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Clinical Radiology
The Royal College of Radiologists

Recommendations for cross-sectional imaging in cancer management, Second edition

Oesophagus and stomach cancers

Faculty of Clinical Radiology

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Oesophageal cancer

Clinical background

The incidence of oesophageal cancer is increasing, particularly at the gastro-oesophageal junction (GOJ), and represents the third most common gastrointestinal malignancy.[1] If staging suggests cure is possible, the majority of patients with adenocarcinoma receive combined modality treatment in the form of either combination chemotherapy followed by surgery, or chemoradiotherapy followed by surgery. Surgery alone is reserved for early disease. Surgery retains a role in squamous carcinoma of the oesophagus, but combination chemoradiotherapy is more widely used, particularly in the upper and middle third of the oesophagus. Primary oesophageal adenocarcinoma most commonly presents in the lower third of the oesophagus, and less commonly in the mid- and upper oesophagus, and is strongly associated with reflux disease and Barrett's oesophagus. The classification of regional lymphadenopathy has changed significantly in the Union for International Cancer Control revised TNM staging system (7th edition, TNM7).[2] The regional lymph nodes, irrespective of the site of the primary tumour, are those in the oesophageal drainage area including coeliac axis nodes and paraoesophageal nodes in the neck, but not supraclavicular nodes which are considered to be distant metastases.

Who should be imaged?

All patients with oesophageal cancer diagnosed at endoscopy or suspected following an upper gastrointestinal barium examination using fluoroscopy. In general, patients with dysplasia and without invasive cancer do not require full CT staging.

Staging objectives

- To define tumour position and length, and estimate the proximal and distal extent of the tumour.
- To define the degree of tumour above and below the diaphragm in GOJ tumours.
- To identify local invasion, particularly with respect to the trachea, main bronchi, aorta, pericardium, pleura, diaphragmatic hiatus and crura. TNM7 distinguishes between resectable (T4a) and unresectable (T4b) disease.[2]
- To identify lymph node enlargement, particularly peri-oesophageal, mediastinal and perigastric regions. The number of nodes is an important prognostic indicator which is reflected in TNM7.[2]
- To identify metastases in retroperitoneal lymph nodes, in the liver and peritoneal cavity.
- To determine the degree of oesophageal obstruction and to identify the presence of complications such as localised perforation or fistulation.

Staging

CT of the thorax and abdomen is the primary imaging investigation.[3]

CT

- Oral administration of 1 litre of water although this may be limited by dysphagia (see Tips).
- 100–150 ml of intravenous iodinated contrast medium injected at 3–4 ml/sec.
- MDCT is commenced at 20–25 seconds (chest) and 70–80 seconds (abdomen) post-injection.
- Using MDCT, slice thickness will depend on scanner capability. In general, sections are acquired at 1.25–2.5 mm and reformatted at 5 mm for multi-planar viewing.

Values of $CTDI_{vol}$ should normally be below the relevant national reference dose for the region of scan and patient group (see Appendix and Radiation protection for the patient in CT in Section 2).

PET-CT

^{18}FDG PET-CT is increasingly being used for primary tumour staging where there is curative intent as oesophageal carcinoma is intensely ^{18}FDG-avid.[4] The technique is helpful for

delineating the craniocaudal extent of oesophageal disease and also for detecting involved regional and distant nodes, and metastases.

Follow-up

CT is the primary imaging modality for follow-up with the same protocol, dictated by the type of treatment (combination chemotherapy, chemoradiotherapy, surgery); although there is growing evidence supporting the use of FDG PET-CT for reassessment of patients following neoadjuvant treatment as this is more accurate than CT alone. Following surgery, a CT at three months is recommended as a baseline for further assessment. Subsequent imaging will depend on disease status and patient symptoms.

Tips

- The patient may be scanned prone to rule out invasion of the aortic adventitia.
- Approximately 200 ml of water given orally immediately before the patient is scanned may help to maximise oesophageal distension and visualisation of the endoluminal component of the tumour.
- Laparoscopy is required in most sub-diaphragmatic tumours to detect small volume peritoneal disease that may not be seen by imaging.
- Endosonography (EUS) supplemented by EUS-guided biopsy of non-regional nodes retains an important role in staging algorithms in patients with curative intent.

Stomach cancer

Clinical background

In patients presenting with symptoms of gastric cancer, approximately one-third will have metastatic disease with an overall five-year survival of 15–18%.[5] Patients presenting with early-stage disease may be curable with surgery, with five-year survival up to 80%.[6] Patients may receive neoadjuvant chemotherapy in addition to surgery for this disease.

The objective of gastric resection is to achieve clear histological margins and total gastrectomy is not necessary for all patients with gastric adenocarcinoma, particularly distal tumours. The extent of nodal dissection is defined as a major factor in staging and can influence outcome by stage. Although there is no benefit in performing extended lymph node dissection in all, for patients with N2 disease (left gastric, common hepatic and coeliac and splenic artery nodes), a more extended dissection is of benefit. The delineation of tumour extent as well as local spread will influence the type of surgery performed. Imaging is essential to rule out metastatic disease in patients considered suitable for surgery. Currently, nodal staging is not sufficiently accurate to enable selection between patients who will require limited versus extended surgical lymph node dissection.

Who should be imaged?

All patients with gastric carcinoma.

Staging objectives

- To identify metastatic disease in the liver and peritoneum including ovarian deposits.
- To determine the proportion of stomach involved by tumour to assist with decision-making with regard to the extent of surgery to be performed.
- To identify the presence or absence of peritoneal nodules and nodal enlargement (peri-gastric, coeliac axis nodes versus metastatic nodal disease in retroperitoneum).
- To document the degree of outflow obstruction in order to guide the clinical management of obstructive symptoms.

Staging

CT of the thorax, abdomen and pelvis is the primary imaging investigation.[3]

CT

- Oral administration of 1 litre of water +/- CO2 granules as a negative contrast agent, of which 400 ml is to be drunk immediately before going onto the scanner (see Tips).
- To ensure maximum gastric distension, an anti-peristaltic agent may be helpful.
- MDCT is commenced at 20–25 seconds (chest) and 70–80 seconds (abdomen and pelvis) post-injection.
- Using MDCT, slice thickness will depend on scanner capability. In general, sections are acquired at 1.25–2.5 mm and reformatted at 5 mm for multi-planar viewing.

Values of $CTDI_{vol}$ should normally be below the relevant national reference dose for the region of scan and patient group (see Appendix and Radiation protection for the patient in CT in Section 2).

PET-CT

^{18}FDG PET-CT is rarely useful for the assessment of gastric carcinomas, because the stomach often shows low- to moderate-grade physiological ^{18}FDG uptake and small local involved nodes may not demonstrate significant ^{18}FDG uptake. However, it does have a role in GOJ tumours which are now all classified as oesophageal cancers in TNM7.[2]

Follow-up

CT is the primary imaging modality for follow-up with the same protocol, dictated by the type of treatment. Following surgery, a CT at three months is recommended as a baseline for further assessment. Subsequent imaging will depend on disease status and patient symptoms.

Tips

- The patient may be scanned prone to aid assessment of local invasion.
- Approximately 400 ml of water given orally immediately before the patient is scanned may help to maximise gastric distension and visualisation of the luminal component of the tumour.
- Laparoscopy is required in most sub-diaphragmatic tumours to detect small volume peritoneal disease that may not be seen by imaging.

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