

BCUHB

Imaging Guidelines for Head & Neck Cancer

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These guidelines are written in consultation with key consultant radiologists who are core members of the Head & Neck MDT within the BCUHB. They take into account national guidance and recommendations based on best evidence, and where relevant adapted readily to meet local requirements and clinical practice.

National Guidelines :

Royal College of Radiologists consensus document – Recommendations for cross-sectional imaging in cancer management (2005)

Scottish Intercollegiate Guidelines Network -Diagnosis and management of Head and neck cancer- A national clinical guideline.

I-refer - RCR guidelines- 2012.

Definitions:

Oro pharyngeal cancer

Oropharyngeal cancer includes tumours of the:

base of tongue
tonsil
soft palate.

Oral cavity cancer

Oral cavity cancer includes tumours of the:

buccal mucosa
retromolar triangle
alveolus
hard palate

Laryngeal cancer

Laryngeal cancer includes tumours of the:

supraglottis
glottis
subglottis.

Hypopharyngeal cancer

Hypopharyngeal cancer includes tumours of the:

postcricoid area
pyriform sinus
posterior pharyngeal wall.

anterior two-thirds of tongue
floor of mouth
mucosal surface of the lip.

Head and Neck Tumours

All patients with a strong clinical suspicion of or biopsy-proven tumour of the head and neck region should have imaging requested for staging at the time of clinical assessment and nasoendoscopy.

Aims of Imaging:

- Assessment of the extent of the primary tumour, including involvement of adjacent structures.
- Evaluation of spread to loco-regional lymph nodes.
- Detection of distant metastatic disease.
- Baseline studies on completion of treatment(s) for future assessment for recurrent disease and further treatment(s).

Assessment of the Primary tumour site (T staging)

The choice of imaging modality is largely dependent on the availability of local resources and expertise.

The guidelines reflect the current approach within BCUHB.

Suprahyoid tumours, including oral cavity, oropharyngeal, nasopharyngeal, sinus and salivary tumours are best imaged initially with MRI, provided there are no contraindications. In some instances (mainly to assess cortical bone involvement), and for all sinus tumours, CT should also be performed with MRI.

Infrahyoid tumours, including laryngeal and hypopharyngeal primaries should be imaged by CT or MRI. CT is generally better tolerated than MRI in these patients.

When the site of the primary tumour is unknown, MRI should be performed, provided there are no contraindications. When MRI, clinical inspection and biopsy do not identify a primary site, PET/CT may be of benefit.

Loco-regional Lymph Node Assessment (N staging)

Loco-regional (cervical) metastatic lymphadenopathy is a major factor in determining the prognosis for the patient and determines the nature of any surgical intervention.

As MRI and CT are comparable imaging techniques for determining lymph node stage, the modality used is dependent on that used for assessing the primary tumour.

Where lymph nodes are of uncertain significance on CT or MRI, US (+/- FNAC) would be of assistance, but must be performed by a suitably trained operator.

Detection of Distant Metastases/Second Primary Tumour (M staging)

The staging scan should be scrutinized for a second primary tumour arising within the head and neck region. The lungs should be assessed for metastatic deposits and primary bronchogenic carcinoma.

The incidence of synchronous second malignant tumours in the thorax is 4%. Higher rates (15%-33%) of synchronous tumours and pulmonary metastases are seen in patients with more advanced (T3/T4) primary tumours, or where there is level IV nodal involvement.

Ultrasound

Ultrasound of the neck is a valuable technique in evaluating Head & Neck cancers. This is particularly true in assessing the equivocal lymph nodes that are shown in the CT or MRI performed as staging scans. Imaging of the neck can suggest the presence of nodal metastases even when nodes are not obviously palpable (occult nodes). This occurs in approximately 20% of imaged cases. All imaging modalities rely on nodal size to indicate tumour involvement. Those nodes with a minimum axial diameter of more than 10mm have a high likelihood of neoplastic involvement with the exception of junctional nodes where a 15mm measurement is employed.

US is very operator dependant but when performed by a radiologist with adequate expertise is a good tool to characterise the lymph nodes better than cross sectional imaging and also to perform US guided FNA to provide cytological confirmation.

It also proves to be a rapid imaging assessment of patients with an undiagnosed neck lump.

US is particularly useful in delineation of thyroid pathology and superficial salivary gland tumours.

Isotope and SPECT

Isotope bone scanning and SPECT of mandible: In oral and skull base tumours where tumour is in contact with bone and other investigations are negative for bone invasion, a SPECT scan provides evidence of early bone invasion.

PET CT is indicated in certain clinical circumstances particularly for unknown primary and recurrent disease with equivocal findings.

Discussion with radiologist or in the MDT is usually beneficial to arrange this examination as there is known variety of pathologies which could show false positive results.

Oral cavity and Oro-pharynx

Squamous cell carcinoma is the commonest histological subtype of tumours of the oral cavity and oropharynx.

Staging systems are based more on tumour size than on depth or extent, although it is the depth of invasion that determines the primary therapeutic approach. Knowledge of the complex suprahyoid anatomy is the key for interpretation of the abnormality.

Who should be imaged?

All patients with biopsy-proven or suspected malignant oral disease should be imaged using MRI.

Staging:

MRI is the primary modality and is dependent on the site and size of the primary tumour.

CT scan of the chest is indicated if the clinical staging of the staging is more than T2 based on the size. T1 tumour less than 2 cm would be assessed with a chest X-ray to exclude metastases.

OPG: All patients with oral or oropharyngeal tumour will have full dental assessment pre-operatively and sometimes helpful for bone involvement of the mandible. This forms part of the evaluation.

Nasopharynx

Squamous cell carcinoma is the commonest nasopharyngeal malignancy and most of these tumours present late, often with lymph node metastases which can be bilateral. Tumours usually arise in the Fossa of Rosenmuller and often spread submucosally and deep.

Distant metastases occur at presentation in less than 10% of cases, with lung, bone and liver being the most common sites of spread. The incidence of distant spread of disease in nasopharyngeal cancer is higher than with other head and neck tumours; rates of 30-50% are reported for N3 disease.

Who should be imaged?

MRI is indicated in all patients with biopsy-proven nasopharyngeal cancer. CT is often performed as the initial investigation for non-specific sino-nasal symptoms. If this demonstrates advanced disease, no further imaging is required.

Staging:

MRI is the preferred imaging technique. Contrast enhanced multiplanar imaging is essential to evaluate peri-neural spread and skull base involvement.

CT scan is very useful to demonstrate bone involvement however it is less accurate in evaluating the soft tissue extent of the tumour.

T staging is different in Nasopharynx tumours as the staging is based on the tumour extent to the adjacent structures unlike other H&N tumour which are based on the size of the lesion. Imaging play a crucial role in the management of nasopharyngeal tumours hence MRI and/or CT should be used as needed to have a clear knowledge of the extent of the tumour.

CT scan of the chest is indicated to assess lung metastases in all clinical staging of the tumour.

Larynx

This is the most common Head & Neck cancer site.

Separate primary site classification systems are used for supraglottic, glottic, and subglottic tumours. Vocal cord fixation upstages all tumours to T3 classification. Cartilage invasion is often clinically occult but upstages tumours to T4.

Staging:

CT is generally preferred as the imaging technique of choice because of speed of acquisition and patient tolerance. If advanced disease is demonstrated, which is not appropriate for surgical management, no further imaging is required.

MRI is the best technique for assessing pre-epiglottic space and tongue base invasion. Degraded images from swallowing motion artefacts are a problem that occurs particularly in patients whose airway is compromised by tumour. MR has proven very sensitive for detecting cartilagenous invasion but can be non specific. The main difficulty is in reliably deifferentiating between perichondrial invasion, early cortex invasion (T3) and full thickness cartilage invasion (T4).

Where there are specific such issues to answer it may be of help to consider supplementing MR with CT and correlating the imaging findings directly with the endoscopic appearances.

CT scan of the chest is indicated to assess lung metastases in all clinical staging of the tumour.

Hypopharynx:

Over 95% of tumours arising here are of squamous cell type. Bulky submucosal spread is typical (resulting in clinical understaging at endoscopy) and the majority have lymph node metastases to the neck at presentation.

Staging:

Preferred imaging modality: MR ideally but CT in those patients who have difficulty with swallowing or coughing while flat. Contrast-enhanced MRI is the preferred technique because of its multiplanar imaging capabilities and superior soft tissue contrast.

CT scan of the chest is indicated to assess lung metastases in all clinical staging of the tumour.

Paranasal sinuses

Tumours of the paranasal sinuses are the least common (3-4%) of all head and neck malignancies. They are often advanced tumours at presentation and hence have a generally poor prognosis. Early disease often presents clinically as infection and may well have coexistent inflammatory change visible on imaging. The majority (80%) are squamous cell tumours and the maxillary antra are commonest sites of involvement.

Tumour spread is by direct infiltration and by perineural extension. Bone destruction is common. In contrast to other head & neck tumours, lymph node spread is uncommon. Distant spread is approximately 10% and when present involves spread to the lungs and bones.

Who to be imaged?

Imaging is indicated in all patients with biopsy proven paranasal sinus cancer.

Staging:

A combination of CT and MRI is generally required for complete staging prior to treatment.

CT is often performed as the initial investigation for non-specific symptoms. If advanced disease is demonstrated, which is not appropriate for surgical management, no further imaging is required.

CT scan of the chest is indicated to assess lung metastases in all clinical staging of the tumour.

Skull base tumours:

Preferred imaging modality MR and CT.

It is important to establish that the imaging changes firstly do represent true pathology and are not pseudo lesions due to normal variants or asymmetrical normal anatomy. Knowledge of the breadth of anatomical variance is essential.

Primary skull base malignant tumours are rare. H&N neck tumours particularly the nasopharynx and sino-nasal tumours may show direct extension to the skull base. Metastases to skull base are more common and hence it is also important to correlate if there is any known history of distant primary malignancy. Thorough clinical examination and history to ascertain the possibility of a distant primary is essential and further cross sectional imaging may be necessary.

Unknown primary in the Head and Neck cancer:

In patients presenting with cervical lymph node metastases, where CT or MRI does

not demonstrate an obvious primary tumour, and no obvious primary lesion is identified during clinical examination, FDG-PET should be performed as the next investigation of choice.

Follow-up imaging:

Imaging follow up of patients with Head and Neck Cancer the imaging modality chosen should be the same as that used for pre-treatment as only then can scans be properly compared.

Increasingly PET-CT is being used as the imaging modality of choice in evaluating potential tumour recurrence. This is particularly useful if the MRI/ CT examination is not conclusive to diagnose a recurrent disease.

Imaging the post-treatment neck is a severe radiological challenge. The radiologist needs to understand the effect of chemoradiation on the appearances of the head and neck soft tissues as well as the complex appearances of microvascular composite free flaps. Treatment induced soft tissue oedema can last from 6 months to 2 years and can mask underlying tumour recurrence

Patients should be followed up clinically following either surgery, surgery and post operative radiotherapy or chemoradiotherapy.

Imaging 2-4 months after surgery, or completion of radiotherapy/ chemotherapy is useful in documenting tumour response and serves as a baseline for future comparisons.

Functional MRI (diffusion and perfusion imaging) may assist in such cases, but these techniques are still undergoing assessment, and are not routine in most circumstances.

Summary of the imaging guidelines

- Staging MRI of the neck for T and N staging.
- Ultrasound of the neck +/- FNA is indicated in patients in assessing the equivocal lymph nodes that are shown in the CT or MRI performed as staging scans.
- Ultrasound proves to be a rapid imaging assessment of patients with an undiagnosed neck lump.
- CT scan of the chest should be performed to exclude metastases and synchronous staging for all H&N tumours. (except the oral and oropharyngeal tumours where CXR is sufficient for T1 staging)
- Laryngeal cancer could be staged by CT+ MRI or CT alone depending on the availability of resources and radiologist preference.
- Combination of CT and MRI is generally required for complete staging prior to treatment in Sino nasal and skull base tumours.
- Imaging follow up of patients with Head and Neck Cancer- the imaging modality chosen should be the same as that used for pre-treatment as only then can scans be properly compared.
- In patients presenting with cervical lymph node metastases, where CT or MRI does not demonstrate an obvious primary tumour, FDG-PET should be performed as the next investigation of choice.
- Discussion with the Radiologist in case of doubt or any variation in clinical presentation.