Gastric Masses - what you need to know

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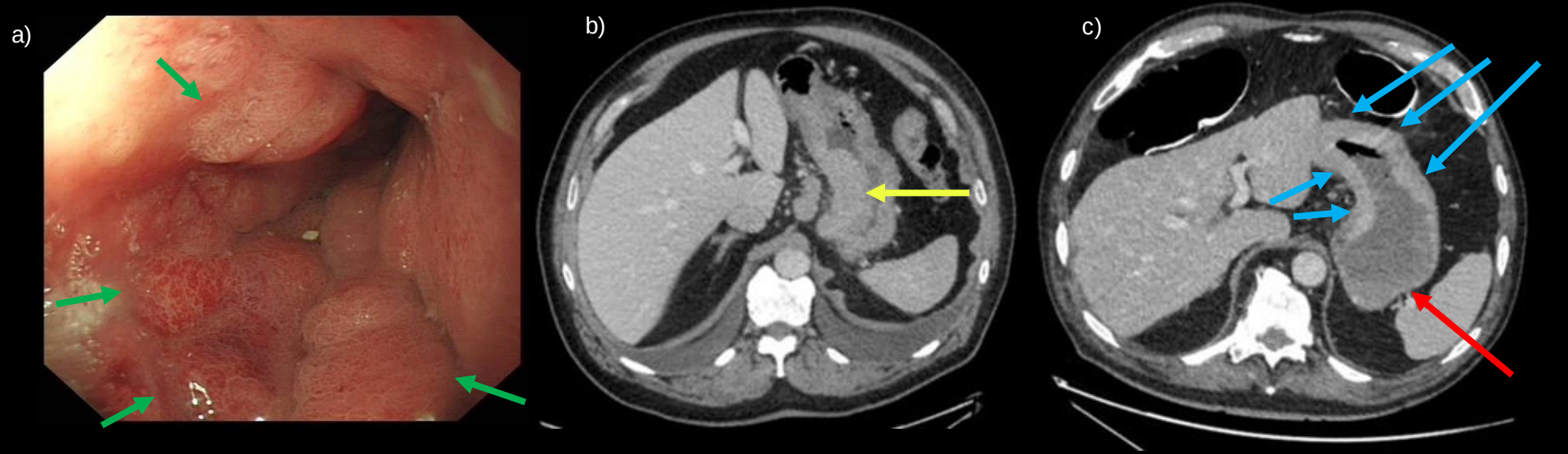
Learning Aims

- Show examples of gastric masses on CT with OGD (oesophagogastroduodenoscopy) and EUS (endoscopic ultrasound) correlation.

- Share tips to make the right diagnosis and particular features to look for.

- Raise awareness of the role of OGD and EUS in the workup of these lesions.

Gastric Adenocarcinoma



OGD (a) and portal venous CT (b,c) images of gastric adenocarcinoma. Images (a) and (c) are from the same patient.

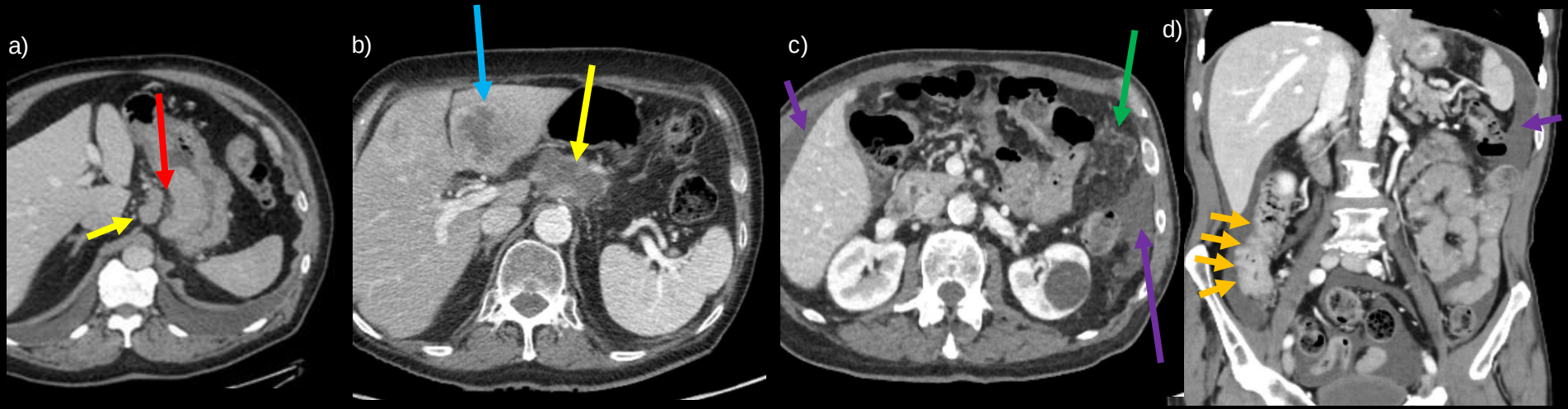
Gastric Adenocarcinoma is the most common gastric malignancy. On OGD it is visible as an irregular, abnormal mucosal mass (green arrows). There are two main subtypes: Intestinal and Diffuse.

Intestinal type appears as a mass or polyp arising from the internal surface of the stomach (yellow arrow). There may or may not be surface ulceration.

Diffuse type (scirrhous) has an infiltrative growth pattern with circumferential involvement of the gastric wall. The affecte d wall shows mucosal hyperenhancement (blue arrows). The unaffected segments upstream may be dilated (red arrow). Gastric lymphoma can have similar appearances.

Diffuse/scirrhous gastric carcinoma is also described as “linitis plastica”. This subtype typically metastasises to nodes and distant organs early.

Gastric Adenocarcinoma – what else to look for?

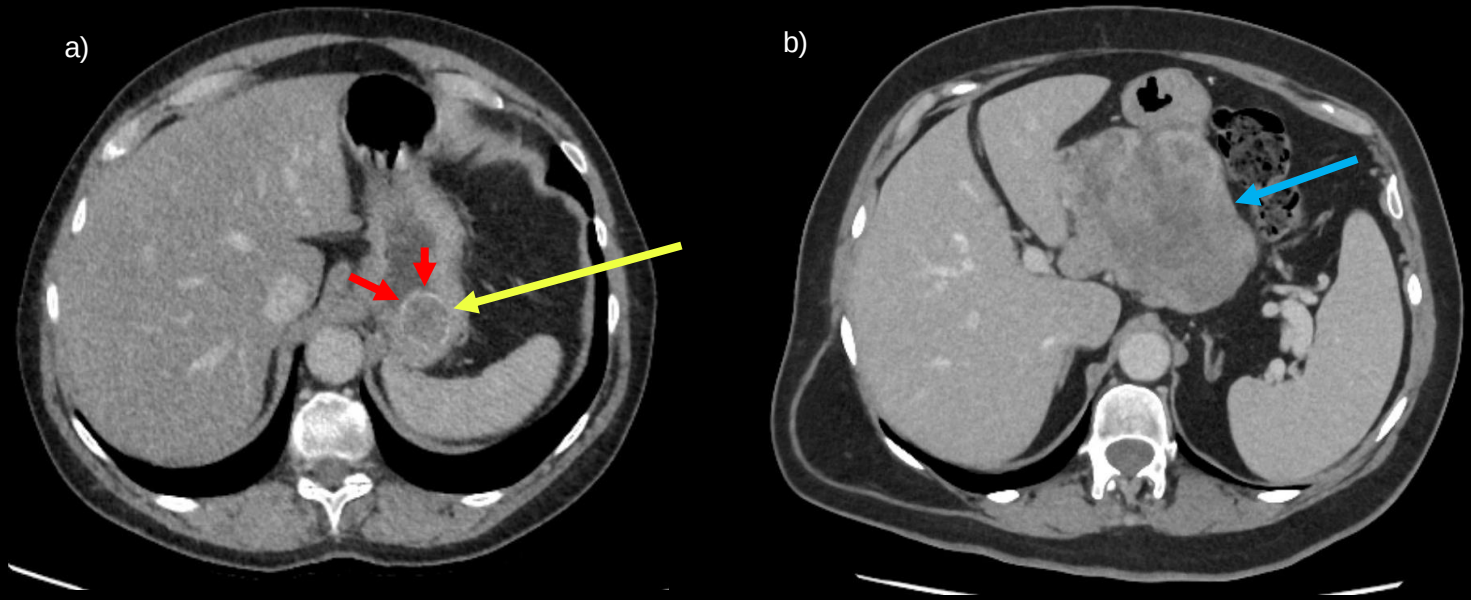


Portal venous phase CTs (a-d) of various patients showing features to look for when assessing a likely gastric adenocarcinoma:

Haziness in the perigastric fat adjacent to the tumour (a, red arrow) is suggestive of tumour infiltration and should be staged as T4a disease. (a) also shows nodal enlargement at the left gastric station (yellow arrow), which along with the lesser sac (b, yellow arrow), are early sites of nodal spread. (b) also shows a low density lesion in the liver consistent with a hepatic metastasis (blue arrow).

Peritoneal disease is common in gastric carcinoma and should be carefully assessed for. Signs of peritoneal disease include ascites (c,d, purple arrows), haziness in the omental fat (c, green arrow) and irregular nodular thickening on the serosal surface of other structures (d, orange arrows). Patients with histology proven gastric adenocarcinoma and no distant disease on CT have a staging laparoscopy prior to commencement of curative therapy.

GIST



Portal venous phase CTs of different patients with GISTs (Gastrointestinal stromal tumours) (a,b). GISTs are the most common GI mesenchymal neoplasm, arising from the interstitial cells of Cajal in the submucosa (unlike mucosal origin adenocarcinomas). They are submucosal masses, most common location is the stomach (60%) followed by the duodenum (30%).

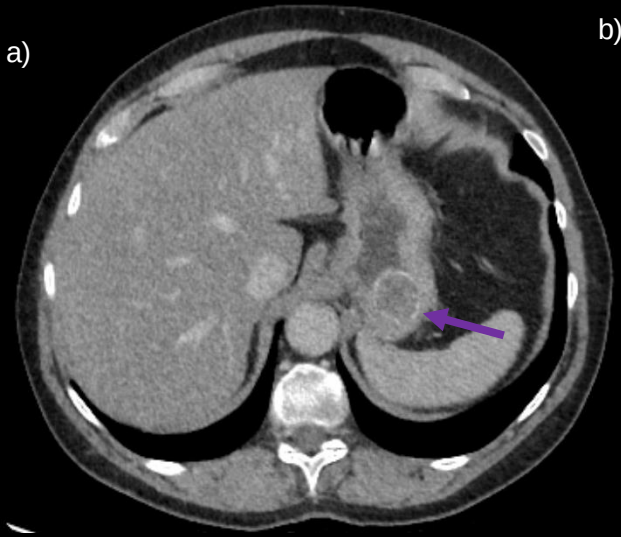
Small GISTs (a) appear as a round well circumscribed mass (yellow arrow). Usually endophytic or exophytic. Calcification is rare but can be seen (red arrows).

Larger GISTS (b) usually appear irregular and heterogeneous (blue arrow), due to central necrosis from outgrowing their blood supply but usually remain well circumscribed. Necrosis can reach the tumour surface leading to ulceration into the gastric lumen and resulting in gas within the centre of the lesion.

10% of GISTs present with disseminated disease. This is usually hepatic metastases; nodal spread is very rare.

GIST

a)



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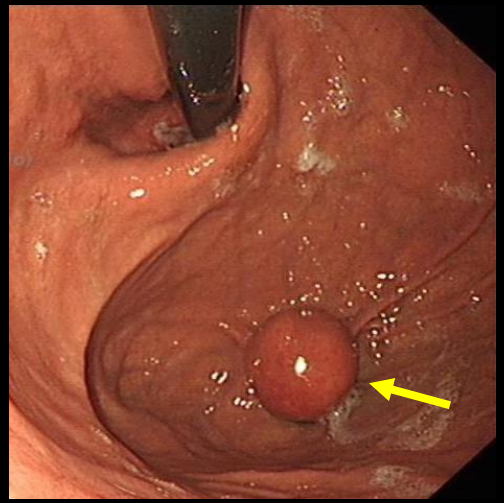

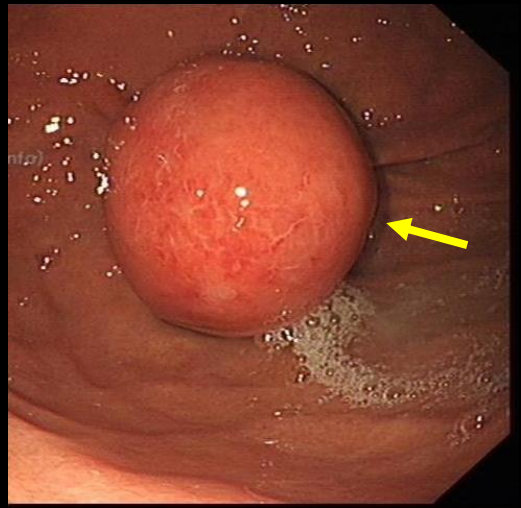

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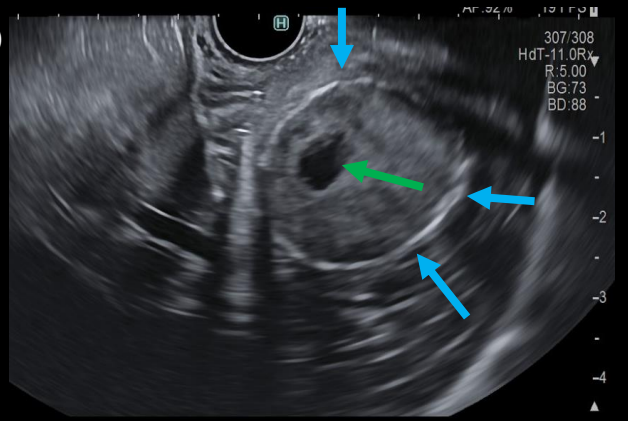


A small GIST on CT (a, purple arrow) is correlated with OGD (b) and EUS images (c) of the same lesion.

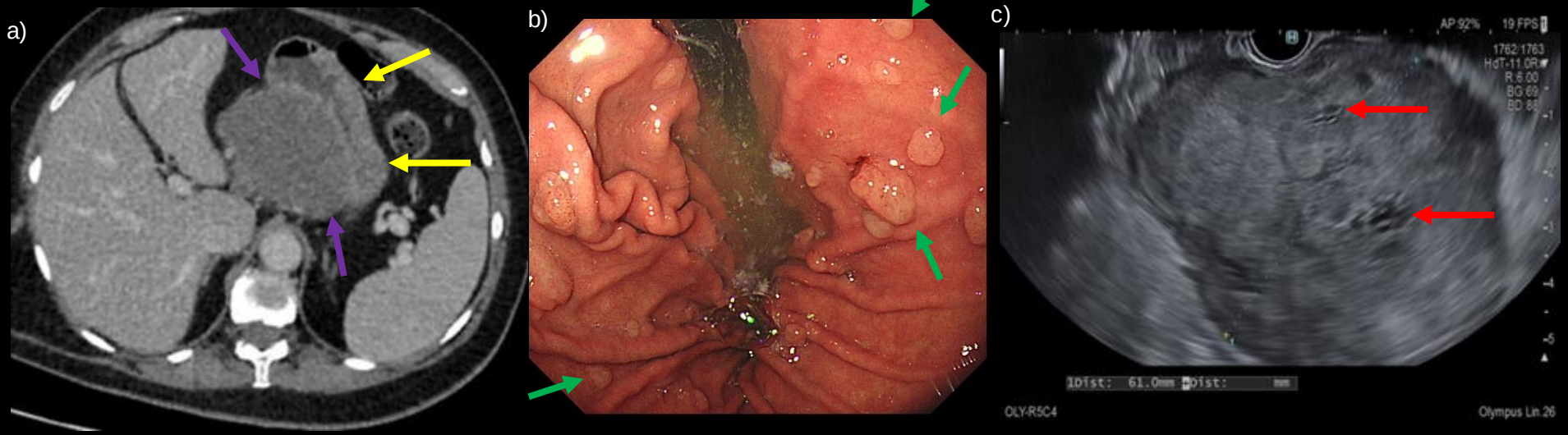
Although OGD can suggest a submucosal mass is most likely a GIST blind biopsies are often non-diagnostic as in this case.

Instead assessment should by EUS (endoscopic ultrasound). This allows high resolution imaging and targeted biopsy.

OGD demonstrates a rounded endophytic lesion in the gastric fundus with normal overlying mucosa (yellow arrows).

EUS demonstrates echogenic rim calcification (blue arrows) and anechoic central necrosis (green arrow).

GIST



A large GIST on CT (a, purple arrows) is correlated with OGD (b) and EUS images (c) of the same lesion.

Large exophytic GISTs can cause extrinsic compression of the stomach (yellow arrows). This lesion was first assessed by OGD (b) which demonstrated extrinsic compression of the gastric lumen and some benign gastric polyps (green arrows) but due to the size and exophytic nature of the mass it could not be appreciated on OGD.

EUS images of the same patient (c) however clearly demonstrated the large exophytic GIST with small foci of cystic necrosis (red arrows).

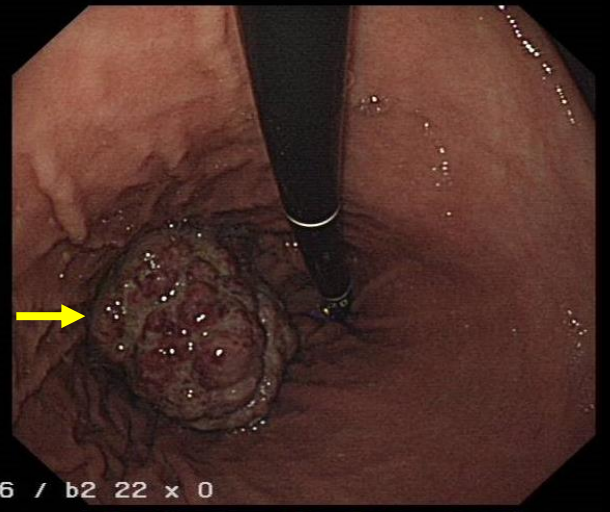
EUS also allowed targeted biopsy of the mass, important as management is determined by histology.

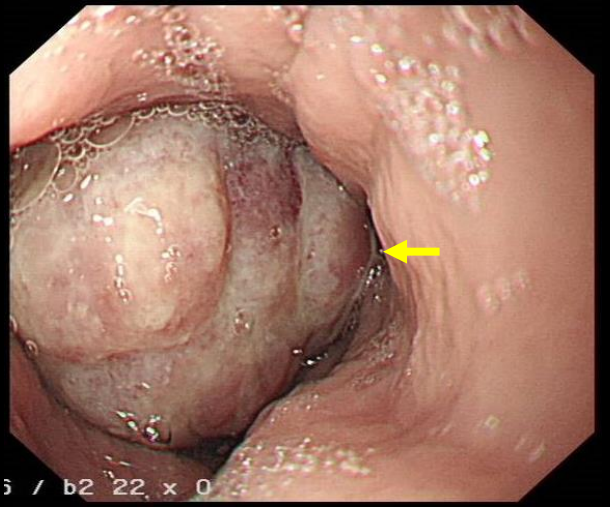
Gastric Metastases

a)

b)

c)





Portal venous CT (a,b) images of renal cell carcinoma metastases to the stomach (red arrows) and OGD images (c, yellow arrows) of one of the deposits in the same patient.

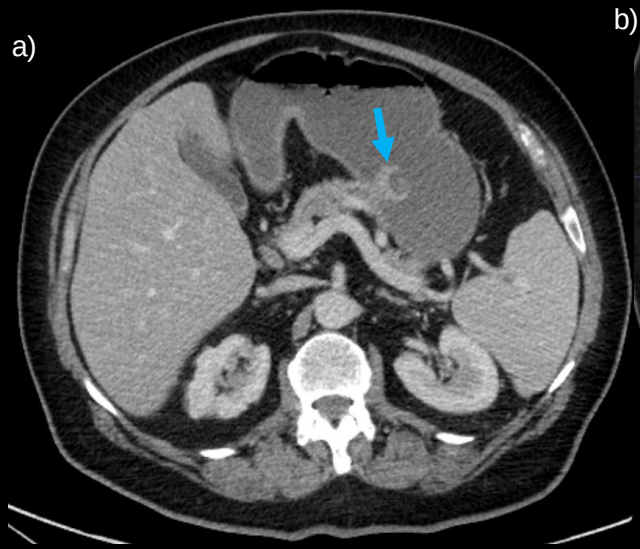
Gastric metastases are rare. The most common primary malignancy to metastasise to the stomach is malignant melanoma. Other malignancies include breast, renal, bronchial and GI tract.

Consider metastases with single or multiple gastric masses, usually in patients with a known primary malignancy. Often hyperenhancing with respect to the background gastric mucosa.

Remember that breast and renal carcinomas metastases can arise many years after treatment.

OGD is key to tissue diagnosis.

Gastric Metastases

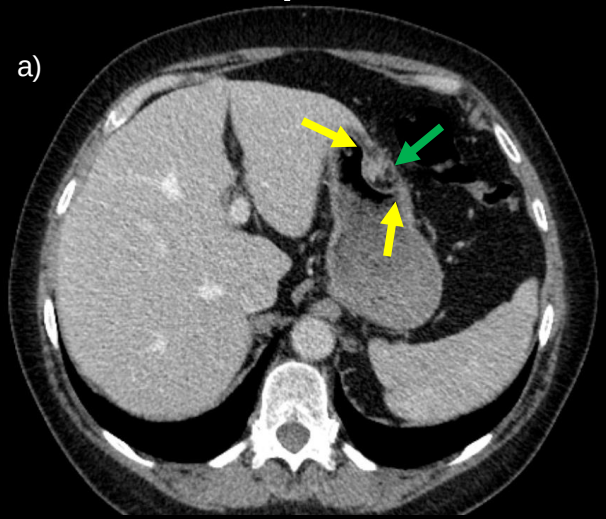


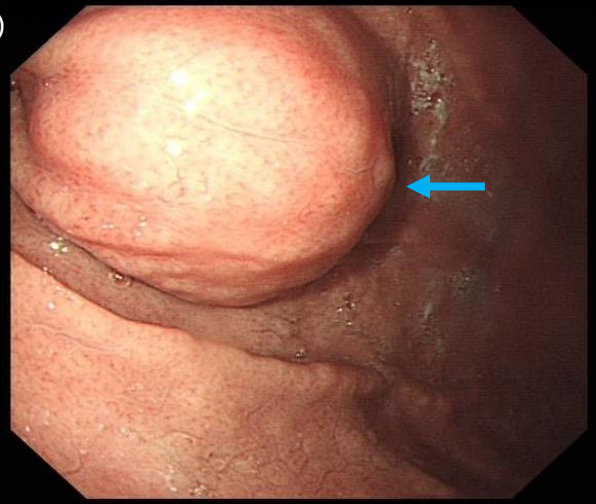
Portal venous CT (a,b) images of metastatic melanoma deposits in the stomach. Note the central ulceration (blue arrows). This would produce the classical "targetoid" appearance at fluoroscopy. There is a second lesion in the duodenal cap, also showing central ulceration (yellow arrow).

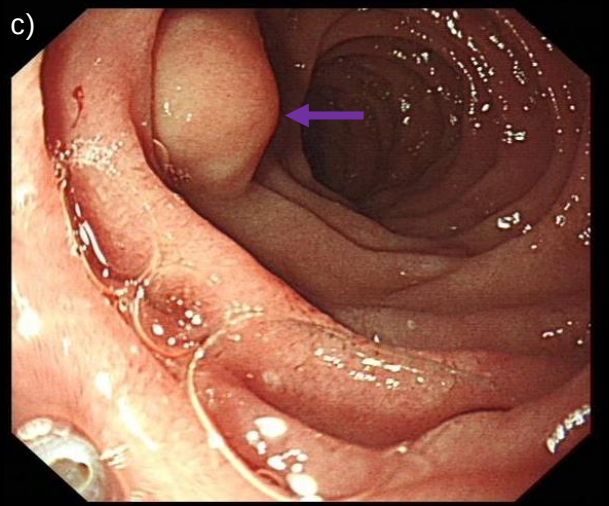
Portal venous MIP CT (c,d) showing linitis plastica. Note the contracted stomach with circumferential mucosal hyperenhancement (green arrows).

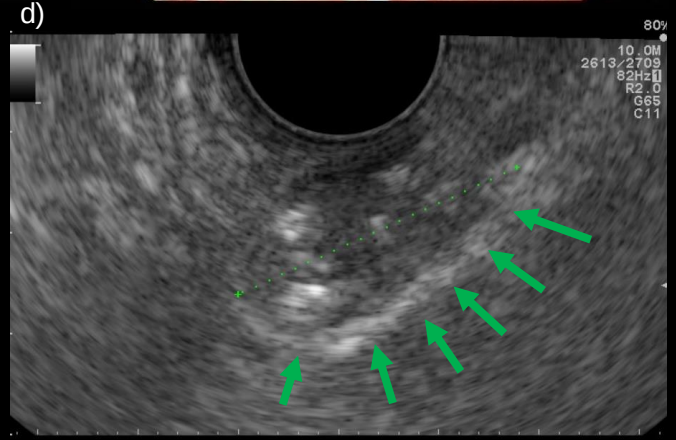
Scirrhous breast carcinoma can produce a linitis plastica type appearance, mimicking primary gastric carcinoma. Clinical history is key. OGD is required to confirm diagnosis.

Gastric Lipoma









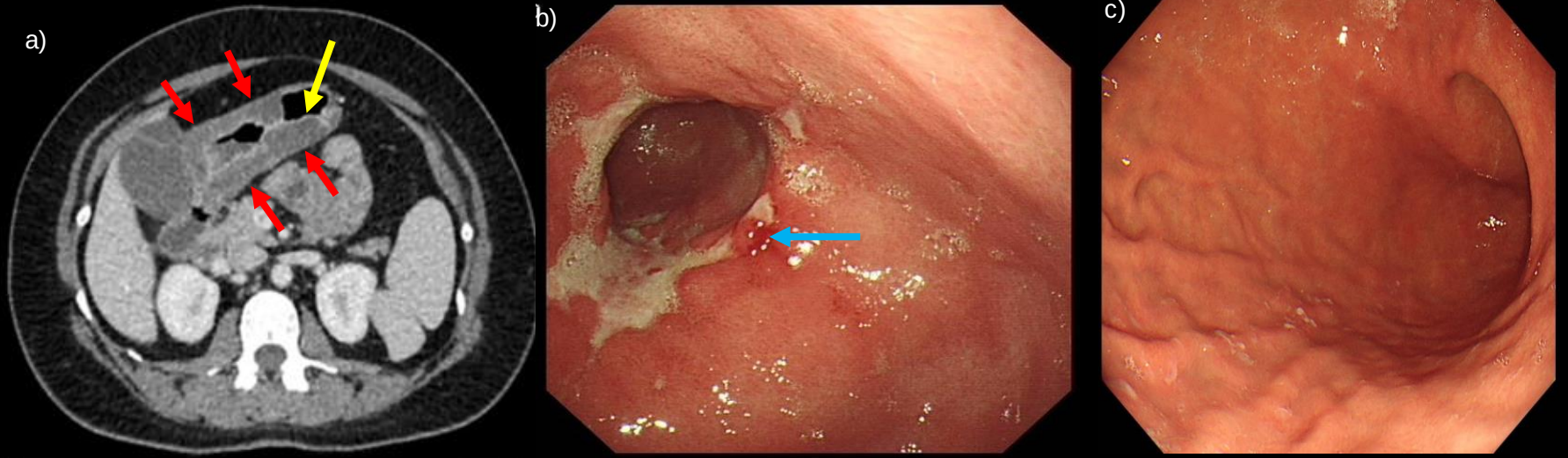
Portal venous CT (a), OGD (b,c) and EUS (d) images. GI tract lipomas can be found anywhere in the GI tract, but are rare in the stomach. Gastric lipomas are usually sessile and the vast majority are submucosal. They are usually incidental and asymptomatic but can develop ulceration and bleeding, and if they are pedunculated can act as lead point for an intussusception.

On CT a submucosal mass with internal fat density is pathognomic (red arrow). This lesion also contained some soft tissue density. Note the obtuse angle with the gastric wall suggests a submucosal location (yellow arrows). The main differential is GIST.

OGD demonstrated a well circumscribed mass on the greater curvature (b) with intact overlying mucosa (blue arrow). The mass has a pearlescent appearance classical for a submucosal lipoma. A similar lesion was also seen in the duodenum (purple arrow).

On EUS assessment the lesion was of heterogeneous echogenicity consistent with an atypical lipoma (green arrows), and not typical for a GIST.

Severe Gastritis



Portal venous CT (a), contemporaneous OGD (b) and followup OGD (c) of the same patient. Gastritis is inflammation of the gastric wall. There are many underlying causes including; infection (including H pylori and immunodeficiency related), NSAIDs, radiation, and autoimmune.

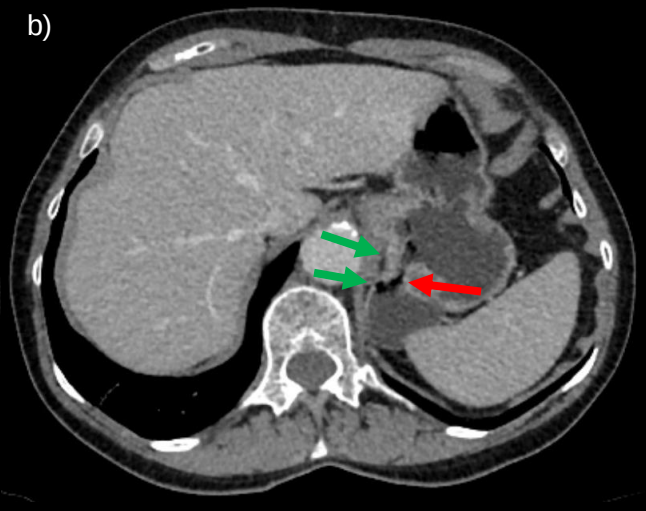
Gastritis is seen on CT as in focal or diffuse gastric wall thickening with hyperenhancing mucosa (yellow arrow) and grossly thickened oedematous submucosa (red arrows). On OGD there was generalised erythematous mucosa with multiple shallow ulcers (blue arrow).

Gastritis and malignant gastric wall thickening can be differentiated by the attenuation of the thickened submucosa. Gastritis has oedematous submucosa approximating water density whilst malignancy will have cellular submucosa of soft tissue density. In any case OGD and biopsy is recommended to exclude malignancy. Gastritis should resolve when the underlying cause has been treated (c) – note the healed normal mucosa. If the thickening fails to resolve ongoing endoscopic monitoring is key.

Gastric Diverticulum

a)

b)



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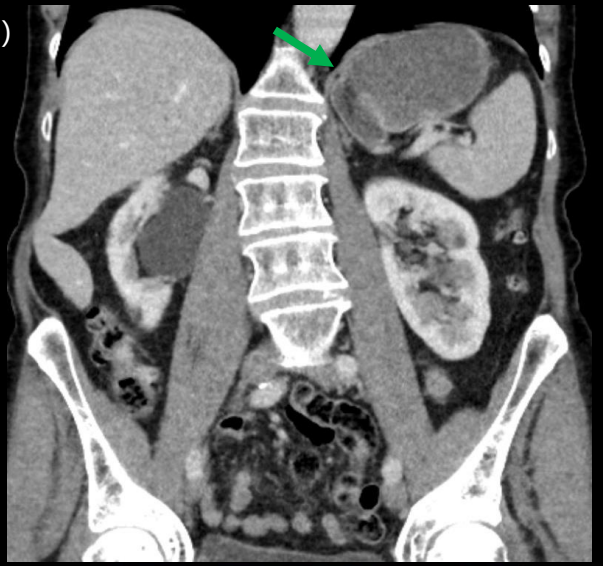

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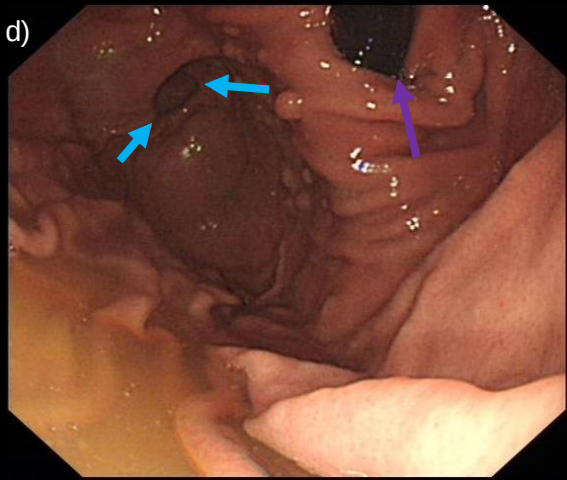
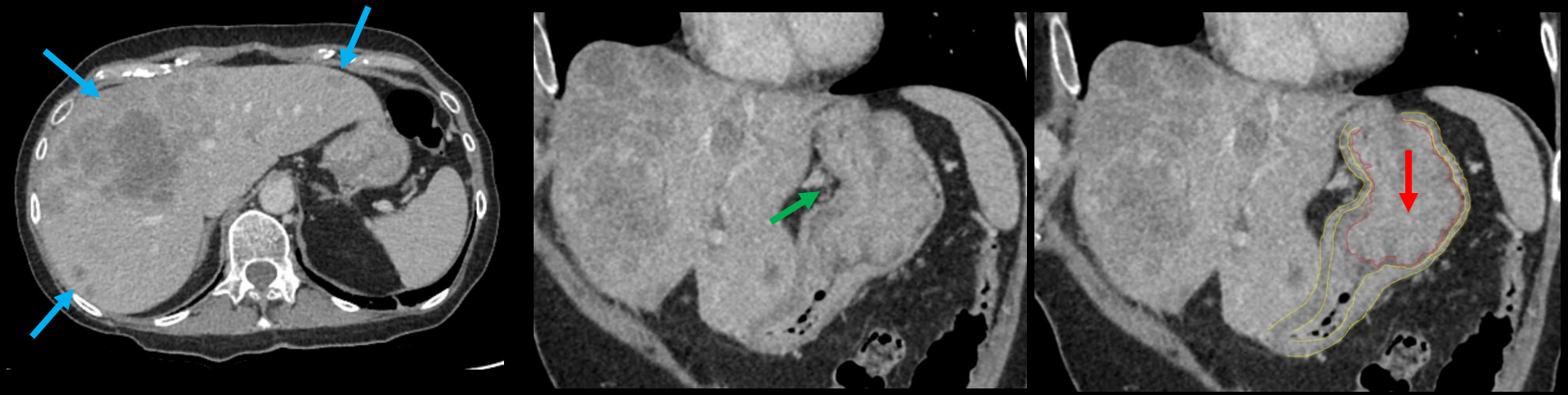


Portal venous CT (a, b, c) and OGD images of the same patient on different occasions. Gastric diverticula are rare and usually asymptomatic. The classical location is arising posterior to the fundus. The major risk is not the diverticulum itself but the possibility of misinterpretation as a left adrenal mass or a peripancreatic fluid collection.

Use multiplanar reformats to find classical features such as an air-fluid level (yellow arrow), internal gas (red arrow) or a visible connection to the main gastric lumen (green arrows). Bear in mind that the diverticulum can change appearance quite substantially between different scans.

On OGD retroflexion view a gastric divertiuclum is visible as an outpouching from the gastric fundus (blue arrows) adjacent to the scope passing through the gastro-oesophageal junction (purple arrow).

Gastric Masses & Intussusception



Portal venous CT axial (a) and paracoronal reformats (b,c) of the same patient. As elsewhere in the GI tract, a pedunculated gastric mass can act as a lead point for intussusception, either transient or non-resolving with pain and obstruction when intussuscepted.

Axial CT demonstrates indrawing of the gastric fundus into the gastric body suggestive of intussusception (purple arrow). Paracoronal reformats better demonstrate a large polypoid gastric mass (outlined in red, red arrow) intussuscepting into the body of the stomach (outlined in yellow).

Note wispy attenuation of the paragastric fat (green arrow) suggesting T4a disease and extensive hepatic metastatic disease (blue arrows).

Take home points

- The stomach is often ignored on CT but is an important location for pathology.
- Carefully interrogate the perigastric fat and local nodal stations.
- If a lesion has obtuse angles with the gastric wall it may be submucosal.
- Gastric metastases are rare but should be considered especially if there is a history of malignancy.
- OGD and EUS have key roles in further assessing gastric pathology detected on CT.

References

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