Common symptoms and symptom complexes are addressed by this tool. Imaging requests for patients with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or patient’s Primary Care Physician (PCP) may provide additional insight.

This version incorporates MSI accepted revisions prior to 11/30/06
ABBR EVIATIONS for NECK GUIDELINES

CT: computed tomography
ENT: Ear, Nose, Throat
FNA: fine needle aspiration
GERD: gastroesophageal reflux disease
GI: gastrointestinal
MRI: magnetic resonance imaging
### NECK-1~GENERAL GUIDELINES

### NECK-2~CEREBROVASCULAR AND CAROTID DISEASE

### NECK-3~DYSPHAGIA

### NECK-4~ESOPHAGUS

### NECK-5~MALIGNANCIES INVOLVING THE NECK

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**NECK-1~GENERAL GUIDELINES**

- Advanced imaging of the neck covers the area from the skull base, nasopharynx, and upper oral cavity to the head of the clavicle. Thus, it includes the parotid gland and the supraclavicular region.
- Neck CT is usually obtained with contrast only (CPT 70491). Little significant information is added by performing a neck CT without and with contrast (CPT 70492). Neck CT without contrast (CPT 70490) can be difficult to interpret due to difficulty identifying the blood vessels.
- Neck CT is indicated in the majority of cases to evaluate pathology in the neck when advanced imaging is appropriate. Indications for neck MRI are much less common.
  - In the pediatric population, neck MRI can be considered when advanced imaging of the neck is appropriate, due to concerns for radiation exposure with CT scans.
- **Pediatric guidelines:** The Neck guidelines are the same for both the pediatric population and the adult population, unless there are specific Pediatric guidelines (highlighted in yellow).

**NECK-2~CEREBROVASCULAR AND CAROTID DISEASE**

- See in Head guidelines:
  - HD-3 CT and MR Angiography
  - HD-18 Hyperacute Headache/Berry Aneurysm/Subarachnoid Hemorrhage
  - HD-30 General Stroke/TIA
  - HD-31 Special Stroke/TIA
  - HD-32 Syncope
  - HD-33 Cerebral Vasculitis
  - HD-34 Vertigo
  - HD-38 Horner’s Syndrome
  - HD-40 Tinnitus
- See PVD-2 Cerebrovascular and Carotid Disease in Peripheral Vascular Disease guidelines

**NECK-3~DYSPHAGIA**

- Dysphagia (difficulty swallowing) can be caused by anything that affects the body’s ability to move food, liquid, or saliva from the mouth to the pharynx and into the esophagus.
- A wide range of etiologies, including weak tongue or cheek muscles, neurological disability from stroke or Alzheimer’s disease, medication side-effects, decreased
function of the esophageal sphincter due to advanced age, esophageal spasm, benign strictures, or cancer, can cause dysphagia.

- Barium swallow, chest x-ray, and endoscopy should be the initial imaging studies obtained to evaluate dysphagia.
- Abnormalities seen on the above studies can be further evaluated with CT or less commonly, MRI.
- GI, ENT, Neurology or Thoracic surgery specialist consultation is helpful in determining the appropriate imaging pathway.
- Reference:
  - British Journal of Nursing 2006;13(10):558-561

**NECK-4~ESOPHAGUS**

- Symptoms of dysphagia, odynophagia (painful swallowing), or regurgitation should be evaluated initially with barium swallow, chest x-ray, and endoscopy.
- Patients who present with hematemesis (including hematemesis from suspected Mallory-Weiss tear in the distal esophagus caused by severe vomiting) should be evaluated initially with endoscopy.
- Advanced imaging is not routinely indicated to evaluate patients with hiatal hernia.
  - Exception: chest CT with contrast (CPT 71260) and abdominal CT with contrast (CPT 74160) can be obtained for preoperative planning in patients with large hiatal hernias or paraesophageal hernias.
  - Postoperative advanced imaging is not routinely indicated unless the patient has signs/symptoms of a potential complication from surgery.
- Advanced imaging is not routinely indicated to evaluate patients with gastroesophageal reflux disease (GERD) unless requested as a preoperative study in patients undergoing Nissen fundoplication or other surgical treatment for the reflux.
  - Postoperative advanced imaging is not routinely indicated unless the patient has signs/symptoms of a potential complication from surgery.
  - Advanced imaging in patients with Barrett’s esophagus is not indicated unless biopsy shows frank malignancy.
- Suspected foreign body obstructing the esophagus should be evaluated with x-ray, contrast study such as barium or Gastrografin study, and endoscopy.
- Suspected esophageal stricture due to any cause (e.g. radiation, peptic stricture from reflux, lye stricture, neoplastic, postoperative, drug-induced, Crohn’s disease, Schatzki’s ring at the squamocolumnar junction, esophageal web) should be evaluated initially with barium swallow and endoscopy.
- Esophageal perforation
  - Associated with high morbidity and mortality
  - Esophageal endoscopy accounts for the vast majority of esophageal perforations.
  - Esophageal perforations occur most commonly at the distal esophagus and in the posterior wall of the cervical esophagus.
• Chest x-ray should be obtained initially and can show subcutaneous emphysema, pneumomediastinum, or prevertebral air.
• Contrast study using water-soluble contrast such as Gastrografin should be performed. If no perforation is seen, repeat contrast study using barium should be done.
• Neck CT and/or chest CT with contrast (CPT 70491 and 71260) can be performed to evaluate for abscess.

- Motility Disorders:
  • Suspected motility disorders such as aperistalsis, achalasia, diffuse spasm, nutcracker esophagus, and scleroderma should be evaluated by barium swallow and manometry. Advanced imaging is not routinely indicated.

- Esophageal Diverticulum
  • Pulsion and traction diverticula can occur.
  • Midesophageal diverticula are usually traction in origin (contain both mucosal and muscular layer).
  • Zenker’s (pharyngoesophageal) and epiphrenic diverticula are usually pulsion (mucosa only).
  • Initial evaluation includes barium swallow, endoscopy, and manometry studies.
  • CT scan of the neck and/or chest (contrast as requested) can be performed for further evaluation if needed.

- Leiomyoma
  • Most common benign esophageal neoplasm.
  • 60% of leiomyomas occur in the distal third of the esophagus, 30% in the middle third, 10% in the upper third.
  • Usually solitary, but multiple leiomyomas can occur.
  • Appears as a filling defect on barium swallow, but mucosa is normal on endoscopy since the leiomyoma is a submucosal lesion.
  • Neck CT and/or chest CT with contrast (CPT 70491 and/or 71260) or MRI (CPT 70543 and/or 71552), and endoscopic ultrasound are helpful in evaluating this lesion and for preoperative planning.

- Other esophageal masses should undergo evaluation with barium swallow, endoscopy, and biopsy prior to considering advanced imaging.

- Esophageal Carcinoma—See ONC-8 Esophageal Cancer in the Oncology guidelines.

- Reference:

**NECK-5~MALIGNANCIES INVOLVING THE NECK**

• See in Oncology guidelines:
  • ONC-2 Squamous Cell Carcinomas of the Head and Neck
  • ONC-3 Salivary Gland Cancers
  • ONC-6 Thyroid Cancer
Painful acute lymphadenopathy and other painful neck masses (including neck “swelling”) should be treated with a trial of conservative therapy (including antibiotics if appropriate). Ultrasound can also be helpful in determining whether a distinct mass/abnormality is present.

Patients who present with symptoms such as significant dyspnea, stridor, or dysphagia should be referred to the Emergency Department for immediate evaluation and treatment.

Patients who present with suspected peritonsillar, retropharyngeal, or other head and neck abscesses should have neck CT with contrast (CPT 70491).

If the neck mass is located on the lateral or posterior neck and is described as a definite, nontender, discrete mass on physical examination, neck CT with contrast (CPT 70491) can be performed.

Neck masses that are located on the anterior neck should have ultrasound performed as the initial imaging study.

For possible neck masses that are not well described on physical examination, ultrasound or ENT evaluation can be helpful in making decisions regarding the need for advanced imaging.

Patients with a history of malignancy who present with a neck mass should have neck CT with contrast (CPT 70491) as the initial imaging study.

Sialogram under fluoroscopy or CT sialogram (CPT 70486), may be performed to rule out a stone. CT of the neck without contrast (CPT 70490) is typically indicated in the setting of suspected salivary duct or gland stone. CT of the neck with contrast (CPT 70491) may be useful if obstructing calculus and inflammatory disease is suspected.

In patients with a suspected parotid gland mass, ENT evaluation can be very helpful in determining the most appropriate diagnostic algorithm, including the use of advanced imaging. CT scan (usually CPT 70487 or 70488 if stone is also being ruled out; some ENT’s prefer CPT 70492) or MRI (CPT 70543) may be useful in determining a diagnosis.

MRI of the neck without and with contrast (CPT 70543) is indicated when ultrasound or CT scan suggests neurogenic tumor (schwannoma, neurofibroma, glomus tumor, etc.), or if CT scan suggests the need for further imaging. MRI is also useful in evaluating vascular malformations and angiofibromas.

Although CT and MRI scan can have characteristic appearances for certain entities, biopsy and histological diagnosis are the only way to obtain a definitive diagnosis.
NECK-7~NECK MASSES (CHILDREN)

- Evaluation of neck masses in pediatric patients involves careful consideration of clinical history and accurate physical examination. The patient's age and knowledge of the anatomy and embryology of the neck are very important in narrowing the differential diagnosis.
- Imaging is helpful in making an accurate diagnosis if there is a well-defined differential diagnosis (see below).
- Ultrasound is the initial imaging study of choice. Ultrasound helps define the size and extent of localized superficial masses and helps confirm whether they are cystic or solid. Color Doppler ultrasound can evaluate the vasculature.
- Neck CT (usually with contrast –CPT 70491) or MRI (contrast as requested) can be used to further characterize abnormalities seen on ultrasound.
  - MRI usually requires sedation in patients under age 6.
- Cervical lymphadenitis is common in children and follows most viral or bacterial infections of the ears, nose, and throat. No advanced imaging is necessary.
- Differential diagnosis of neck lesions by anatomic region:
  - **Subcutaneous tissues**: Teratoma (includes dermoid cysts), vascular malformations, lipoma, cellulitis, plexiform neurofibroma, keloid, scar, subcutaneous fat fibrosis (in neonates).
  - **Retropharyngeal space**: Abscess, cellulitis, adenitis
    - Usually involves children under age 6
    - Patients have history of upper respiratory tract infection followed by high fever, dysphagia, neck pain
    - CT (CPT 70491) or MRI (contrast as requested) can be used to rule out abscess
    - Lymphadenopathy
    - Extension of goiter
    - Extension of pharyngeal tumor
  - **Retrovisceral space** (posterior to the cervical esophagus): Gastrointestinal duplication cysts (usually are diagnosed in first year of life)
  - **Pretracheal space** (contains trachea, larynx, cervical esophagus, recurrent laryngeal nerves, and thyroid and parathyroid glands): thyroglossal duct cyst, goiter, laryngocele, lymphadenopathy, abscess
  - **Danger space** (closed space lying between the skull base and the posterior mediastinum and between the alar and prevertebral fasciae in a sagittal plane): Cellulitis, abscess.
  - **Prevertebral space**: Neuroenteric cyst, cellulitis, abscess, spondylodiskitis
  - **Carotid sheath space**: Jugular vein thrombosis or phlebitis, lymphadenopathy, cellulitis, abscess, paraganglioma.
  - **Parotid gland space**: Parotid lymphadenopathy, retromandibular vein thrombosis, parotiditis, sialodochitis (inflammation of the salivary gland duct), salivary duct stone
Submandibular and sublingual spaces:
- Thyroglossal duct cyst
  - Usually presents as an enlarging, painless midline mass in a child or young adult.
  - 50% of patients present before age 20 and 50% present during young adulthood.
- Branchial cyst
  - 90% of branchial abnormalities arise from the second branchial apparatus.
  - Most second branchial cleft cysts are located in the submandibular space, at the antero-medial border of the sternocleidomastoid muscle, lateral to the carotid space, or posterior to the submandibular gland.

Masticator space (includes masseter and pterygoid muscles): Venous or lymphatic malformation, cellulitis, abscess, rhabdomyosarcoma.

Parapharyngeal space:
- Cellulitis, abscess, rhabdomyosarcoma (second most common pediatric head and neck malignancy), extension of lymphoma.

Perivertebral space (includes the prevertebral and paravertebral spaces):
- Cervical dermal sinus (epithelium-lined dural tubes that connect the skin with the central nervous system or its covering), meningocele, rhabdomyosarcoma, extension of lymphoma, cervical neuroblastoma.

Posterior cervical space: Lymphatic malformation, lymphadenopathy.

Reference:

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NECK-8~RECURRENT LARYNGEAL PALSY

See HD-9 Recurrent Laryngeal Palsy in the Head guidelines.

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NECK-9~THYROID AND PARATHYROID

- Ultrasound and nuclear medicine scan are the preferred initial imaging studies for suspected thyroid masses. If ultrasound shows a dominant mass, fine needle aspiration (FNA) should be the next diagnostic study. Neck CT (CPT 70490 or 70491) can be obtained as a preoperative study in patients in whom resection is planned.
- Incidental thyroid nodules found on imaging (ultrasound, CT, or MRI) can be followed by ultrasound. FNA is indicated if the nodule becomes palpable, has findings suggestive of malignancy on ultrasound, is larger than 1.5 cm, or if the patient has a history of head or neck irradiation or a strong family history of thyroid cancer.
- Nuclear medicine Sestamibi study of the parathyroid gland is the preferred initial imaging study in patients with suspected parathyroid disease (high calcium and high parathyroid hormone level).
MRI has good sensitivity and positive predictive value for imaging non-ectopic and ectopic abnormal parathyroid glands and is generally used in patients with recurrent or persistent hyperparathyroidism following neck exploration.* CT or MRI is also useful in patients with very high calcium (greater than or equal to 13) suggesting parathyroid carcinoma. All requests for advanced imaging in patients with thyroid or parathyroid disease should be sent for Medical Director review.


Neck and chest CT with contrast (CPT 70491 and 71260) are sufficient to evaluate a suspected substernal goiter (i.e. a major portion of the goiter lies within the mediastinum). The vast majority of these goiters can be resected through a cervical incision.

NECK-10~TRACHEA

- The initial imaging studies for evaluating patients with suspected tracheal pathology include plain x-ray and bronchoscopy.
- Neck CT with contrast (CPT 70491) or without contrast (CPT 70490) and chest CT with contrast (CPT 71260) or without contrast (CPT 71250) can be performed to further evaluate abnormalities seen on other imaging studies.
- CT is often not helpful in making the diagnosis of tracheomalacia, and cineradiography and bronchoscopy are the imaging studies of choice.*
NECK-6~NECK MASSES (ADULT)
Evidence Based Clinical Support

- Most lateral neck masses are enlarged lymph nodes.
- Other entities in the differential diagnosis include branchial cleft cyst, abscess, laryngocele, lipoma, neurinoma, glomus tumor, paraganglioma, fibroma.
- Adults over age 40 presenting with a cystic neck mass can have cystic metastases from occult squamous cell primaries. Neck CT scan, FNA, and panendoscopy of the head and neck should be performed.
- 25%-45% of extracranial schwannomas occur in the head and neck and usually present as asymptomatic solitary neck lesions.
- The most common ENT manifestations of sarcoidosis are neck masses, parotid masses, and facial nerve palsy. Cervical adenopathy is usually bilateral with mobile, nontender lymph nodes. Neck CT scan and biopsy are needed for diagnosis.

NECK-7~NECK MASSES (CHILDREN)
Evidence Based Clinical Support

- Congenital cervical cysts usually present in children and include thyroglossal duct cyst (55% of cases), cystic hygroma (25%), branchial cleft cysts (16%), bronchogenic cyst (0.91%), and thymic cyst (0.3%).
- Thyroglossal duct cyst is the most common congenital neck mass and is usually detected before the age of 20. 75% present as a midline mass. 43% of patients present with an infected mass. Thyroid carcinoma occurs in 1% of thyroglossal duct cysts.
- Second branchial cleft cysts are the most common branchial cleft cyst and usually present in young adults as painless fluctuant masses. A history of repeated infections in the region of the mandible suggests the diagnosis.
- Fourth branchial pouch cysts are rare and present as a recurring abscess in the left side of the neck. Barium swallow and neck CT scan are needed for diagnosis.
- The most common malignant ENT tumors in children are lymphoma and rhabdomyosarcoma.
NECK GUIDELINE REFERENCES

NECK-3~Dysphagia

NECK-4~Esophagus

NECK-7~Neck Masses (Children)

NECK-9~Thyroid and Parathyroid

NECK-10~Trachea