinophilic infiltration of the stomach and proximal small bowel, appears as nodular and irregular fold thickening; therefore, it can mimic the appearance of lymphoma or small bowel adenocarcinoma [12]. In addition, giardiasis and Whipple's disease present as thickened folds in the distal duodenum and proximal jejunum [8]. Although rare, localized lymphangiectasia of the jejunum resulting from lymphatic blockage of a limited bowel segment may mimic the appearance of lymphoma on CT, as low-attenuating wall thickening of the small bowel [13].

Multiple small bowel masses

Multiple masses can be found in the small bowel at the time of CT diagnosis. Small bowel tumors that can present as multiple masses are summarized in Table 1.

Various kinds of primary malignancies, such as cancers of the lung, breast, and kidney, as well as melanoma, can spread to the small bowel [14, 15]. Metastatic tumors involve the small bowel most frequently via intraperitoneal spreading. In such cases, the tumor invades the serosal side of the bowel and appears as masses or wall thickening of the small bowel accompanied by peritoneal masses, peritoneal thickening, and ascites. However, if multiple polypoid masses are found in the small bowel without peritoneal lesions in patients with primary malignancy, they may be caused by hematogenous metastasis. Among them, melanoma and lung cancer should be considered likely primary tumors in cases of multiple small bowel metastases. Melanoma accounts for about one-third of all metastases involving the gastrointestinal tract [14]. In a study of 32 patients with small bowel metastases from melanoma, a polypoid pattern with equal

Table 1 Multiple polypoid tumors in small bowel

Tumors	Characteristics
Metastasis	Lag time (+), melanoma (most common)
Peutz–Jegher's syndrome	Jejunum, young age, skin lesion (+)
Mantle cell lymphoma	Ileum, soft tissue attenuation, lymph node (+)
Neuroendocrine tumor	Ileum, well enhancement, mesenteric mass
GIST in neurofibromatosis type I	Jejunum, well enhancement, skin lesions (+)

GIST gastrointestinal stromal tumor

distribution between the jejunum and ileum, was found in 20 patients (63%); in addition, approximately 19% of patients showed polyposis (more than 10 masses) (Fig. 5) [14]. The average lag time from the initial diagnosis of melanoma to the detection of small bowel metastases was reported to be 3.2 years [14]. The prevalence of small bowel metastasis of primary lung cancer has been reported to be 2.6 to 10.7%. The majority of cases present with a single metastasis, while some cases exhibit multiple masses in the small bowel, but usually include less than five lesions [15]. As opposed to melanoma metastases, lung cancer metastases to the small bowel generally appear within a year of initial diagnosis; in addition, more than 70% of patients showed extra-intestinal metastases including the brain, adrenal gland, bone and liver at the time of the initial presentation [15].

Several polyposis syndromes can involve the gastrointestinal tract. Among them, the hamartomatous polyps of Peutz–Jeghers syndrome are most prevalent in the small bowel, especially the jejunum, followed in order by the ileum, duodenum, colon, and stomach [16]. On CT, multiple variably sized, enhancing polyps can be seen in the small bowel (Fig. 6). Sometimes, polyps larger than 15 mm lead to intussusception, causing small bowel obstruction [16]. Because larger hamartomas often contain focal adenomatous changes, premalignant lesions can be found in up to 18% of polyps of Peutz-–Jeghers syndrome [16, 17]. The risk for the occurrence of malignancy in the gastrointestinal tract increases with age, most commonly affecting the small bowel [16]. Peutz–Jeghers syndrome, a rare autosomal dominant condition, is characterized by the hyperpigmentation

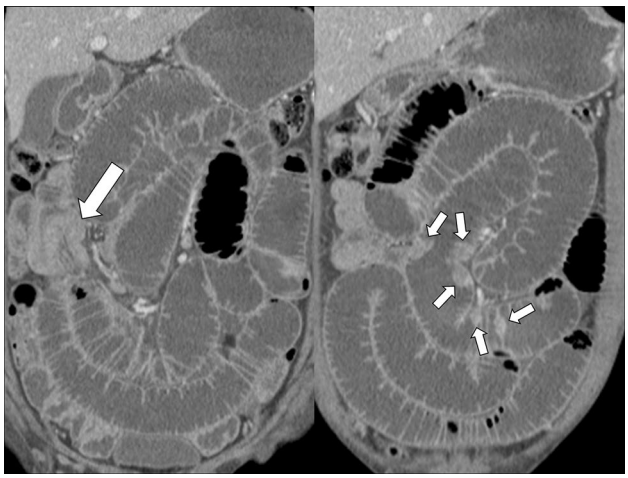

Fig. 5 A 67-year-old man with small bowel obstruction by intussusception. Enhanced coronal CT scans show diffuse jejunal dilatation with a bowel-in-bowel appearance at the right abdomen (arrow, left). In addition, note mutifocal small enhancing masses in the jejunum (small arrows, right). The masses were proven to be melanomas. This patient underwent surgical excisions of the melanomas at his left leg and left inguinal area two and three years ago, respectively

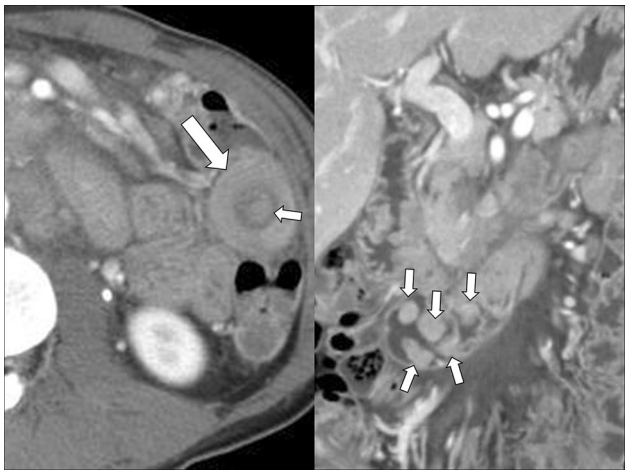

Fig. 6 A 46-year-old man with small bowel obstruction by intussusception. Axial CT shows an enhancing, endoluminal polypoid mass (small arrow, left) with small bowel intussusception at the left abdomen (large arrow, left). Coronal CT shows multiple, small enhancing polyps in the jejunum (small arrows, right). This patient also had black pigmentation around the oral mucosa and lips. Pathology revealed hamartomatous polyps in the jejunum after surgery. The diagnosis of Peutz–Jeghers syndrome was made

of the skin and mucosa as well as small bowel polyposis [16, 17]. Cronkhite–Canada syndrome is a nonfamilial, diffuse gastrointestinal polyposis associated with ectodermal abnormalities of the skin, hair, and nails [8, 9]. Although inflammatory polyps of Cronkhite–Canada syndrome almost always involve the stomach and colon, small bowel polyps are also found in more than 50% of cases [8, 18]. In familial adenomatous polyposis syndrome, which is characterized by numerous colonic adenomatous polyps, small bowel involvement has been reported in approximately 20% of patients [8].

Small bowel lymphoma can also present with multiple polypoid masses [1, 7]. Mantle cell lymphoma, an aggressive type of B-cell lymphoma, appears typically as multiple, variably sized polyps with frequent involvement of the ileum, ascending colon, and rectum (Fig. 7) [7]. Extensive abdominal lymphadenopathy as well as organomegaly can be clues to differentiate mantle cell lymphoma from other polyposis involving small bowels. Follicular lymphoma can also appear as small bowel polyposis; however, it is usually hard to detect the lesions on CT or usually appears as bowel wall thickening due to the small sizes of the masses [7].

Neuroendocrine tumors occur most commonly in the small bowel, especially the distal ileum; 40% of them are found within 60 cm of the ileocecal valve [1, 19]. Arterial phase CT scanning is useful for the detection of small bowel neuroendocrine tumors, because the tumors usually present with small hyperenhancing masses (30% of these are multiple at diagnosis) (Fig. 8a) [1, 2, 19]. Neuroendocrine tumor cells tend to show infiltrative growth through the

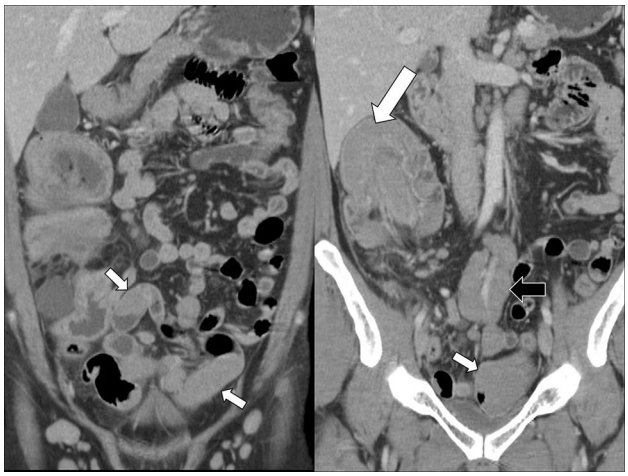

Fig. 7 A 36-year-old man with acute abdominal pain caused by ileocolic intussusception. Coronal CT images show a bowel-in-bowel configuration with a leading mass (large arrow, right). Multiple enhancing polypoid intraluminal masses are seen in the ileal loops (small arrows, both). In addition, note multiple enlarged lymph nodes at the mesentery (black arrow, right) and both inguinal regions (left figure). After surgical resection, multiple ileal masses were confirmed to be mantle cell lymphoma

small bowel wall into the adjacent mesentery, causing mesenteric fibrosis with the encasement of mesenteric vessels that subsequently results in bowel ischemia (Fig. 8b) [19]. If the primary tumor is larger than 2 cm, nodal metastasis and liver metastasis occur in more than 80% and 40% of tumors, respectively [13]. When a neuroendocrine tumor produces serotonin exceeding the metabolic capacity of the liver, carcinoid syndrome (diarrhea, bronchospasm, flushing) can develop, frequently after development of liver metastasis [4, 19].

Gastrointestinal stromal tumors (GISTs) arising in type 1 neurofibromatosis commonly present with multiple masses, typically in the small bowel. They tend to be mitotically inactive and small in size, exhibiting well-enhancing, intramural, or subserosal masses on CT (Fig. 9) [9, 20].

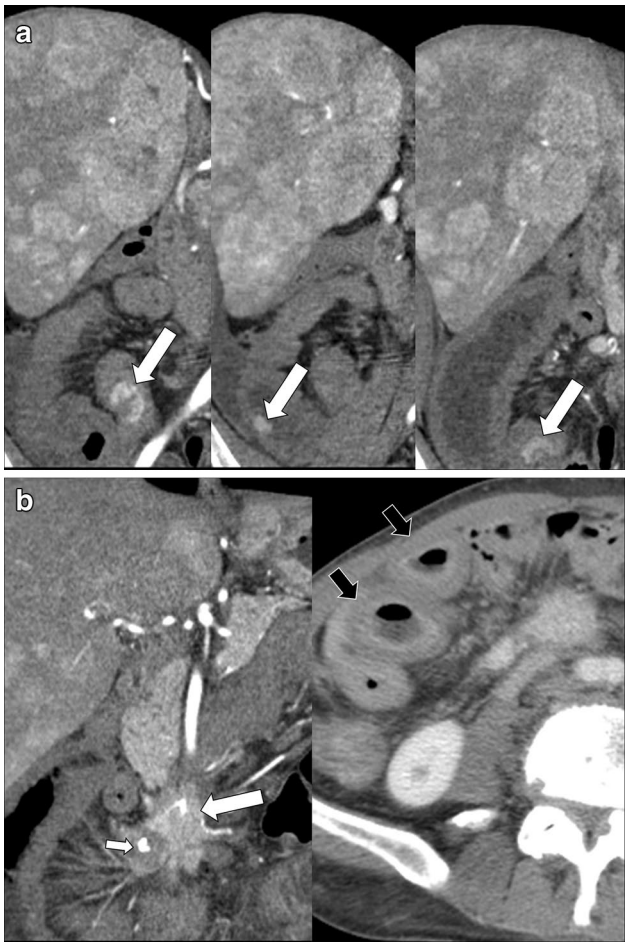

Fig. 8 A 52-year-old man presenting with diarrhea, flushing, weight loss and abdominal discomfort. **a** Serial CT coronal images on arterial phase show multiple small enhancing masses in the ileum (arrows). Note multiple hypervascular metastatic masses in the liver. Liver target biopsy for the mass revealed a neuroendocrine tumor (G1). **b** CT coronal image shows an irregular enhancing mass encasing the mesenteric artery with luminal stenosis (arrow, left). There is a small calcification in the mass (small arrow, left). Axial enhanced CT image shows layered-wall thickening of the right sided, ileal loop due to mesenteric arterial stenosis, indicating ischemic enteritis (black arrows, right)

Hypervascular masses in the small bowel

Several small bowel tumors, such as hemangiomas, small GISTs, neuroendocrine tumors, and malignant gastrointestinal neuroectodermal tumors (GNETs), usually appear as well-enhanced masses. Because the imaging features of metastases usually depend on those of the primary tumor, hypervascular small bowel masses may be metastases of hypervascular primary cancer.

Hemangiomas, which can be found anywhere in the body, occurs rarely in the small bowel. They manifest as well-enhancing, intraluminal polypoid masses with jejunal predominance (Fig. 10) [21].

Both GISTs and neuroendocrine tumors have a characteristic arterial hypervascular enhancement pattern on post-contrast CT [2]. In particular, small GISTs less than 5 cm in size present with a persistently well-enhanced mass, differing from large GISTs which show mild heterogeneous enhancement and internal necrosis because the neovascularization in the large tumor does not catch up with the rapid tumor growth (Fig. 11) [22].

GNET, previously known as a "clear cell sarcoma-like tumor of the gastrointestinal tract", is located in the submucosa and muscularis propria with a predominance of small bowel [23]. This is a very rare tumor, composed of

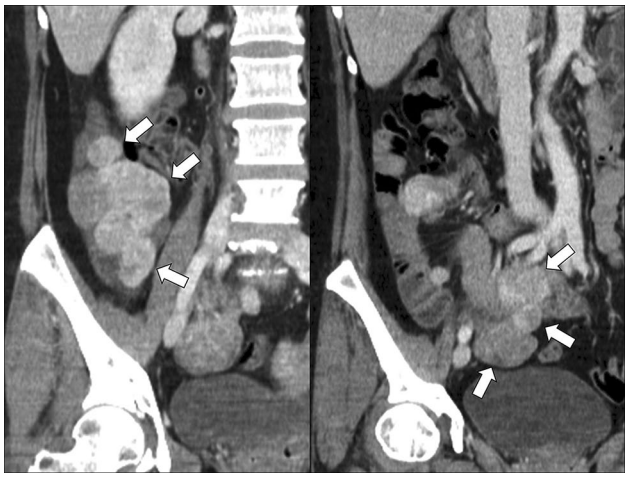

Fig. 9 A 47-year-old woman with NF1. Enhanced CT coronal images show multiple, variable-sized, enhanced masses in the small bowel (arrows). Six high-risk GISTs were confirmed in the jejunum. [Reprinted from Clinical Radiology, 71(2), Kim SW et al., *Gastrointestinal stromal tumours (GISTs) with a thousand faces: atypical manifestations and causes of misdiagnosis on imaging*, e140, 2016, with permission from Elsevier]

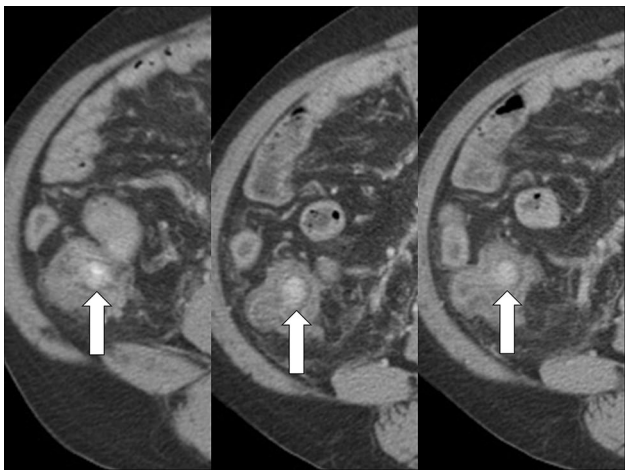

Fig. 10 A 55-year-old man with liver cirrhosis. Multiphasic enhanced CT images show a small, polypoid intraluminal mass, which shows enhancement through three phases (the arterial, portal venous, and equilibrium phases), in the terminal ileum. This mass was found incidentally during liver CT examination and was confirmed to be capillary hemangioma in the terminal ileum after colonoscopic removal

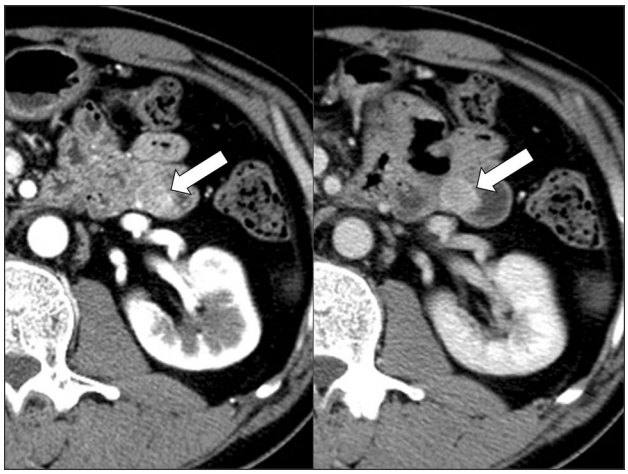

Fig. 11 A 40-year-old man with an incidentally found, small bowel mass on CT. Multiphasic enhanced CT images show a small, well-enhanced, ovoid mass in the jejunum on arterial (left) and portal phase (right) images (arrows). This mass was confirmed as very low-risk GIST

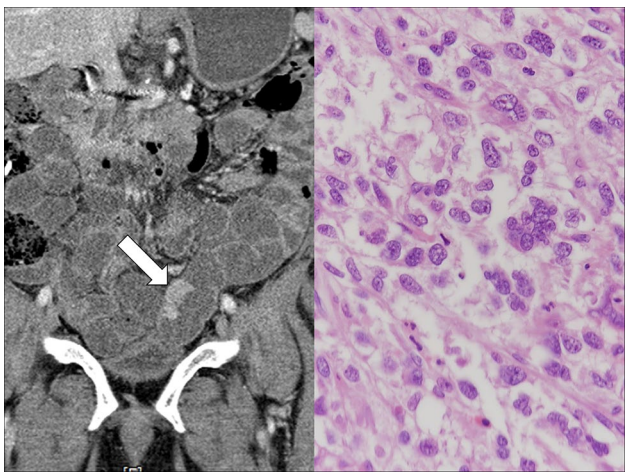

Fig. 12 A 75-year-old woman presenting with anemia and positive stool occult blood. A coronal image of CT enterography shows an ovoid-to-rectangular, well-enhanced, intraluminal polypoid mass in the ileum (arrow, left). After surgical excision of the mass, microscopic image (right) shows epithelioid and polygonal cells with eosinophilic cytoplasm with expression of S-100 protein and negative results for c-kit, SMA/actin and melanosome (HMB-45). The diagnosis of malignant gastrointestinal neuroectodermal tumor (GNET) was made

primitive-appearing, epithelioid or oval-to-spindle tumor cells with eosinophilic cytoplasm. On immunohistochemistry, GNET is typically positive for S100 protein, but exhibit a lack of expression for melanocytic markers [23]. Grossly, a GNET appears as an exophytic and intraluminal polypoid tumor, mimicking GIST, or a wall-thickening pattern, mimicking adenocarcinoma or lymphoma. We have experienced a few cases of GNET in the small bowel. Among them, polypoid GNET showed an irregular, well-enhanced, intraluminal mass in the small bowel on CT (Fig. 12).

Because hamartomatous or adenomatous polyps in various polyposis syndromes can appear as well-enhanced masses in the small bowel, as described earlier, small bowel adenoma is supposed to present with a hypervascular mass even when manifesting as a single mass (Fig. 13). However,

it is difficult to differentiate a single adenoma from other hypervascular tumors in the small bowel on CT.

Small bowel tumors presenting as wall-thickening patterns

Several tumors appear as focal or diffuse wall thickening in the small bowel, potentially mimicking small bowel adenocarcinoma; these include lymphoma, GIST, GNET, metastasis and hemangiomatosis.

Differentiation among adenocarcinoma, lymphoma, and GIST can be challenging because these tumors commonly present as wall-thickening lesions on CT. To facilitate a correct differential diagnosis among them on CT, wall thickening features, length, preferred location, the presence or absence of bowel obstruction, lymph node involvement, and perforation should be considered together (Table 2, Figs. 14, 15, 16) [1, 6, 7, 9]. In addition, the enhancement patterns of these three tumors could be another clue for differential diagnosis. The mean attenuation values of GISTs are higher than those of adenocarcinoma and lymphoma in the arterial and enteric phases, while the mean attenuation values of adenocarcinomas and lymphomas are not significantly different in any phase [2]. Unlike GIST, adenocarcinoma and lymphoma show a delayed enhancement pattern, indicating that these tumors have attenuation of enteric or venous phase higher than those of arterial phase [2]. In lymphoma, tumor cells infiltrate from the submucosa to the serosa. In addition, lymphomatous involvement of the muscularis propria can inhibit peristalsis. Therefore, these pathologic findings appear as homogeneously-attenuating bowel wall thickening with aneurysmal dilatation and destruction of the normal small bowel fold on imaging [1, 4, 7]. This is different from adenocarcinoma, which frequently causes small bowel obstruction due to an annular, constrictive growth pattern [4]. In terms of enhancement, lymphoma usually enhances homogeneously, whereas larger GISTs and adenocarcinomas tend to show heterogeneous enhancement. However, sometimes nonspecific wall thickening lesions of the small bowel can cause confusion in the diagnosis of small bowel tumors (Fig. 17). In addition, high-risk GIST may present as extensive wall thickening with mass formation, which often makes it difficult to differentiate from adenocarcinoma. Furthermore, lymph node metastasis, which occurs rarely in GIST, can complicate differentiation [24].

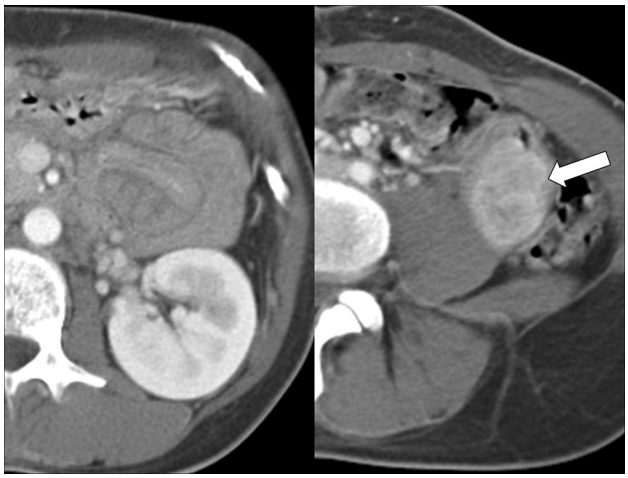

Fig. 13 A 35-year-old woman presenting with abdominal. CT axial images show a jejuno-jejunal intussusception at the left abdomen (left). A lobulating, well-enhanced mass is seen in the jejunum as a leading cause (arrow, right). After surgical excision, this mass was confirmed to be a villotubular adenoma with focal high-grade dysplasia in the jejunum

As mentioned earlier, GNET can appear as bowel wall thickening, thus mimicking small bowel adenocarcinoma. We have experienced a case of small bowel GNET, which was misdiagnosed as adenocarcinoma on CT (Fig. 18).

A significant proportion of small bowel metastases from lung cancer manifests as wall thickening [25]. Some metastatic lesions from lung cancer can be associated with bowel perforation, because the full-thickness, mural involvement

Table 2 Differential diagnosis of tumors with wall-thickening pattern in small bowel

	Location	Features	Length	Bowel obstruction	LN	Perforation	Peak enhancement	Enhancement homogeniety
Adenocarcinoma	Jejunum	Apple-core appearance	Short	Frequent	+	Very rare	Delay phase	Heterogeneous
Lymphoma	Ileum	Aneurysmal dilatation	Relatively longer, multifocal	Rare[$]	++	Possible (T-cell)	Delay phase	Homogeneous
GIST	Jejunum	Mass form with cavitary changes	Variable	Rare[$]	–	Possible	Enteric phase	Heterogeneous in large GISTs

LN lymph node

[$]In cases of lymphoma and GIST, small bowel obstruction usually occurs as a result of intussusception by polypoid tumors

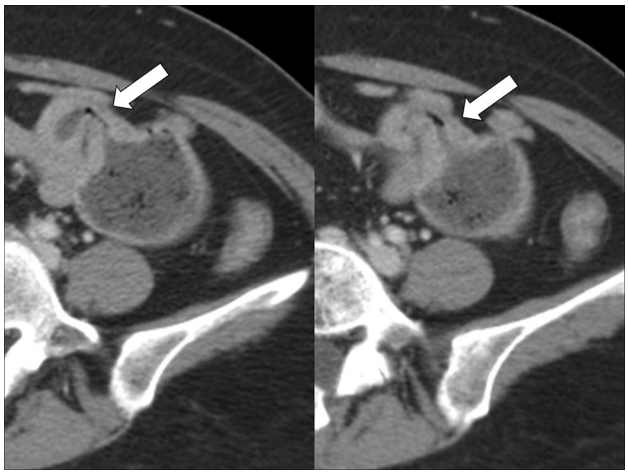

Fig. 14 A 53-year-old woman with vomiting. Serial CT images show short-segmental, symmetric, annular wall thickening of the jejunum (arrows) with luminal dilatation of the proximal small bowel. After surgical resection, moderately differentiated adenocarcinoma in the jejunum was proven

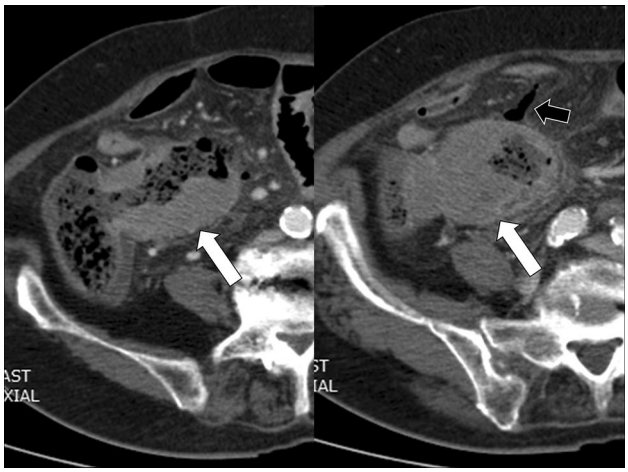

Fig. 15 A 91-year-old woman with abdominal pain. Serial CT images show segmental, annular, low-attenuating wall thickening of the terminal ileum (arrows). Despite annular wall thickening, bowel obstruction was not noted. Additionally, perienteric free air (black arrow) and small fluid collection (not shown), indicating bowel perforation, were observed. After right hemicolectomy, diffuse large B-cell lymphoma with serosal perforation arising from the terminal ileum was confirmed

of metastatic cells with necrosis leads to hemorrhage or perforation in the bowel [15, 25].

Infrequently, hemangioma diffusely involves the small bowel, known as hemangiomatosis, with appearances of diffusely enhanced, small bowel wall thickening with or without calcifications [21].

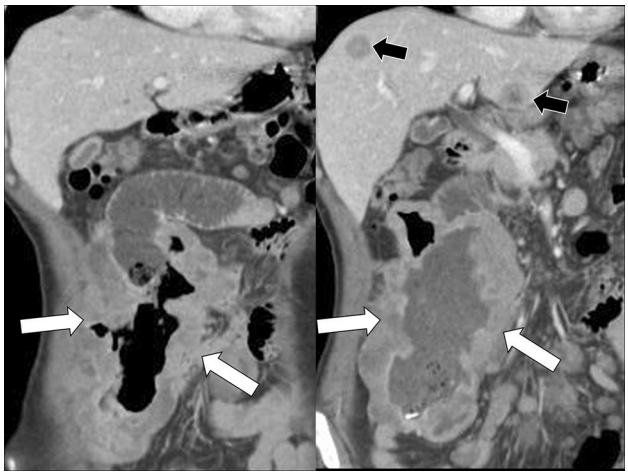

Fig. 16 A 54-year-old man with abdominal discomfort. Coronal CT images show a huge mass with cavitary change mimicking annular wall thickening plus aneurysmal dilatation in the jejunum (arrows). Neither lymph node enlargement nor bowel obstruction was found on CT. Note two small hypoattenuated metastases in the liver (black arrows, right). After jejunal mass excision, the diagnosis of high-risk GIST was made

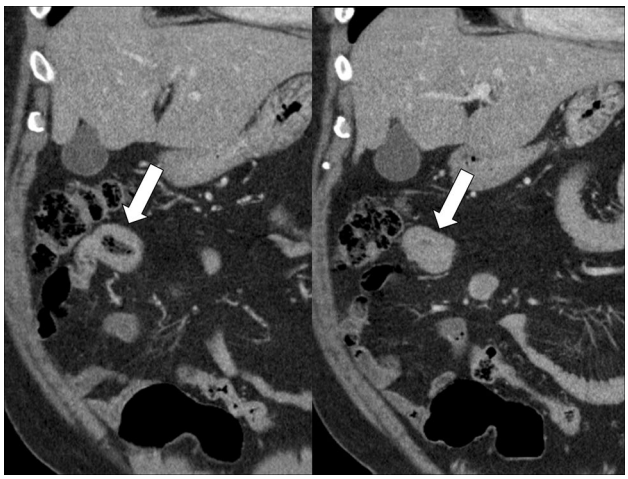

Fig. 17 A 47-year-old man with abdominal discomfort. Coronal CT images show circumferential wall thickening with iso-to-low attenuation in the small bowel. Because no bowel obstruction was observed, our initial diagnosis was lymphoma rather than adenocarcinoma. However, this mass was proven to be adenocarcinoma after surgical resection

Conclusion

Various small bowel tumors are illustrated in this article according to their presenting patterns on CT, such as their propensity of location (jejunum vs. ileum), multiplicity, well enhancement, and morphology. Because a variety of small bowel tumors can share imaging findings on CT and

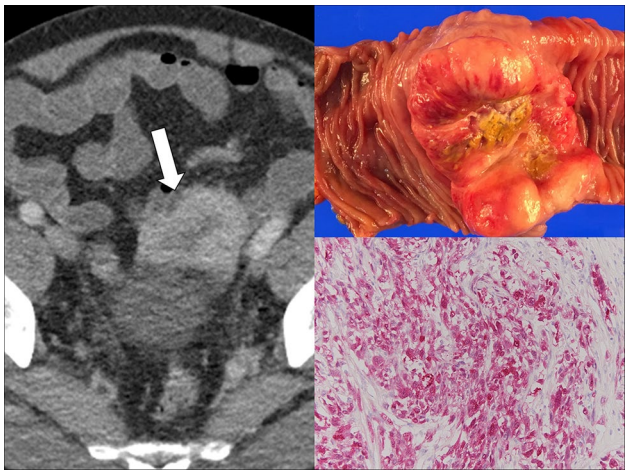

Fig. 18 A 63-year-old man with abdominal discomfort. Enhanced CT shows focal, irregular, enhanced wall thickening in the ileum of pelvic cavity (arrow, left). Perienteric fat infiltrations and a few small lymph nodes were noted around the lesion (not shown). Bowel obstruction was not observed. Our initial diagnosis was small bowel adenocarcinoma. The photography of gross specimen shows an ulcerofungating mass in the ileum (right, upper). Microscopy revealed epithelioid cells with eosinophilic cystoplasm and pleomorphic nuclei with vesicular chromatin (not shown). Immunohistochemistry showed the presence of expression of S-100 protein (right, lower) and the absence of expression of c-kit, SMA/actin, and melanosome (HMB-45). The diagnosis of GNET was made based on pathologic findings

surgical treatment is needed for patients with symptomatic small bowel tumors, the radiologists should combine the characteristic imaging findings of the tumor and narrow the differential diagnosis to make a diagnosis accurately and promptly.

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