

Guideline for the Imaging of Patients with Suspected Upper G.I. Cancers

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| Date Approved by Network Governance | July 2012 |
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| Date for Review | July 2015 |
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Changes Between Versions 1.0 and 2.0

No changes have been made as evidence base remains current.

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1. Scope of the guideline

This guideline has been produced to provide guidance for imaging for suspected Upper GI cancers.

2. Background

To be used in conjunction with staging and management algorithm.
(www.birminghamcancer.nhs.uk)

3. All patients

- 3.1 All patients with oesophago-gastric (OG) cancer should undergo staging CT unless they are deemed unfit for intervention at time of diagnosis.
- 3.2 Patients with oesophageal and OG junction tumours with potentially curable disease on CT are further staged with EUS (Endoscopic Ultrasound Scan).
- 3.3 On the basis of CT and EUS scanning patients with potentially resectable disease should undergo FDG-PET (fluorodeoxyglucose - positron emission tomography) scanning for further assessment.
- 3.4 Patients with OG junction and gastric cancers require additional staging with laparoscopy.

4. Imaging protocols\techniques

4.1 Computed Tomography (CT)

This is the preferred and **minimum** imaging procedure for staging of upper GI cancer, supplemented by EUS/ PET as appropriate.

4.2 Oesophagus

4.2.1 Area to be examined chest and abdomen (*pelvis and neck optional*).

4.2.2 Staging

CT with intravenous contrast medium with distension of the oesophagus with water (*optional - muscle relaxant or prone scans*) is the preferred technique for staging. The chest is usually scanned in the arterial phase (30-35 sec) as the tumour-tissue difference is maximal at this stage. The liver should be examined in the portal venous phase of enhancement. 5mm max thickness preferred.

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Although there are isolated reports of high tumour (T) and node (N) staging accuracy using dedicated CT protocols, it is generally accepted that CT is inferior to EUS for local staging, particularly in series where there is a high proportion of early cancers. T and N staging accuracies are 60-67%. PET is superior in detecting occult metastasis.

4.3. Stomach

4.3.1 Area to be examined chest, abdomen and pelvis.

4.3.2 Localisation - CT with intravenous contrast medium using 1 litre water as an oral contrast agent immediately prior to scan (*muscle relaxant - optional*).

4.3.3 Staging - CT with intravenous contrast medium. The liver should be examined in portal venous phase (*arterial phase optional*) 5mm max thickness preferred.

4.3.4 Overall accuracy of T staging using CT is around 77% although recent reports using Multidetector CT (MDCT) put this at 84-89%. N staging accuracy is lower at around 75-80%.

5. Structured CT reporting for staging

5.1 In addition to standardising techniques and protocols, there is an increasing need to standardise formal radiological reporting so that all of the information required for management decisions is always included. The majority of the CTs should be reported by radiologists with a declared interest.

5.2 A cancer imaging report for staging a primary tumour should include:

- a) a description of the tumour and sites of spread with appropriate measurements of the primary tumour and metastases
- b) a descriptive statement of the primary tumour and the extent of tumour spread in relation to adjacent anatomy
- c) image and series numbers on which the tumour is demonstrated
- d) a statement regarding the presence or absence of nodal enlargement in nodal chains draining the primary tumour and a guide as to the number of enlarged nodes identified
- e) a statement regarding the presence of distant metastases
- f) a statement regarding the absence of disease in common sites of metastases (e.g., liver metastases in colon cancer)
- g) dimensions of the primary tumour and nodal metastasis (e.g., maximum short axis diameter of the largest node)
- h) dimensions and location of metastases should be recorded with reference to specific image numbers—at least the largest and smallest should be measured (RECIST reporting criteria)

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- 5.3 Dimensions and recognition of metastases may be useful as marker lesions for measuring response but even if the patient is not in a clinical trial such information provides the clinician with an overall assessment of tumour burden prior to treatment. Measurements should be based on the RECIST recommendations on evaluation criteria in solid tumours. Although these recommendations are primarily useful for evaluation or response to treatment, the principles of assessment of tumour size are also applicable to staging investigations.
- 5.4 The CT report should also include:
- a) a descriptive statement regarding the presence of disease in other sites which may or may not be malignant
 - b) a descriptive statement regarding disease that is associated with malignancy but unlikely to be cancer, e.g., pulmonary consolidation.
 - c) a conclusion summarising the major features of the primary tumour and sites of spread
 - d) radiological TNM staging or an alternative should be given but must be regarded as provisional. Formal staging is the responsibility of the clinical oncologist/ pathologist

6. Indications for PET scanning

- 6.1 PET does not have a routine role in gastric cancer.
- 6.2 In oesophageal cancer PET should be used as a staging procedure in patients potentially fit enough for surgery and of otherwise limited stage on CT.
- 6.3 The grading of evidence for use of PET in Oesophageal Cancer (PET - A Strategy for Provision in the UK - Report of the Intercollegiate Standing Committee on Nuclear Medicine 2003). The report indicates:
- a) staging of primary cancer (B)
 - b) assessment of disease recurrence in previously treated cancers (C)
 - c) PET is not a routine indication but may be helpful assessment of neoadjuvant chemotherapy (C)
- 6.4 **NB** – CT evidence of inoperability should be unequivocal i.e. ‘probable type’ reports need additional verification before excluding patient from surgery– if there is doubt PET (or biopsy) should be performed.
- 6.5 PET/CT as available in the West Midlands does not include a diagnostic CT (although capability is there).
- 6.6 Evidence base:
- a) one-third of patients undergoing surgery are found to have occult metastases

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- b) PET is highly sensitive in detection of primary tumour and hepatic / distant metastases
- c) local lymph nodes not well staged with PET (or CT)
- d) peritoneal spread difficult with PET (or CT)
- e) sensitivity for distant metastases
 - PET 69%; CT46%
- f) specificity
 - PET 93%; CT 74%
- g) non-attenuation corrected PET - Luketich 1999
- h) advanced disease (Stage 4)
 - Accuracy 82% (CT/EUS 64%)
 - Sensitivity 74% (CT/EUS 47%)
 - Specificity 90% (CT/EUS 78%)
- i) local nodal disease
 - 81% sens EUS/CT
 - 33% sens PET
- j) distant / regional nodes
 - 46% sens PET
 - 43% sens CT/EUS
- k) PET specificity better for distant nodes

7. Endoscopic ultrasound in oesophageal cancer

- 7.1 Please see the National EUS Guidelines, British Society of Gastroenterologist, 2004 (relevant pages are in appendix 1). This document provides minimum standards and guidance for endosonographers involved in the staging of oesophago-gastric malignancy. It has been produced by the UK EUS Users Group in collaboration with the British Society of Gastroenterology, Association of Upper GI Surgeons and the Royal College of Radiologists.

8. Staging

- 8.1 Staging data for 70% of all cancers (90% of stageable cancers) should be collected electronically and transferred to the West Midlands Cancer Intelligence Unit (WMCUI).

8.2 All Trusts

- a. the Trust should send electronic extracts from their histopathology system regularly to the WMCUI
- b. the Trust should send imaging extracts for cancer patients electronically to the WMCUI regularly, who have established remote access for the WMCUI to their radiology information system

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- 8.3 For cancers diagnosed clinically or those that have not had surgery
 - a. Clinical TNM stage should be recorded on the MDT database
- 8.4 For those with invasive cancer who have had surgery
 - a. MDTs should record the full cancer registry dataset onto their MDT database at the time of discussion at the MDT meeting and send extracts to the WMCIU on a regular basis

Monitoring of the guideline

Adherence to the Network guidelines may from time to time be formally monitored through routine collection of Key Performance Indicators or audit.

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References

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2. PET/CT in Oncology: Integration into Clinical Management of Lymphoma, Melanoma, and Gastrointestinal Malignancies (*Heiko Scho"der, MD; Steven M. Larson, MD; and Henry W.D. Yeung, MD* J Nucl Med 2004; 45:72S–81S)
3. Clinical Role of FDG PET in Evaluation of Cancer Patients1 (*Lale Kostakoglu, MD; Harry Agress, Jr, MD; Stanley J. Goldsmith, MD*)
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9. Chen CY et al. Radiology 2007 ;242 : 472-48210. RCR imaging for oncology 200411. National EUS Guidelines. British Society of Gastroenterologist 2004.

Approval Signatures

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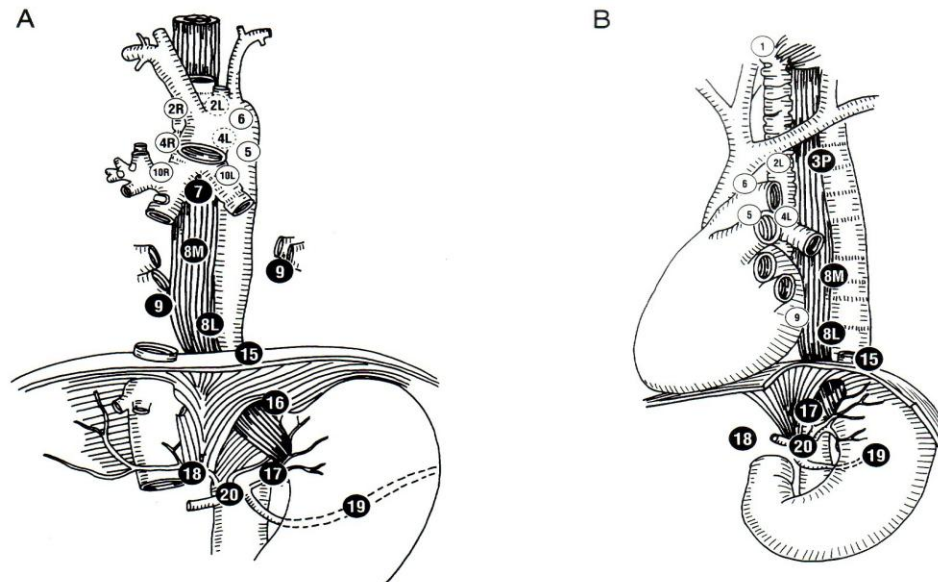
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Appendix 1

Using the Upper GI Imaging Guidelines

Lymph node stations in oesophago-gastric carcinoma (1, 2)



Regional lymph node stations for staging esophageal cancer, from front (A) and side (B).

| | | |
|------|-----------------------------------|---|
| 1 | Supraclavicular nodes | Above suprasternal notch and clavicles |
| 2R | Right upper paratracheal nodes | Between intersection of caudal margin of innominate artery with trachea and the apex of the lung |
| 2L | Left upper paratracheal nodes | Between top of aortic arch and apex of the lung |
| ● 3P | Posterior mediastinal nodes | Upper paraesophageal nodes, above tracheal bifurcation |
| 4R | Right lower paratracheal nodes | Between intersection of caudal margin of innominate artery with trachea and cephalic border of azygous vein |
| 4L | Left lower paratracheal nodes | Between top of aortic arch and carina |
| 5 | Aortopulmonary nodes | Subaortic and para-aortic nodes lateral to the ligamentum arteriosum |
| 6 | Anterior mediastinal nodes | Anterior to ascending aorta or innominate artery |
| ● 7 | Subcarinal nodes | Caudal to the carina of the trachea |
| ● 8M | Middle paraesophageal lymph nodes | From the tracheal bifurcation to the caudal margin of the inferior pulmonary vein |
| ● 8L | Lower paraesophageal lymph nodes | From the caudal margin of the inferior pulmonary vein to the esophagogastric junction |
| ● 9 | Pulmonary ligament nodes | Within the inferior pulmonary ligament |
| 10R | Right tracheobronchial nodes | From cephalic border of azygous vein to origin of RUL bronchus |
| 10L | Left tracheobronchial nodes | Between carina and LUL bronchus |
| ● 15 | Diaphragmatic nodes | Lying on the dome of the diaphragm, and adjacent to or behind its crura |
| ● 16 | Paracardial nodes | Immediately adjacent to the gastroesophageal junction |
| ● 17 | Left gastric nodes | Along the course of the left gastric artery |
| ● 18 | Common hepatic nodes | Along the course of the common hepatic artery |
| ● 19 | Splenic nodes | Along the course of the splenic artery |
| ● 20 | Celiac nodes | At the base of the celiac artery |

FIG. 9.1. Esophageal lymph node map indicating regional lymph node stations for staging esophageal cancer, from front (A) and side (B). (Reproduced with permission from Bristol-Myers Oncology Division.)

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**Example Staging Proforma
OESOPHAGEAL & OESOPHAGOGASTRIC JUNCTIONAL CANCERS**

STAGING ENDOSCOPY & EUS DATA FORM

Patient sticker or details:

Name:

Hospital No:

D.O.B.

Referring Hospital:

Referring Cons:

Date:

Endoscopist:

Supervisor:

Scope(s) used

1. Endoscopic details (cm from incisors):

| | | | |
|--|--------------|--|------------------|
| <i>Distance (cm) from incisor teeth to:</i> | | <i>Distance from top aortic arch (cm) to:</i> | |
| Proximal margin tumour |cm | Proximal tumour margin |cm |
| Distal margin tumour |cm | Distal tumour margin |cm |
| Tumour length (cm) |cm | | |
| Location OG junction |cm | | |
| Hiatal hernia? Y / N | | from | tocm |
| Barrett's? Y / N | | proximal extent | cm |
| Stricture: | none/minimal | moderate/passable | tight/impassable |
| Dilatation | Y / N | | |

2. Tumour classification (as per AJCC):

- Cervical OC (lower border cricoid to thoracic inlet)
- *Intrathoracic*
 - Upper (inlet to tracheal bifurcation)
 - Mid (bifurcation to just above OGJ)
- Lower thoracic/abdominal (inc. OGJ / intra-abdominal oesophagus)

| | | |
|--------|--------|--------|
| Type 1 | Type 2 | Type 3 |
|--------|--------|--------|

3. Other relevant data:

Prior antireflux surgery? Y / N prior gastric surgery Y / N

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4. T staging:

longitudinal submucosal spread not visible at OGD? Y / N fromtocm

T1a T1b T2 T3 T4

Details of advanced T stage:

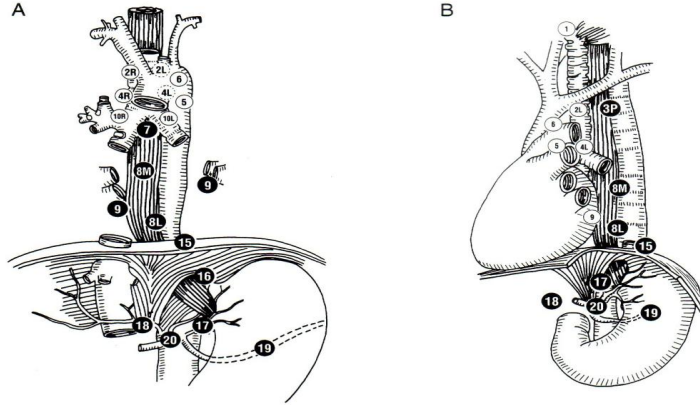
'minimal' T3 (just breaches m. propria, 4th layer) **'bulky' T3** (extensive invasion beyond m.propria)

T4: aorta pericardium pleura crura airways
other.....

Full thickness disease below diaphragm? Y / N

5. LN staging:

Total number LN identified: FNA performed? Y / N

|  | | No. & short axis Size (mm) for each site | FNA – document site |
|--|---|--|---------------------|
| <p style="text-align: center;">Regional lymph node stations for staging esophageal cancer, from front (A) and side (B).</p> <table border="0"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> 1 Supraclavicular nodes 2R Right upper paratracheal nodes 2L Left upper paratracheal nodes ● 3P Posterior mediastinal nodes 4R Right lower paratracheal nodes 4L Left lower paratracheal nodes 5 Aortopulmonary nodes 6 Anterior mediastinal nodes ● 7 Subcarinal nodes ● 8M Middle paraesophageal lymph nodes ● 8L Lower paraesophageal lymph nodes ● 9 Pulmonary ligament nodes 10R Right tracheobronchial nodes 10L Left tracheobronchial nodes ● 15 Diaphragmatic nodes ● 16 Paracardial nodes ● 17 Left gastric nodes ● 18 Common hepatic nodes ● 19 Splenic nodes ● 20 Celiac nodes </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> Above suprasternal notch and clavicles Between intersection of caudal margin of innominate artery with trachea and the apex of the lung Between top of aortic arch and apex of the lung Upper paraesophageal nodes, above tracheal bifurcation Between intersection of caudal margin of innominate artery with trachea and cephalic border of azygous vein Between top of aortic arch and carina Subaortic and para-aortic nodes lateral to the ligamentum arteriosum Anterior to ascending aorta or innominate artery Caudal to the carina of the trachea From the tracheal bifurcation to the caudal margin of the inferior pulmonary vein From the caudal margin of the inferior pulmonary vein to the esophagogastric junction Within the inferior pulmonary ligament From cephalic border of azygous vein to origin of RUL bronchus Between carina and LUL bronchus Lying on the dome of the diaphragm, and adjacent to or behind its crura Immediately adjacent to the gastroesophageal junction Along the course of the left gastric artery Along the course of the common hepatic artery Along the course of the splenic artery At the base of the celiac artery </td> </tr> </table> | | | |
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FIG. 9.1. Esophageal lymph node map indicating regional lymph node stations for staging esophageal cancer, from front (A) and side (B). (Reproduced with permission from Bristol-Myers Oncology Division.)

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6. Details of metastases

Liver – left lobe / right lobe Coeliac LN (see below)

Left adrenal Cervical LN (see below)

Other

FNA / Bx performed Y / N

7. Staging summary

T.....N.....M.....

Group stage

| | T | N | M |
|-----------|----------|----------|----------|
| Stage 0 | Tis | N0 | M0 |
| Stage I | T1 | N0 | M0 |
| Stage IIA | T2 | N0 | M0 |
| | T3 | N0 | M0 |
| Stage IIB | T1 | N1 | M0 |
| | T2 | N1 | M0 |
| Stage III | T3 | N1 | M0 |
| | T4 | Any N | M0 |
| Stage IV | Any T | Any N | M1 |
| Stage IVA | Any T | Any N | M1a |
| Stage IVB | Any T | Any N | M1b |

Signed

Date

Status

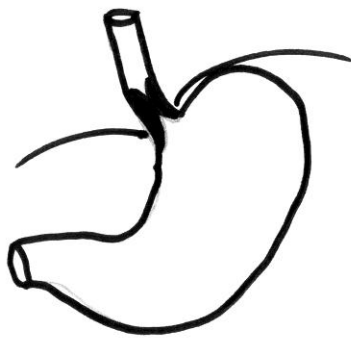
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Classification of junctional tumours (see ref. 4)

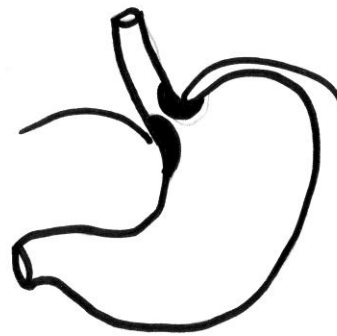
Type 1. Oesophageal – just involves OG junction

Type 2. Tumour straddles junction

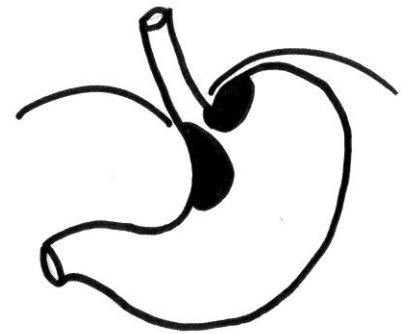
Type 3. Cardia tumour involving OG junction



TYPE 1



TYPE 2



TYPE 3

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