Head & Neck Clinical Sub Group

Network Agreed Imaging Guidelines for UAT and Thyroid Cancer

A: Pharynx, Larynx and Oral Cavity

1. Clinical diagnosis

Endoscopy and biopsy

Occult SCC following biopsy with negative endoscopy → MRI neck
Primary on MRI → non-contrast staging chest CT
No primary → PET-CT

2. Staging

Timing of scans to conform with target cancer waiting times.
CA Larynx stage with CT neck and thorax with contrast.
CA nasopharynx, oropharynx, hypopharynx and oral cavity → MR head and neck and a non-contrast CT thorax.

Follow-up imaging

Use same imaging technique as staging scan
Where there is residual or recurrent abnormality post treatment, consider PET-CT to differentiate recurrence from post treatment effect.

3. CT and MRI protocols

CT neck

Body area:	Neck
Prep:	Ask patient not to swallow prior to each scan and position arms down.
	Ensure skin surface is visualised.
IV contrast medium:	Iohexal (Omnipaque) 300 100ml at 2ml/sec
Injection:	Scan at 100 sec post injection.
Scan region:	Skull base to sternal notch
Reconstructions	1 - 2.5mm review in axial, coronal and sagittal planes

Non-contrast CT chest –

Scan region:	Sternal notch to diaphragm 2.5 - 5mm

MRI neck

Coil:	Head and neck coil.
Positioning:	Patient supine with patient as high as possible in coil. Use fast sequences as needed
IV contrast:	Gadovist (Gadobutrol) 1.0mmol/ml at a dose rate of 0.1ml/kg to a maximum of 10ml.

Regions and sequences (all 3mm slice thickness)

T1 and T2 axial to T1 coronal STIR coronal	Parallel to hard palate, to cover area from frontal sinus down sternal notch; overlapping blocks.
T2 sagittal	For midline disease and tongue lesions

Post-contrast:

T1 axial FS:	T1 coronal FS

4. TNM staging

Primary Tumour (T)

T0 No evidence of primary tumour
Tis Carcinoma in situ

Nasopharynx

T1 Confined to the nasopharynx or extending to oropharynx or nasal cavity.

T2 Parapharyngeal extension
T3 Involving skull base and/or paranasal sinuses
T4 Intracranial extension and/or involving cranial nerves, hypopharynx, orbit, masticator space

Regional Lymph Nodes (N)

N0 No regional lymph node metastasis

N1 Unilateral cervical lymph node(s), ≤6cm, above the supraclavicular fossa, unilateral or bilateral, retropharyngeal lymph nodes, ≤6 cm.
N2 Bilateral cervical lymph node(s), ≤6 cm above the supraclavicular fossa.

N3a >6 cm lymph node.
N3b Lymph node extension to the supraclavicular fossa.

Distant Metastasis (M)

M0 No distant metastasis.
M1 Distant metastasis.

Oropharynx

T1 ≤2.0cm or less.
T2 Between 2 - 4.0 cm.
T3 >4.0 cm or extension to lingual surface of the epiglottis.

T4a Invading the larynx, extrinsic muscle of tongue, medial pterygoid, hard palate or mandible.

T4b Invades lateral pterygoid muscle, pterygoid plates, lateral nasopharynx or skull base or encases the carotid artery.

Regional Lymph Nodes (N)

N0 No regional lymph node metastasis.
N1 Single ipsilateral lymph node, ≤3.
N2 Single ipsilateral lymph node, ≥3 cm but not >6 cm, or in multiple ipsilateral lymph nodes, bilateral or contralateral lymph nodes, none >6 cm.
N2a Single ipsilateral lymph node ≥3 cm but not >6 cm.
N2b Multiple ipsilateral lymph nodes, none >6 cm.
N2c Bilateral or contralateral lymph nodes, none >6 cm.
N3 Lymph node >6 cm.

Distant Metastasis (M)

M0 No distant metastasis.
M1 Distant metastasis.

Oral Cavity

Primary Tumour (T)

Tx Primary tumour cannot be assessed.
T0 No evidence of primary tumour.
Tis Carcinoma in situ.
T1 Tumour ≤2.0cm.
T2 Tumour >2.0cm but ≤4.0cm.
T3 Tumour > 4.0cm.
T4a Moderately advanced local disease invading adjacent structures.
T4b Very advanced local disease invading masticator space, pterygoid plates, skull base and/or encasing internal carotid artery.

Regional Lymph Nodes (N)

Nx Cannot be assessed.
N0 No regional lymph node metastasis.
N1 Metastasis in a single ipsilateral lymph node ≤3.0cm.
N2 Metastasis in a single ipsilateral lymph node >3.0cm but <6.0cm or in multiple ipsilateral nodes, bilateral or contralateral lymph nodes <6.0cm.
N2a Metastasis in a single ipsilateral lymph node >3.0cm but <6.0cm.
N2b Metastasis in multiple ipsilateral lymph nodes ≤6.0cm.
N2c Metastasis in bilateral or contralateral lymph nodes ≤6.0cm.
N3 Metastasis in a lymph node >6.0cm.

Distant Metastasis (M)

M0 No distant metastasis.
M1 Distant Metastasis.

Hypopharynx

T1 Limited to one subsite of hypopharynx and/or ≤2.0cm.
T2 More than one subsite or an adjacent site or between 2.0 - 4.0 cm but not fixated to hemilarynx..
T3 >4.0cm with fixation to hemilarynx or extension to oesophagus.

T4a Invading thyroid/cricoid cartilage, hyoid bone, thyroid gland or central compartment soft tissue.
T4b Invading prevertebral fascia, encases carotid artery, or involves mediastinal structures.

Regional Lymph Nodes (N)

N0 No regional lymph node metastasis.
N1 Single ipsilateral lymph node, ≤3 cm.
N2 Single ipsilateral lymph node, ≥3 cm but not >6 cm, or in multiple ipsilateral lymph nodes, bilateral or contralateral lymph nodes, none >6 cm.
N2a Single ipsilateral lymph node ≥3 cm but not >6 cm.
N2b Multiple ipsilateral lymph nodes, none >6 cm.
N2c Metastasis in bilateral or contralateral lymph nodes, none > 6 cm.
N3 Metastasis in a lymph node > 6 cm.

Distant Metastasis (M)

M0 No distant metastasis.
M1 Distant metastasis.

Larynx

Primary Tumour (T)

TX Primary tumour cannot be assessed.
T0 No evidence of primary tumour
Tis Carcinoma in situ

Supraglottis

T1 Limited to one subsite of supraglottis with normal vocal cord mobility.
T2 Invading mucosa of more than one adjacent subsite of supraglottis or glottis or region outside the supraglottis without fixation of the larynx.
T3 Limited to larynx with vocal cord fixation and/or invades any of the following: postcricoid area, pre-epiglottic space, paraglottic space and/or inner cortex of thyroid cartilage.
T4a Moderately advanced local disease invading the through the thyroid cartilage and/or invades tissues beyond the larynx.
T4b Very advanced local disease invading the prevertebral space encasing the carotid artery or invading mediastinal structures.

Glottis

T1 Limited to the vocal cord(s) (may involve anterior or posterior commissure with normal mobility.
T1a Limited to one vocal cord.
T1b Involving both vocal cords.
T2 Extending to supraglottis and/or subglottis and/or with impaired vocal cord mobility.
T3 Limited to the larynx with vocal cord fixation and/or invasion of paraglottic space, and/or inner cortex of the thyroid cartilage.
T4a Moderately advanced local disease invading through the outer cortex of the thyroid cartilage and/or invades tissues beyond the larynx.
T4b Very advanced local disease invading prevertebral space, encasing carotid artery or invades mediastinal structures.

Subglottis

T1 Limited to the subglottis.
T2 Extending to the vocal cords with normal or impaired mobility.
T3 Limited to larynx with vocal cord fixation.
T4a Moderately advanced local disease invading cricoid or thyroid cartilage and/or invades tissues beyond the larynx.
T4b Very advanced local disease invading prevertebral space, encasing the carotid or invading mediastinal structures.

Regional Lymph Nodes (N)

NX Regional lymph nodes cannot be assessed.
N0 No regional lymph node metastases.
N1 Metastasis in a single ipsilateral lymph node ≤3.0cm
N2 Metastasis in a single ipsilateral lymph node >3.0cm but <6.0cm or in multiple ipsilateral nodes, bilateral or contralateral lymph nodes <6.0cm.
N2a Metastasis in a single ipsilateral lymph node ≥3.0cm but <6.0cm.
N2b Metastasis in multiple ipsilateral lymph nodes ≤6.0cm.
N2c Metastasis in bilateral or contralateral lymph nodes ≤6.0cm
N3 Metastasis in a lymph node >6.0cm.

Distant Metastasis (M)

M0 No distant metastasis.
M1 Distant metastasis.

B: Sinuses

1. Clinical diagnosis:

Endoscopy and biopsy.

2. Radiological staging

Timing of scans to conform with target cancer waiting times.
Patients should have both MRI and CT.
MRI neck as per pharynx.
CT sinuses with soft tissue and bony reconstructions (coronal/axial).

3. CT and MRI protocols

CT

Body area:	Neck
Prep:	Ask patient not to swallow prior to each scan and position arms down.
	Ensure skin surface is visualised.
IV contrast medium:	Iohexal (Omnipaque) 300/100ml at 2ml/sec
Injection:	Scan at 100 seconds post-injection.
Scan region:	Top of frontal sinus to bottom of maxillary sinus.
Reconstructions	3 mm review in axial/coronal planes, soft tissue and bony windows, additional 1 mm bony windows.

MRI

Coil:	Head and neck coil.
Positioning:	Patient supine with the patient as high as possible in coil.
	Fast sequences as required
IV contrast:	Gadovist (Gadobutrol) 1.0 mmol/ml at a dose rate of 0.1ml/kg to a maximum of 10ml.

Regions and sequences (all 3mm slice thickness)

T1 and T2 axial to T1 coronal STIR coronal	Parallel to hard palate, to cover area from frontal sinus down to sternal notch; overlapping blocks.
T2 sagittal	For midline disease and tongue lesions

Post-contrast:
T1 axial FS
T1 coronal FS

4. TNM staging

Primary Tumour (T)

T0	No evidence of Primary tumour
Tis	Carcinoma in situ

Maxillary Sinuses

T1 Limited to maxillary sinus mucosa with no erosion or destruction of bone.
T2 Causing bone erosion or destruction except extension to posterior wall of maxillary sinus and pterygoid plates.
T3 Invading posterior wall of maxillary sinus, subcutaneous tissues, floor or wall of orbit, pterygoid fossa, ethmoid sinuses.
T4a Invading anterior orbital contents, skin of cheek, pterygoid plates, infratemporal fossa, cribiform plate, sphenoid or frontal sinuses.
T4b Invading any of the following: orbital apex, dura, brain, middle cranial fossa, cranial nerves other than maxillary division of trigeminal nerve (V_2), nasopharynx or clivus.

Nasal Cavity and Ethmoid Sinuses

T1 Restricted to any one subsite with or without bony invasion.
T2 Invading two subsites in a single region or extending to involve an adjacent region within the nasoethmoidal complex, with or without bony invasion.
T3 Invading the medial wall or floor of the orbit, maxillary sinus, palate, or cribiform plate.
T4a Invading any of the following: anterior orbital contents, skin of nose or cheek, minimal extension to anterior cranial fossa, pterygoid plates, sphenoid or frontal sinuses.
T4b Invading any of the following: orbital apex, dura, brain, middle cranial fossa, cranial nerves, other than (V_2), nasopharynx or clivus.

Regional Lymph Nodes (N)

N0 No regional lymph node metastasis.
N1 Single ipsilateral lymph node, ≤3 cm.
N2 Single ipsilateral lymph node, ≥3 cm but not >6 cm, or in multiple ipsilateral lymph nodes, bilateral or contralateral lymph nodes, none >6 cm.
N2a Single ipsilateral lymph node ≥3 cm but not >6 cm.
N2b Multiple ipsilateral lymph nodes, none >6 cm.
N2c Metastasis in bilateral or contralateral lymph nodes, none > 6 cm.
N3 Metastasis in a lymph node > 6 cm.

Metastasis (M)

M0 No distant metastasis.
M1 Distant metastasis.

C: Thyroid

1. Clinical diagnosis

Ultrasound and FNA.

2. Radiological staging

Timing of scans to conform with target cancer waiting times.

Papillary and follicular CA

Small thyroid nodule → chest X-ray

Large mass that may be hard to resect → CT neck and thorax for surgical planning.

Anaplastic CA → CT neck, thorax and abdomen.

NB Avoid IV contrast if considering radioiodine ablation.

3. CT protocol

CT

Body area:	Neck
Prep: arms	Ask patient not to swallow prior to each scan and position down. Ensure skin surface is visualised.
IV contrast medium:	Iohexal (Omnipaque) 300/100ml at 2ml/sec
Injection:	Scan at 100 seconds post-injection.
Scan region:	Skull base to sternal notch
Reconstructions	1 - 2.5mm review in axial, coronal and sagittal planes Non-contrast CT chest - sternal notch to diaphragm 2.5 - 5mm

4. Follow-up imaging post-ablation

Where thyroglobulin increased and suspicion of recurrence:

US thyroid bed → if negative → CT thorax and consider MRI neck

If CT/MRI negative → PET-CT.

5. TNMstaging.

Primary Tumour (T)

T0 No evidence of primary tumour.
T1 ≤ 2 cm and limited to the thyroid
T1a ≤ 1 cm limited to the thyroid
T1b > 1 cm but ≤ 2 cm limited to the thyroid
T2 > 2 cm but ≤ 4 cm limited to the thyroid
T3 > 4 cm limited to the thyroid or any tumour with minimal extrathyroid extension.
T4a Tumour of any size extending beyond the thyroid capsule to invade subcutaneous soft tissues, larynx, trachea, oesophagus, or recurrent laryngeal nerve.
T4b Tumour invading prevertebral fascia or encases carotid artery or mediastinal vessels.

Regional Lymph Nodes (N)

N0 None
N1 Lymph node metastasis.
N1a Metastasis to level VI (pretracheal, paratracheal and prelaryngeal/Delphian lymph nodes).
N1b Metastasis to unilateral, bilateral, or contralateral cervical (levels I, II, III, IV or V) or retropharyngeal or superior mediastinal lymph nodes (level VII).

Metastasis (M)

M0 No distant metastasis.
M1 Distant metastasis.

Responsibilities

It is the responsibility of the diagnostic centre to perform relevant diagnostic and staging imaging (CT, MRI, Chest Xray, PETCT request) to the point of referral to the MDT. Any further imaging that is determined to be required at the MDT discussion will be arranged by the MDT / treating team.

This document has been a collaborative effort by Dr Bonington, Dr Razzaq, Dr Qureshi, Dr Jain, Dr Mak, Dr Barker and Dr Potter