

1	1999	12	10	2000	2	28	.
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(Fig. 2).

1-2%

가

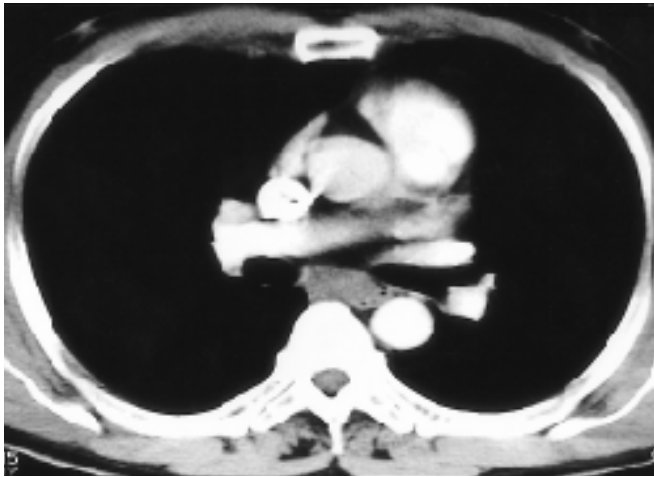
5 cm

40%

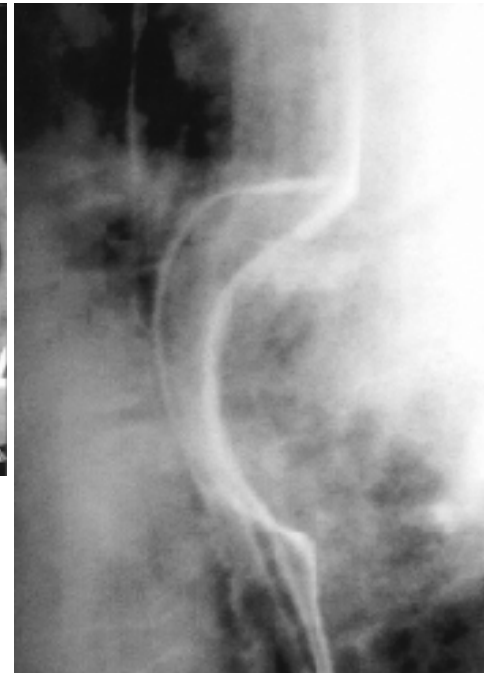
가 2cm

50-70%

(Fig. 3).



A

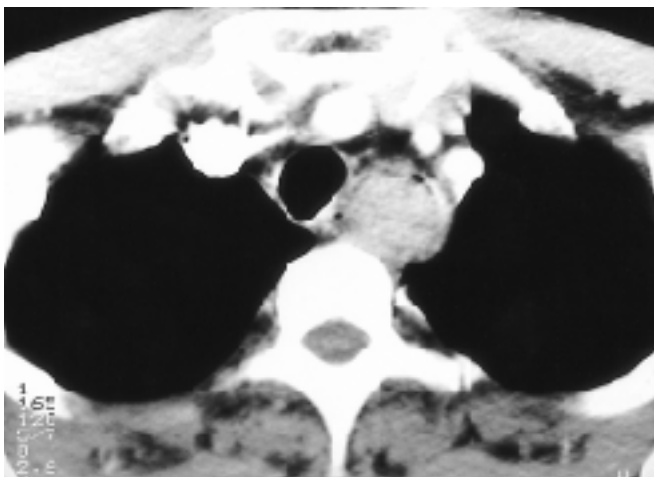


B

Fig. 1. Leiomyoma of lower esophagus in a 49-year-old man.

A. CT scan shows 3 cm sized oval-shaped homogenous soft tissue mass at lower esophagus.

B. Esophagogram shows a submucosal mass that has smooth surface and obtuse angle with adjacent esophageal wall at lower esophagus.



A



B

Fig. 2. Leiomyosarcoma of mid-esophagus in a 44-year-old man.

A. CT scan shows lumen-occupying soft tissue mass at mid-esophagus.

B. Esophagogram shows a lobulated-margined intraluminal mass with relatively well-defined proximal and distal borders in mid-esophagus. It resembles polypoid esophageal cancer.

(2) 가  
(3). CT  
(80%) 3가  
15%  
가 (Fig. 4).  
(schwannoma), (neurofibro-  
ma), (paraganglioma) (ganglioneu-  
roma) 5-10%

schwann cell  
(myenteric plexus)  
Von Recklinghausen's disease  
10% 가  
(Fig. 5). 가 가  
2-3%  
(gastric antrum) 가  
가 (2).



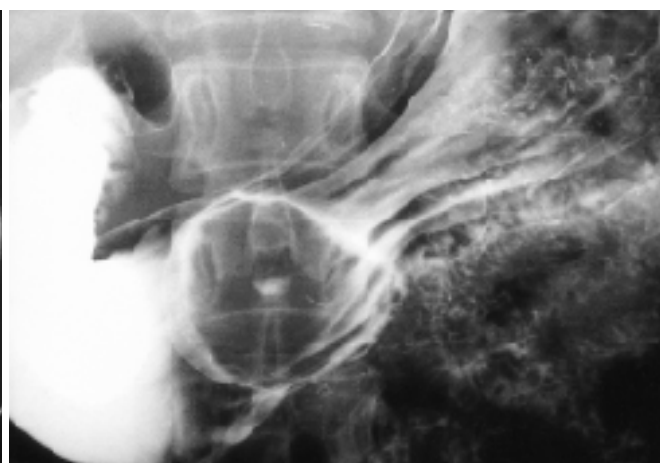
Fig. 3. Leiomyoma of stomach in a 59-year-old man. CT scan shows a smooth-margined intraluminal protruding mass with focal ulceration (air) and intact enhancing mucosa overlying the mass at the fundus of stomach.



Fig. 4. Leiomyoma of stomach in a 44-year-old man. CT scan shows a 3.5 cm sized soft tissue mass in the wall of high body of stomach which is smooth margined and has endophytic and exophytic components.



A



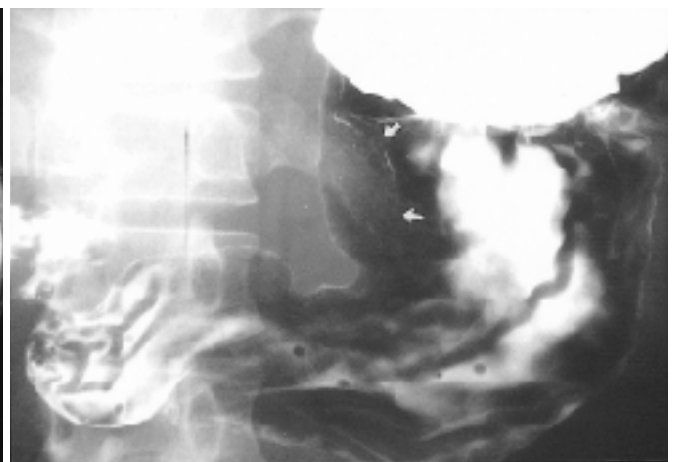
B

Fig. 5. Neurofibroma of stomach in a 49-year-old woman. A. CT scan shows a large sized, smooth margined homogenous soft tissue mass at anterior wall of low body of stomach. B. UGI shows a centrally ulcerated submucosal mass in the anterior wall of low body of stomach. This lesion cannot be distinguished radiographically from an ulcerated leiomyoma.

가 -80 ~ -120HU CT 가  
 CT 가 1-3cm  
 2%  
 가 (7) (Fig. 6).  
 (Inflammatory fibroid polyp) 가  
 가 1-3% 90%가  
 10cm 가  
 (Ectopic pancreatic rests) (Fig. 7) (8).



A



B

Fig. 6. Ectopic pancreatic rest of stomach in a 43-year-old man.

A. CT scan shows a small homogenous soft tissue mass on posterior wall of mid-body of stomach, which is smooth margined and has some exophytic component.

B. UGI shows a discrete submucosal mass on the lesser curvature of mid-body (arrow).



Fig. 7. Leiomyosarcoma of stomach in a 67-year-old man. CT scan shows a bulky intraluminal protruding mass with irregular ulceration in the gastric body along lesser curvature.



Fig. 8. Leiomyoma, borderline malignancy of stomach in a 70-year-old man.

CT scan shows about 6.5 cm sized intraluminal protruding mass with central necrosis and exophytic growth in the gastric body. Note high enhancing mucosal layer overlying the mass helping the diagnosis of submucosal mass.

68%

가

(8). CT

가 5.5cm

ma propria)

(3).

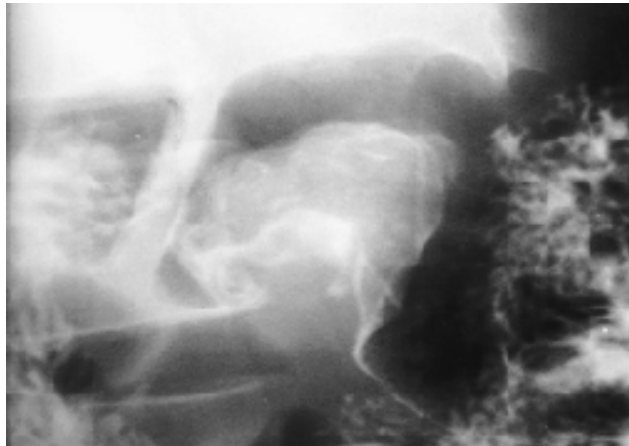
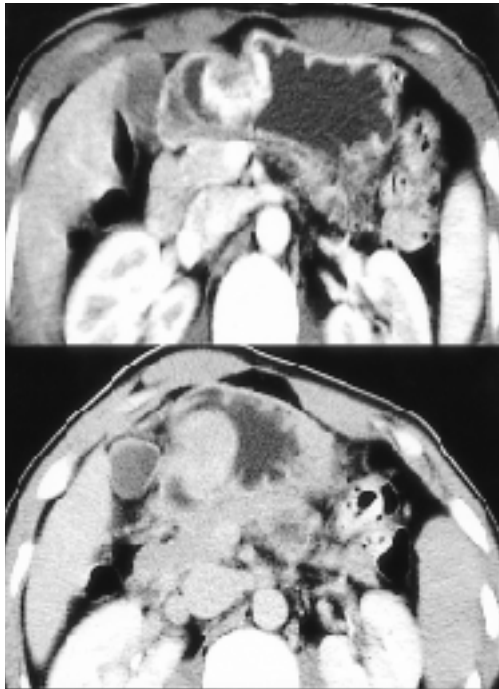
가

, 1

가

(Fig. 8),

가



B

Fig. 9. Collision tumor (adenocarcinoma and leiomyosarcoma) of stomach in a 28-year-old man.

A. CT scan shows irregular wall thickening of gastric antrum which shows dense mucosal enhancement in early phase and persistent delayed enhancement of entire wall in delayed phase.

B. UGI shows 5.5cm sized mass in the greater curvature side of gastric antrum with slightly irregular mucosa.

A

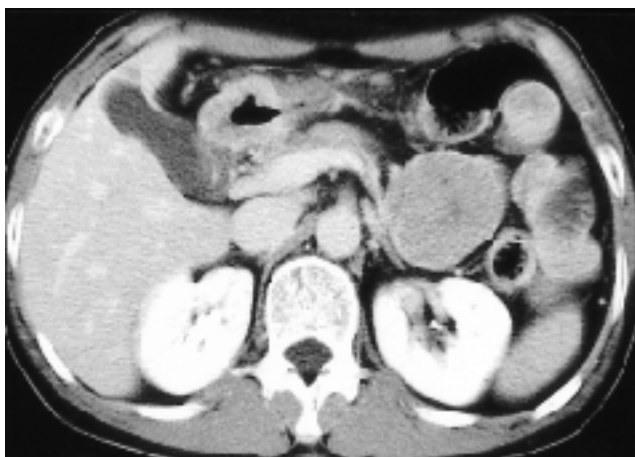


Fig. 10. Non-Hodgkin's lymphoma involving stomach and jejunum in a 58-year-old man.

CT scan shows diffuse homogenous wall thickening of gastric antrum and 5cm sized mass at proximal jejunum. There was no associated bowel obstruction.

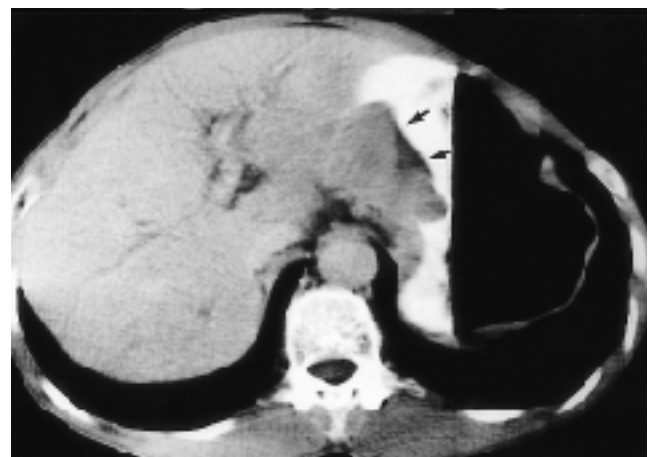


Fig. 11. Submucosal metastasis to stomach cardia from a mid-esophageal cancer in a 69-year-old man.

CT scan shows sharply demarcated intraluminal bulky mass along lesser curvature of cardia with central necrosis (arrows). This lesion was confirmed by US-guided percutaneous needle biopsy.

가 .  
가

가

(Fig. 12). CT 1-10cm

가

(Fig.

가

가

가

가

(3, 6, 7).

가

50%

1-4%

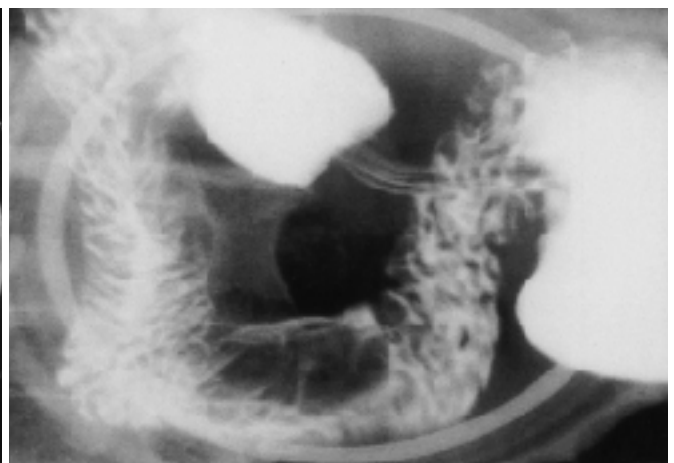
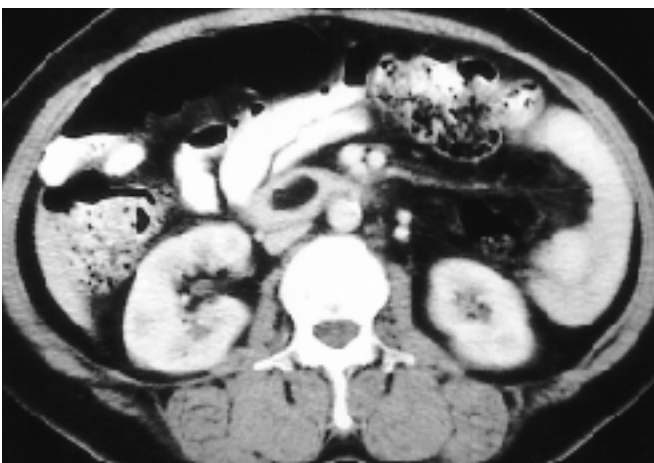
50%

가

5 cm)

(1, 2).

CT scan shows 7cm sized relatively homogenous enhancing mass in low abdomen with surrounding free fluid collection (hemoperitoneum).



814

1-6cm ,  
 . CT -80 ~ -120HU  
 (7) (Fig. 13). 가  
 가  
 (Fig. 14).  
 9%  
 50%가 가  
 (5, 6, 8) (Fig. 15A). CT  
 가  
 (Fig.15B, C). 가  
 (3, 8).

가  
 . CT 가  
 가 ,

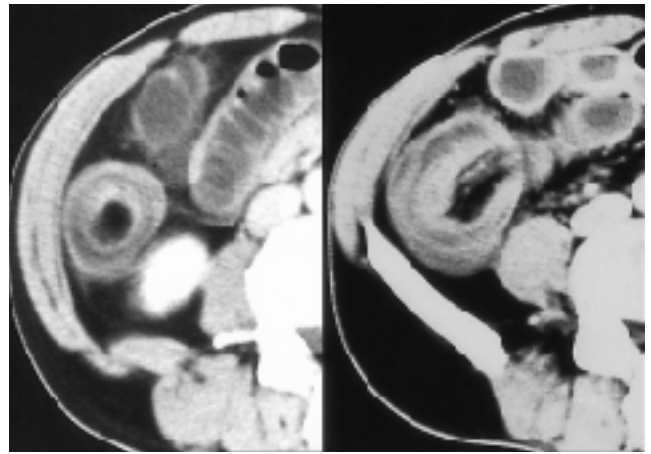


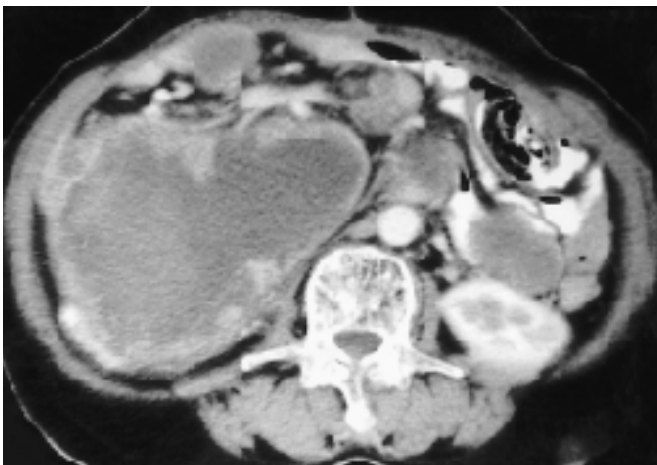
Fig. 14. Intussusception caused by a lipoma of terminal ileum in a 53-year-old man. CT scan shows a round fat attenuation mass surrounded by alternating layers of the low and high attenuation at right lower quadrant.



A



B



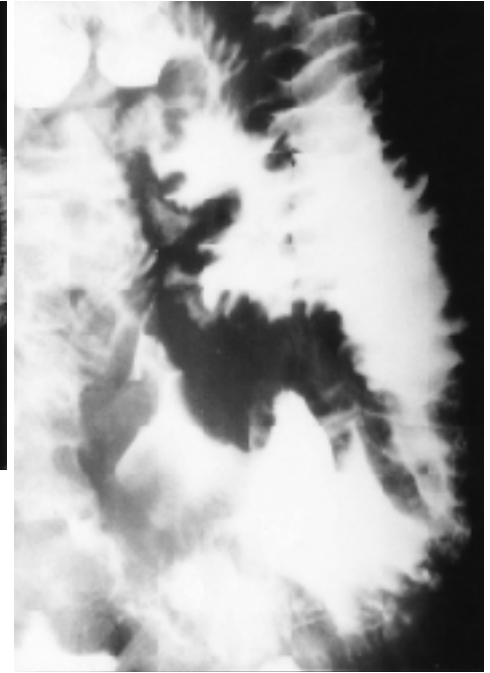
C

Fig. 15. Leiomyosarcoma of jejunum with peritoneal leiomyosarcomatosis and liver metastasis in a 52-year-old woman.  
 A. Initial CT scan shows 8cm sized thick-walled cavitory lesion with air-fluid level in left upper quadrant.  
 B. Follow-up CT scan after 18 months shows three variable sized low attenuation nodules in liver.  
 C. Follow-up CT scan shows multiple variable-sized, mesenteric mass containing area of low attenuation, suggesting peritoneal leiomyosarcomatosis. There is no associated ascites.

가 sandwich 가 (Fig. 17).  
 가 60% 가  
 (7) (Fig. 16). (9).  
 4.  
 3%  
 1%



A

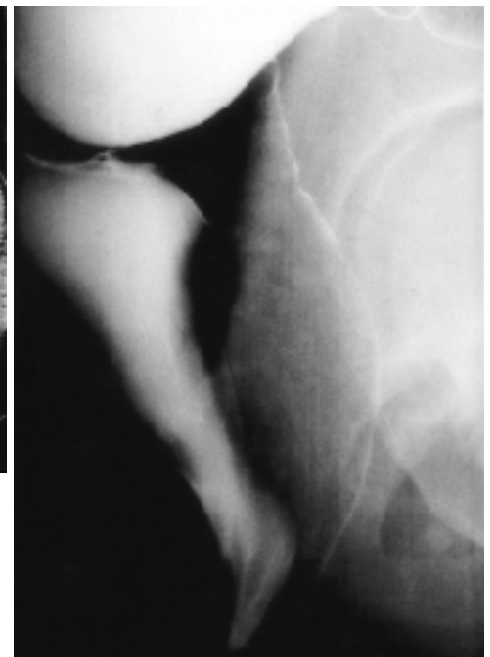


B

Fig. 16. Non-Hodgkin's Lymphoma of jejunum in a 49-year-old woman.  
 A. CT scan shows regular concentric wall thickening of jejunum along long segment.  
 B. Small bowel series demonstrates effaced mucosal folds and aneurysmal dilation of jejunum along long segment. There is no bowel obstruction.



A



B

Fig. 17. Leiomyoma of rectum in a 53-year-old woman.  
 A. CT scan shows a well-defined, slightly enhancing mass with multiple low density areas in the distal rectum area.  
 B. Spot radiograph of rectum on double contrast barium enema shows a well defined, smooth margined filling defect in the distal rectum.



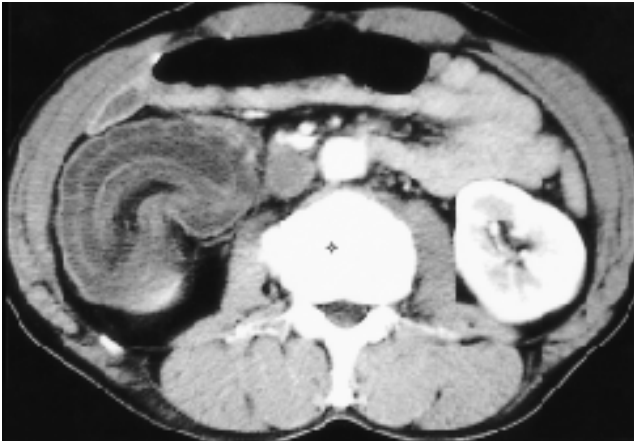


Fig. 18. Non-Hodgkin's lymphoma of cecum with intussusception in a 57-year-old man.  
CT scan shows sausage-shaped mass with alternating layers of low and high attenuation at cecum area with suggested focal wall thickening.

가 가  
가 가  
5-9.5%가 10-15%가  
(13%) (52%) (21%) (14%)  
(8%)  
2:1  
가 가  
CT

(Fig. 18).  
(Carcinoid tumor) , ,  
serotonin  
S  
serotonin  
2 cm  
2/3 가  
가  
50-60% 가  
1. , , , , .  
CT 1994;31:489-494  
2. Fishman EK, Urban BA, Hruban RH. CT of the stomach : spectrum of disease. *Radiographics* 1996;16:1035-1054  
3. Megibow AJ, Balthazar EJ, Hulnick DH, Naidich DP, Bosniak MA. CT evaluation of gastrointestinal leiomyoma and leiomyosarcomas. *AJR Am J Roentgenol* 1985;144:727-731  
4. Chun HJ, Byun JY, Chun KA et al. Gastrointestinal leiomyoma and leiomyosarcomas: CT differentiation. *J Comput Assist Tomogr* 1998;22:69-74  
5. Shojaku H, Futatsuya R, Seto H, Tajika S, Matsunou H. Malignant gastrointestinal stromal tumor of the small intestine : Radiologic-pathologic correlation. *Radiat Med* 1997;15:189-192  
6. Tworek JA, Appelman HD, Singleton TP, Greenson JK. Stromal tumors of the jejunum and ileum. *Med R Pathology* 1997;10:200-209  
7. Buckley JA, Fishman EK. CT evaluation of small bowel neoplasms : Spectrum of Disease. *Radiographics* 1998;18:379-392  
8. McLeod AJ, Zornoza J, ShirKhoda A. Leiomyosarcoma : Computed tomographic findings : *Radiology* 1984;152:133-136  
9. : 2 . 1994;31:511-514

## **Radiologic Findings of Submucosal Tumors of Gastrointestinal Tract<sup>1</sup>**

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Gastrointestinal submucosal tumors originate from submucosal histologic structures such as muscles, lymph nodes, nerves, fibers and vessels. Most patients are asymptomatic. Lesions that are large or ulcerated may cause abdominal pain or upper gastrointestinal bleeding, and those that grow intraluminally sometimes become pedunculated and occasionally prolapse to cause intussusception.

Adenocarcinoma is the most common primary gastrointestinal tumor, accounting for approximately 90-95% of such lesions, while submucosal tumors account for approximately 2-6% of all gastrointestinal tumors.

Because their overlying mucosa appears normal, submucosal tumors are difficult to visualize endoscopically, and for this reason, barium studies or CT scans are helpful for diagnosis.

In this paper, variable CT and barium study findings of the different types of gastrointestinal submucosal tumor are demonstrated, and a brief discussion of the respective disease entities is included.

**Index words :** Gastrointestinal tract, neoplasms  
Gastrointestinal tract, CT  
Gastrointestinal tract, abnormalities

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