Cross Sectional Imaging of the Head and Neck

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Cross sectional imaging

• Computed tomography:
  + Fast, widely available
  + Multidetector technology:
    faster acquisition, reconstruction in coronal and sagittal planes
  – Iodinated contrast
  – Radiation exposure

• Magnetic resonance imaging:
  + Excellent soft tissue differentiation
  + No radiation exposure
  – Longer exam, more prone to motion and breathing artifacts
  – More expensive
CT scan of the neck

- Complex anatomy
- For PET-CT interpretation:
  - Recognizing the anatomic location of the abnormality
    - Suprahyoid and infrahyoid neck spaces
    - Subdivisions of the pharyngeal mucosal space
  - Recognizing the nodal stations
  - Recognizing head and neck structures that have variable physiologic FDG uptake

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Neck Spaces

• Suprahyoid neck spaces:
  – Pharyngeal mucosal
  – Masticator
  – Parotid
  – Carotid
  – Buccal
  – Parapharyngeal
  – Retropharyngeal
  – Prevertebral

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Pharyngeal Mucosal space

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Anatomic Localization

• Pharyngeal mucosal space:
  – Nasopharynx
  – Oropharynx
  – Hypopharynx

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Epiglottis
Soft palate/uvula
Hard palate
Piriform sinus/hypopharynx
Vocal cords
Vocal cords

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Nasopharynx
Oropharynx
Hypopharynx

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Torus Tubarius

Lateral pharyngeal recess
Oropharynx

Inferior Alveolar ridge-mandible

Submandibular gland

SCM

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Pharyngoepiglottic fold

Glossoepiglottic fold

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Platysma muscle

CCA

IJV

False vocal cord

Supraglottic space

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Glottic space

True vocal cords

Thyroid cartilage

Arytenoid cartilage

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Infraglottic space

Cricoid cartilage
Trachea

SCM

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Buccal

Masticator

Parotid

Prevertebral

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Neck Spaces

- Infrahyoid neck spaces:
  - Visceral space
  - Posterior cervical space
  - Anterior cervical space
  - Retropharyngeal space
  - Prevertebral space
  - Carotid space
Larynx

- Larynx:
  - Glottis
  - Subglottis
  - Supraglottis
Larynx

Slide images of the larynx showing the epiglottis, cricoid cartilage, vocal cords, midsagittal and parasagittal planes. Slides are not to be reproduced without permission of author.
Larynx

midsagittal  parasagittal

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Lymph nodes

- Level I (1)
- Level II (2)
- Level III (3)
- Level IV (4)
- Level V (5)
- Level VI (6)
- Level VII (7)
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Level VII

Level VI

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Supraclavicular

Parotid

Occipital

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Pathology

- Vocal cord paralysis
- Airway compromise
- Infiltrative tumors
- Abscesses
- Lymphadenopathy
Infiltrative tumors
Post-treatment neck

- Post surgery (neck dissection, laryngectomy…etc):
  - asymmetric/missing structures

- Post chemo/radiation:
  - Streaking of fat planes
  - Poorly defined borders of neck structures
  - Soft tissue densities
- Right submandibular gland resected
- Soft tissue densities
- Loss/streaking of fat planes surrounding vessels

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Radiotherapy: streaking of fat planes, soft tissue thickening
Surgery: loss of normal anatomy/ symmetry

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Hx: Left tonsillar tumor, S/P treatment
Recurrence?
No enhancement
No mass lesion
Recurrence? yes
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MRI

• Better soft tissue differentiation
• Gadolinium enhancement
• Recognize basic sequences: T1, T2, fat saturated, enhanced
• Lymph nodes can be better seen than on CT
Cross-sectional Neck Anatomy

• Complex
• Recognize:
  – General location of abnormalities
  – Nodal stations
  – Vocal cord paralysis, airway compromise
  – Neck structures with physiologic FDG uptake