



CLINICAL GUIDELINES

Neck Imaging Policy

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eviCore healthcare Clinical Decision Support Tool Diagnostic Strategies: This tool addresses common symptoms and symptom complexes. Imaging requests for individuals with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or individual's Primary Care Physician (PCP) may provide additional insight.

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NECK IMAGING GUIDELINES

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ABBREVIATIONS for NECK IMAGING GUIDELINES

ALS	amyotrophic lateral sclerosis
CT	computed tomography
ENT	Ear, Nose, Throat
FNA	fine needle aspiration
GERD	gastroesophageal reflux disease
GI	gastrointestinal
HIV	human immunodeficiency virus
MRI	magnetic resonance imaging

NECK IMAGING GUIDELINES

NECK-1~GENERAL GUIDELINES

A current clinical evaluation (within 60 days), which includes a relevant history and physical examination and appropriate laboratory studies and non-advanced imaging modalities, such as plain x-ray or ultrasound, are required prior to considering advanced imaging. Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation

- ✓ Advanced imaging of the neck covers the following areas:
 - Skull base, nasopharynx, and upper oral cavity to the head of the clavicle
 - Parotid glands and the supraclavicular region
 - Skull base; thus a separate CPT® code for head imaging in order to visualize the skull base is not necessary.

Ultrasound of the soft tissues of the neck including thyroid, parathyroid, parotid and other salivary glands, lymph nodes, cysts, etc. is coded as CPT® 76536. This can be helpful in more ill-defined masses or fullness and differentiating adenopathy from mass or cyst, to define further advanced imaging.

Neck CT

- ✓ A 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), and there is the risk of added radiation exposure, especially to the thyroid.
 - Neck CT without contrast (CPT® 70490) can be difficult to interpret due to difficulty identifying the blood vessels
 - Exception:
 - Contrast is not generally used when evaluating either the trachea or thyroid gland with CT.
 - Contrast may cause intense and prolonged enhancement of the gland which interferes with radioactive iodine nuclear medicine studies.
 - Evaluate salivary duct stones in the appropriate clinical circumstance where intravenous contrast may obscure high attenuation stones

Neck MRI

Neck MRI is used less frequently than neck CT.

- ✓ Neck MRI without and with contrast (CPT® 70543) is appropriate if CT suggests the need for further imaging or if ultrasound or CT suggests any of the following:
 - Neurogenic tumor (schwannoma, neurofibroma, glomus tumor, etc.),
 - Vascular malformations

- o Deep neck masses
- o Angiofibromas

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NECK-2~Cerebrovascular and Carotid Disease

See these related topics in the Head Imaging Guidelines:

HD-1.5 CT and MR Angiography

HD-12~Aneurysm and AVM

HD-21~General Stroke/TIA

HD-23~Dizziness, Vertigo and Syncope

HD-22~Cerebral Vasculitis

HD-32~Eye Disorder-Horner's Syndrome

HD-31~Tinnitus

See **PVD-3~Cerebrovascular and Carotid Disease** in Peripheral Vascular Disease Imaging Guidelines.

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NECK-3~DYSPHAGIA

NECK-3.1 Dysphagia

- ✓ Mass suspected, either intrinsic or extrinsic, to the esophagus.
 - Esophagram (Barium swallow) evaluation is considered the initial study in the evaluation of dysphagia. These results can then lead to further evaluation with:
 - Endoscopy, and/or
 - Neck CT with contrast (CPT[®] 70491), and/or chest CT with contrast (CPT[®] 71260), and/or abdominal CT with contrast (CPT[®] 74160) (if requested).
- ✓ Dysmotility suspected
 - Esophagram and Motility study
- ✓ Vascular Ring suspected
 - Chest MRI without contrast, or chest MRI without and with contrast (CPT[®] 71552), can be performed if vascular ring is suspected.
- ✓ Globus Sensation
 - Findings typical of globus sensation (lump in the throat) need no advanced imaging and has a benign natural history.
 - If the diagnosis is unclear or the clinician cannot adequately visualize the pharynx, after examination and laryngoscopy, the following imaging can be considered:
 - Esophagram, Endoscopy and/or X-ray pharynx dynamic and static imaging.
 - Dysphagia, weight loss, odynophagia, throat pain and hoarseness
 - Neck CT with contrast (CPT[®] 70491)
 - Current or previous upper aerodigestive or esophageal malignancy ,or lymphoma
 - Previous neck, esophageal or gastric surgery
 - Palpable neck abnormality, see **NECK-6**

Practice Notes

A detailed history of the dysphagia symptoms is important to distinguish neurogenic, pharyngeal and esophageal disorders.

Dysphagia (difficulty swallowing) can be caused by a wide range of benign and malignant causes that affects the body's ability to move food or liquid from the mouth to the pharynx and into the esophagus.

A short duration (weeks to months) of rapidly progressive esophageal dysphagia with associated weight loss is highly suggestive of esophageal cancer.

(See **ONC-9~Esophageal Cancer** in the Oncology Imaging Guidelines).

A study including 148 neck CTs and 104 barium esophagrams done for the evaluation of globus sensation, found no malignancies. (5, 6)

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NECK IMAGING GUIDELINES

NECK-4~ESOPHAGUS

Neck-4.1 Imaging

- ✓ Neck, Chest and/or Abdomen CT all with contrast (CPT[®] 70491, CPT[®] 71260 and/or CPT[®] 74160) can be performed to evaluate any of the following:
 - GERD, sliding or paraesophageal hiatal hernias: preoperative planning, (chest and/or abdomen CT)
 - Hiatal hernia surgery: for GI Specialist or surgeon treatment/pre-operative planning or signs/symptoms of a potential complication, (chest and abdomen CT)
 - Mallory Weiss tear: suspected after endoscopy, (chest and abdomen CT)
 - Esophageal cancer: biopsy proven
 - See: **ONC-9~Esophageal Cancer** in the Oncology Imaging Guidelines
 - Esophageal perforation: suspected (Neck and/or Chest and/or Abdomen CT)
 - Esophageal diverticulum: Depending on location, any of the CT studies above can be used
- ✓ Neck and/or chest CT or MRI (CPT[®] 70543 and/or CPT[®] 71552) AND endoscopic ultrasound (CPT[®] 76975) can be used for leiomyoma, depending on the location.
- ✓ Suspected **foreign body** obstructing the esophagus should be evaluated with x-ray. If x-ray is negative, use contrast study such as esophagram. A location appropriate CT can be used for further evaluation.
- ✓ Any type of **esophageal stricture** (radiation, peptic, lye, neoplastic, postoperative, drug-induced, Crohn's disease, Schatzki's ring, esophageal web) should be evaluated with esophagram (barium swallow) and endoscopy prior to CT. If esophagram findings are negative, use CT of appropriate location.
- ✓ Esophageal motility study (CPT[®] 78258) can be considered for any of the following:
 - Dysphagia associated with chest pain and difficulty swallowing both solids and liquids
 - Gastroesophageal reflux
- ✓ Gastroesophageal Reflux Study (CPT[®] 78262) can be considered for any of the following:
 - Chronic heartburn
 - Dysphagia
 - Family history of Barrett's esophagus or esophageal carcinoma

- ✓ Gastric Mucosa Imaging (CPT[®] 78261) to evaluate Barrett's esophagus when there is dyspepsia or esophagitis.

Globus (Pharyngeus, "Hystericus") sensation, Lump in throat (see **NECK-3.1**)

Practice Notes

- ✓ A variety of mechanical and motility lesions occur in the esophagus.
- ✓ Dysphagia is difficulty swallowing; odynophagia is painful swallowing.

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NECK IMAGING GUIDELINES

NECK-5~Cervical Lymphadenopathy

Neck-5.1 Imaging

- ✓ Ultrasound (CPT[®] 76536) can be considered for any of the following:
 - Inflammatory, infective or reactive adenopathy but has failed a 2 week trial of treatment or observation (including antibiotics if appropriate).
 - To further evaluate an ill-defined mass
 - High suspicion of malignancy
- ✓ Neck CT with contrast (CPT[®] 70491) can be considered if:
 - Carcinoma found in a lymph node or in an organ known not to be primary, see **ONC-31.7 Unknown Primary**
 - Ultrasound is indeterminate or suspicious for malignancy.

Practice Notes

Chest x-ray is helpful to identify primary lung disease, involvement of mediastinal lymph nodes or other metastases.

Inflammatory neck adenopathy is often associated with upper respiratory infection, pharyngitis, dental infection. Occasionally, it is associated with sarcoidosis, toxoplasmosis and HIV.

Most common causes of neoplastic adenopathy are metastasis from head and neck tumors and lymphoma.

CT is the preferred initial modality in neck mass in adults.

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NECK-6~NECK MASSES

See **Pediatric Neck Imaging Guidelines**, if under age 18.

Neck-6.1 Imaging

- ✓ Ultrasound (CPT[®] 76536) is the initial study for:
 - Anterior neck masses
 - Lateral or posterior neck masses that are tender and have been observed for 2 weeks under physician care and reassessed (generally an acute, infections, or inflammatory mass).
- ✓ Neck CT with contrast (CPT[®] 70491) is supported for:
 - Lateral or posterior neck masses that are nontender and discrete in the adult ($\geq$ age 18)
 - History of malignancy
 - Suspected peritonsillar, retropharyngeal or other head and neck abscesses
 - If sarcoidosis is suspected the Neck CT with contrast (CPT[®] 70491) should be followed by biopsy.
 - Preoperative evaluations of any neck mass
- ✓ Neck MRI without and with contrast (CPT[®] 70543) if:
 - CT suggests the need for further imaging.
 - Ultrasound or CT suggests neurogenic tumor (schwannoma, neurofibroma, glomus tumor, etc.), vascular malformations, deep neck masses and angiofibromas.
- ✓ Uncomplicated Pharyngitis or Tonsillitis should undergo conservative therapy including antibiotics, if appropriate. Advanced imaging is not indicated.

Practice Notes

Although CT is considered the preferred initial modality in neck mass in adults, the use of US is steadily increasing and should be considered when malignancy is not obvious.

Most lateral neck masses are enlarged lymph nodes.

Malignancy is a greater possibility in adults that are heavy drinkers and smokers.

ENT evaluation can be helpful in determining the need for advanced imaging.

Although CT and MRI can have characteristic appearances for certain entities, biopsy and histological diagnosis are the only way to obtain a definitive diagnosis.

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NECK IMAGING GUIDELINES

NECK-7~Malignancies Involving the Neck

See the following in the **Oncology Imaging Guidelines**:

- o **ONC-3~Squamous Cell Carcinomas - Head and Neck**
- o **ONC-4~Salivary Gland Cancers**
- o **ONC-6~Thyroid Cancer**
- o **ONC-9~Esophageal Cancer**
- o **ONC-27~Lymphoma**

NECK IMAGING GUIDELINES

NECK-8~Recurrent Laryngeal Palsy

See **HD-7~Recurrent Laryngeal Palsy** in the **Head Imaging Guidelines**

NECK IMAGING GUIDELINES

NECK-9~Thyroid and Parathyroid

Neck-9.1 Thyroid Nodule

- ✓ Ultrasound (US) of the Neck (CPT[®] 76536) is the appropriate initial study for anterior neck masses, including goiter and thyroid²⁶ or mass(es) (see **Neck-6.1**). US is also appropriate for evaluation of thyroid nodules in the following clinical scenarios:
 - Normal or High serum thyrotropin (TSH)
 - Low TSH and nuclear scan shows non-functioning nodule.
 - Incidentally found on CT, MRI or PET (focal activity).
 - Nodules ≤ 1 cm with very low suspicion US pattern including spongiform pattern and pure cysts do not require repeat US.
 - For more suspicious or larger nodules, if FNA is not performed or was not diagnostic for malignancy, US can be repeated:
 - If US features are highly suspicious: repeat US every 6 months for up to 24 months.
 - If US features are of low to intermediate suspicion: repeat US at 12 and 24 months.
 - If nodule is stable after 24 months, follow-up ultrasound exams (CPT[®] 76536) can be performed every 3 to 5 years interval surveillance.²⁵.
- ✓ Fine-Needle Aspiration (FNA) should be considered for thyroid nodules using the American Thyroid Association criteria listed below. Note that FNA procedures do not require prior authorization.

TABLE 6. SONOGRAPHIC PATTERNS, ESTIMATED RISK OF MALIGNANCY, AND FINE-NEEDLE ASPIRATION GUIDANCE FOR THYROID NODULES

<i>Sonographic pattern</i>	<i>US features</i>	<i>Estimated risk of malignancy, %</i>	<i>FNA size cutoff (largest dimension)</i>
High suspicion	Solid hypoechoic nodule or solid hypoechoic component of a partially cystic nodule with one or more of the following features: irregular margins (infiltrative, microlobulated), microcalcifications, taller than wide shape, rim calcifications with small extrusive soft tissue component, evidence of ETE	>70–90 ^a	Recommend FNA at ≥1 cm
Intermediate suspicion	Hypoechoic solid nodule with smooth margins without microcalcifications, ETE, or taller than wide shape	10–20	Recommend FNA at ≥1 cm
Low suspicion	Isoechoic or hyperechoic solid nodule, or partially cystic nodule with eccentric solid areas, without microcalcification, irregular margin or ETE, or taller than wide shape.	5–10	Recommend FNA at ≥1.5 cm
Very low suspicion	Spongiform or partially cystic nodules without any of the sonographic features described in low, intermediate, or high suspicion patterns	<3	Consider FNA at ≥2 cm Observation without FNA is also a reasonable option
Benign	Purely cystic nodules (no solid component)	<1	No biopsy ^b

US-guided FNA is recommended for cervical lymph nodes that are sonographically suspicious for thyroid cancer (see Table 7).

^aThe estimate is derived from high volume centers, the overall risk of malignancy may be lower given the interobserver variability in sonography.

^bAspiration of the cyst may be considered for symptomatic or cosmetic drainage.

ETE, extrathyroidal extension.

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(Source: 2015 American Thyroid Management Guideline for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer)

- ✓ Nuclear medicine thyroid scan (CPT[®] 78013 or CPT[®] 78014) is considered for any of the following:
 - Inconclusive US with suspected thyroid cancer
 - Substernal goiter with any one of the following:
 - Dyspnea (including exertional)
 - Wheezing or stridor
 - Cough
 - Dysphagia
 - Evaluate eligibility for radioiodine therapy
 - Select nodules to biopsy in multinodular goiter even if TSH not low
- ✓ Nuclear medicine thyroid scan (CPT[®] 78013 or CPT[®] 78014) is considered if low serum thyrotropin (TSH) and any of the following:
 - Single or multiple thyroid nodules
 - Suspicion of ectopic thyroid tissue
 - Presence of thyroid nodule in the setting of Grave's disease (to rule out cold nodule).

- ✓ CT Neck with contrast* (CPT® 70491) or CT Neck without contrast (CPT® 70490), or MRI Neck without and with contrast (CPT® 70543). MRI and CT are not indicated for routine thyroid nodule evaluation and should only be considered for:
 - Evaluation of size/substernal extension of a nodular goiter
 - Airway compression
 - Presence of pathologic lymph nodes in cervical regions not visualized on ultrasound
 - In selected cases for nodules with aggressive features for more accurate pre-operative staging
 - Clinically suspected advanced disease, including invasive primary tumor
 - Inconclusive US with suspected thyroid cancer
 - Preoperative planning for any thyroid disease
 - CT Chest with contrast* (CPT® 71260) or without contrast (CPT® 71250) may be used with a CT neck study if:

- ✓ A thyroid nodule detected for the first time during pregnancy should be managed in the same way as in non-pregnant patients, except for avoiding the use of radioactive agents for diagnostic and therapeutic purposes

Practice Notes:

The basis of thyroid nodule management is the use of ultrasonography (US), thyrotropin (TSH, formerly thyroid-stimulating hormone) assay, and fine-needle aspiration (FNA) biopsy, together with clinical findings.

Patient Features Suggesting Increased Risk for Thyroid Malignancy.

- History of head and neck irradiation
- Family history of medullary thyroid carcinoma, multiple endocrine neoplasia type 2, or papillary thyroid carcinoma
- Age <14 or >70 years
- Male sex
- Growth of the nodule
- Firm or hard nodule consistency
- Cervical adenopathy
- Fixed nodule
- Persistent dysphonia, dysphagia, or dyspnea

* Iodinated CT contrast may interfere with diagnostic nuclear medicine thyroid scans (scintigraphy) and radioiodine treatment.

There is insufficient evidence supporting the use of PET to distinguish indeterminate thyroid nodules that are benign from those that are malignant.

¹⁸FDG-PET imaging is not routinely recommended for the evaluation of thyroid nodules with indeterminate cytology. Routine preoperative ¹⁸FDG-PET scanning is not recommended.

Neck-9. 2 Hyperthyroidism

- ✓ Hyperthyroidism suspected
 - Thyroid Uptake Study (CPT[®] 78012 or CPT[®] 78014) if one of the following:
 - TSH below normal range and elevated free T4 and/or free T3, OR
 - Subclinical hyperthyroidism with TSH <0.1 mU/L and normal free T4 and free T3.

Neck-9. 3 Parathyroid Imaging

- ✓ Primary Hyperparathyroidism suspected
 - Parathyroid Planar Imaging (CPT[®] 78070), Parathyroid Planar Imaging with SPECT (CPT[®] 78071) or Parathyroid Planar Imaging with SPECT and CT (CPT[®] 78072) if either:
 - Elevated serum calcium and elevated serum parathyroid hormone level.
 - Serum calcium 1mg/dL more over lab normal value
 - CT or MRI neck without and with contrast (CPT[®] 70492 or CPT[®] 70543):
 - Very high calcium (≥ 13) suggesting parathyroid carcinoma
 - Preoperative localization
 - Recurrent or persistent hyperparathyroidism following neck exploration (MR preferred).
 - Chest CT with contrast may be indicated in rare circumstances in the evaluation of ectopic mediastinal parathyroid adenomas.

Practice Notes

A thyroid nodule is distinct either on palpation or radiologically (incidentaloma). Nonpalpable nodules have the same risk of cancer as palpable. Nodules > 1cm are evaluated, while smaller nodules are generally evaluated if suspicious, associated with adenopathy or a history of radiation or cancer exists.

Ultrasound is not used to screen: 1) the general population, 2) patients with normal thyroid on palpation with a low risk of thyroid cancer, 3) patients with hyperthyroidism, 4) patients with hypothyroidism or 5) patients with thyroiditis. Conversely, US can be considered in patients who have no symptoms but are high risk as a result of: history of head and neck irradiation, total body irradiation for bone marrow transplant, exposure to fallout from radiation during childhood or adolescence, family history, thyroid cancer

syndromes such as MEN2, medullary or papillary thyroid cancer, Cowden's disease, familial adenomatous polyposis, Carney complex, Werner syndrome/progeria.

Radionuclide thyroid scan can be considered to evaluate nodules when hyperthyroidism is present, for surveillance of thyroid cancer, or to detect non-palpable nodules. This scan is not useful for other nodules since hyper functioning nodules rarely harbor malignancy. Thyroid nodules >4 cm may be considered for thyroid lobectomy due to a high incidence of both false negative FNA biopsies and malignancy (26%).

FNA may be repeated after an initial non-diagnostic cytology result, because repeat FNA with US guidance will yield a diagnostic cytology specimen in 75% of solid nodules and 50% of cystic nodules. However, up to 7% of nodules continue to yield non-diagnostic cytology results despite repeated biopsies and may be malignant at the time of surgery.

Thyroid nodules may be stratified as to risk of thyroid cancer based on sonographic findings of microcalcification, hypervascularity on Doppler ultrasound, solid or cystic nature of mass and margins of mass.

*Incidental focal FDG-PET uptake often corresponds to a clinically relevant thyroid nodule and ultrasound is recommended; incidentally noted diffuse thyroid FDG-PET uptake most often corresponds to inflammatory uptake, however, ultrasound should be done to ensure that there is no evidence of clinically relevant nodularity.

*Elastography provides information about nodule stiffness that is complementary to gray scale ultrasound findings in nodules with indeterminate cytology or ultrasound findings. It should not be used as a substitute for gray scale ultrasound.

*Use of ultrasound contrast medium is not recommended for the diagnostic evaluation of thyroid nodules and its current use is restricted to definition of size and limits of necrotic zones after minimally invasive nodule ablation techniques.

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NECK IMAGING GUIDELINES

NECK-10~TRACHEA AND BRONCHUS

Neck-10.1 Imaging

- ✓ Plain x-rays of the neck and chest and bronchoscopy are the initial imaging studies for evaluating patients with suspected tracheal and visualized bronchial pathology. Bronchoscopy can further evaluate the distal (endo) bronchial tree.
 - Suspected tracheal disease can be identified by inspiratory stridor and a characteristic flow-volume loop of PFTs.
- ✓ Neck CT with contrast (CPT[®] 70491) or without contrast (CPT[®] 70490) and/or chest CT with contrast (CPT[®] 71260) or without contrast (CPT[®] 71250) can be performed to further evaluate abnormalities, which include tracheal or bronchial tumor, foreign bodies, or persistent segmental or lobar lung collapse seen on other imaging studies based on the physician's preference. Expiratory HRCT (CPT[®] 71250) is indicated in patients with obstructive physiology tracheomalacia and can also be useful in the evaluation of interstitial lung disease.
- ✓ Trachea or bronchial “inspissation” without an abnormality described above, is not a risk for malignancy.

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NECK IMAGING GUIDELINES

NECK-11~Torticollis and Dystonia

See also: SP-7~Myelopathy and SP-3~Neck Pain and Cervical Radiculopathy

Newborn Infant:

- ✓ Ultrasound of the Neck is the initial study to determine if congenital muscular torticollis
 - Positive→ No further imaging is needed since diagnosis is defined
 - Negative→CT Neck with contrast or MRI Neck with contrast to try to identify other cause

Older Child (beyond infancy) or Adult

- ✓ For trauma, CT Neck with contrast and/or CT Cervical Spine without contrast is the initial study to identify fracture or mal-alignment
- ✓ For no trauma, CT Neck with contrast, and/or MRI Cervical Spine without contrast, or CT Cervical Spine without contrast is the initial study to locate a soft tissue or neurological cause
 - Positive→ Further advanced imaging is not required if CT Neck or CT Cervical Spine has identified local cause
 - Negative→MRI Brain without and with contrast to exclude CNS cause

Practice Notes

Torticollis or cervical dystonia is an abnormal twisting of the neck with head rotated or twisted. Its causes are many and may be congenital or acquired and caused by trauma, infection/inflammation, neoplasm and those less defined and idiopathic. It occurs more frequently in children and on the right side (75%).

Retropharyngeal space abscess could be associated with torticollis because child would not move neck freely.

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NECK IMAGING GUIDELINES

NECK-12~SALIVARY GLAND DISORDERS

- ✓ Xerostomia (Dry Mouth)
 - Salivary Gland Nuclear Imaging (one of CPT[®] 78230, CPT[®] 78231, or CPT[®] 78232) can be considered for any one of the following:
 - Dry mouth and either:
 - Sjögren's syndrome
 - Sialadenitis
 - History of head or neck radiation therapy
 - History of cerebral palsy
 - Parotid mass to allow preoperative diagnosis of Warthin's tumor
- ✓ Salivary Gland Stones:
 - For, suspected salivary duct or gland stone, CT of the neck without contrast (CPT[®] 70490) or CT of the neck without and with contrast (CPT[®] 70492) or CT of the maxillofacial area without and with contrast (usually CPT[®] 70488) or neck MRI without and with contrast (CPT[®] 70543).
 - Sialography (contrast dye injection) under fluoroscopy, may be performed to rule out a stone, with post sialography CT (CPT[®] 70486), **or** post sialography MRI (CPT[®] 70540).
- ✓ Parotid Mass
 - Any one of the following can be approved:
 - MRI Orbits/Face/Neck without and with contrast (CPT[®] 70543)
 - CT Neck with contrast (CPT[®] 70491)
 - CT Neck without contrast (CPT[®] 70490)
 - In addition to one of the above:
 - Salivary Gland Nuclear Imaging (CPT[®] 78230, CPT[®] 78231, or CPT[®] 78232) is indicated If salivary gland stone is suspected, CT of the maxillofacial area without and with contrast (usually CPT[®] 70488) or neck MRI without and with contrast (CPT[®] 70543) can be considered in place of neck CT.

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