**Head & Neck 911**

**Imaging of Neck & Airway Emergencies**

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**Disclosure of Commercial Interest**

- Neither I nor my immediate family (that would be my Bichon Frise “GoGo”) have a financial relationship with a commercial organization that may have a direct or indirect interest in the content of this presentation.

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Neck & Airway Emergencies
Neck Space Infection & Inflammation

- Glandular “emergencies”
- Tonsillitis & peritonsillar abscess
- Acute calcific prevertebral tendonitis
- Odontogenic infection
- Floor of mouth infection (Ludwig angina)
- Deep neck space infection
- Necrotizing fasciitis

57 year old male with left neck swelling & pain

Neck & Airway Emergencies
Glandular “Emergency”

Acute Submandibular Sialolithiasis-adenitis

Neck & Airway Emergencies
Acute Sialoadenitis

- Facial swelling & tenderness ↑ by oral intake
- Parotitis – CN7 paresis
- Obstructing sialolith
- 80-90% of acute cases
- SMG (70-80%)
- Large, ascending duct & small papillary orifice, ↑ secretion viscosity & slow flow rate
- No stone?...look for anterior FOM mass!

Acute on Chronic Sialolithiasis-Sialoadenitis

Neck & Airway Emergencies
Sialoadenitis

63 year old male with tongue pain and neck swelling

Sialoadenitis 2° Tongue/FOM SCCa

Neck & Airway Emergencies
Glandular Emergency

18 & 19 year old females with sore throat

Acute Sialolithiasis and SMG Abscess

Tonsillitis without Intratonsillar Abscess
Neck & Airway Emergencies

**Tonsillitis & Tonsillar Abscess**

- Young patients with sore throat, trismus, tonsillar enlargement & erythema
- EBV > Staph, Strep
- Imaging in severe cases
  - Evaluate for abscess & extent
- Tonsillitis
  - Enlarged, “kissing” in midline, striated enhancement pattern
- Intratonsillar vs. peritonsillar abscess

**Intratonsillar Abscesses**

- Liquefaction contained by capsule, enhancing rim
- No extension posterior to ICA/IJV

**Peritonsillar Abscess**

- Extends beyond capsule into connective tissue between tonsil & superior constrictor ring
- Airway compromise
- Cellulitis in PPS, MS, RPS, PVS

**Intratonsillar vs. Peritonsillar Abscess**

Confusing!

**41 year old female with sore throat & dysphagia**

Acute Calcific Prevertebral Tendonitis with RPS Effusion

- Relatively rare & underdiagnosed
- Tonsillitis mimic
- Adult (30-60 yrs)
- Stiff neck, sore throat, no infection or dental disease
- No or low-grade fever, minimal ↑ WBC, ↑ ESR
- Crystal deposition in longus colli tendons & inflammatory tendonitis & RPS effusion

**33 year old female with facial swelling & trismus**

Odontogenic Masticator Space Abscess

- Odontogenic abscess
  - From molar tooth infection or following dental procedure
  - 2nd or 3rd molar teeth
    - Roots below mylohyoid
      - SMS
  - Adjacent to posterior body and ramus
  - +/- Osteomyelitis
  - Changes therapy
Neck & Airway Emergencies
Masticator Space Infection
84 year old female with cheek swelling & erythema
Maxillary Odontogenic Abscess with SZMS Extension

Neck & Airway Emergencies
46 year old male with progressive anterior neck swelling and erythema
“Ludwig Angina”

Neck & Airway Emergencies
Floor of Mouth Infection – Ludwig Angina
• “Angina Ludovici”, “angina maligna”, “morbus strangulantis”
• Potentially life-threatening floor of mouth (SLS) cellulitis
  • ± Abscess
• Adults with dental infection > complicated SMG infection
  • Canine, premolar, 1st molar
  • Roots above mylohyoid (SLS)
• Airway compromise
  • OP or pretracheal ST

Neck & Airway Emergencies
Floor of Mouth Infection
Wilhelm Friedrich von Ludwig 1790-1865

Neck & Airway Emergencies
69 year old male with fever & dysphagia
Retropharyngeal & PVS Abscess 2nd Cervical Osteodiscitis

Neck & Airway Emergencies
Deep Neck Space Infection
Retropharyngeal & Danger Space Anatomy
• RPS between buccopharyngeal fascia & alar fascia
  • Clivus to T3 level
• Danger space between alar fascia & prevertebral fascia
  • Clivus to above diaphragm
  • Conduit to mediastinum
• Potential spaces & indistinguishable on imaging

BPF
AF
PVF
Neck & Airway Emergencies
Retropharyngeal & Danger Space

- Lateralized > Lymph Node
- Midline > Effusion/Abscess

Most common in children < 6 years
- Ruptured suppurative LN or penetrating FB
- Less common in adults
- Immunocompromised or diabetic
- Cervical osteodiscitis or post-spine surgery

Imaging features
- Tense fluid collection
- Wall enhancement / gas
- Image inferior extent

71 year old male post cervical fusion with fever & dysphagia

Screw Extrusion with RPS/PVS Abscess

54 year old male with fever, neck pain, dysphagia, and difficulty breathing

Multispatial, Retropharyngeal & PVS Abscess
Surgical drainage performed...

1 week post RPS-PVS abscess drainage presented with ↑ neck pain & paresthesias

Cervical Osteodiscitis with PVS → Epidural Abscess

56 year old male with tonsillar abscess

RPS & DS Extension with Descending Mediastinitis
Mediastinitis

- Mediastinitis 2° H&N infection > 1°
- RPS infection permeates the alar fascia
- Infection spreads to danger space & with gravity extends into mediastinum
- Potentially life-threatening
  - Severe sepsis
  - Cardiovascular collapse

50 year old patient post XRT for HP SCCa. Presents with sore throat, difficulty swallowing, neck swelling, and sepsis

Radionecrosis of the Hyoid Bone and Thyroid Cartilage

Neck & Airway Emergencies

Descending Mediastinitis

- Necrotizing Fasciitis

- Rare, but ↑ incidence
- Patients immune-compromised, DM, EtOH-ic
- Inciting condition
  - Pharyngitis, odontogenic most often
  - Symptoms and signs deceptively benign
  - Polymicrobial
    - Anaerobes & other
    - Bacterial enzymes & exotoxins destroy tissue
  - Mortality: ~ 25%
    - Sepsis, mediastinitis, carotid erosion, venous thrombophlebitis, aspiration pneumonia, airway compromise
- Multiple debridements often required

- Imaging features
  - Cellulitis: skin thickening, reticulation of fat
  - Fasciitis: thickening & enhancement of fascia
  - Myositis: swelling & enhancement of muscles
  - Multispatial fluid collections
    - Necrotic tissue > abscesses
    - Gas collections (65-75%)
  - Imaging role for surgery
    - Vascular complication
    - Descending mediastinitis
    - Collection > 3 cm, involving > 2 spaces, or involving GS, PVS, VS

65 year old diabetic male with worsening posterior neck pain & bloody drainage
Neck & Airway Emergencies
Airway Emergencies

46 year old female with sore throat & dysphagia

Supraglottitis

- Potentially life threatening infection/inflammation of supraglottic larynx in adult with sore throat & dysphagia
  - Pharyngeal > laryngeal symptoms
  - Thickened epiglottis, AEF, obliterated preepiglottic fat, mucosal enhancement
  - Often involves tonsils and base of tongue
  - Abscess formation more common in adults

40 year old female with intermittent right neck swelling; follow up 18 months later

Laryngopyocele

- Thin walled air or fluid-filled cystic lesion communicating with laryngeal ventricle
- Types:
  - Internal
  - Mixed (external)
  - Secondary laryngocele
  - Laryngopyocele

67 year old female with rapid onset of tongue swelling & difficulty breathing; Tx with ACE inhibitor x 1 year for HTN

ACE Inhibitor-Induced Angioedema

- Generalized inflammation of mucosa & submucosa
- Varying airway narrowing & respiratory compromise
  - Minor Δ in luminal size → significant impact on airflow
    - Diameter by ½ = ↑ airway resistance 16x
- Etiologies: Drugs (ACE inh), anaphylaxis, XRT, cellulitis
- Tx aimed at underlying condition, airway protection
Neck & Airway Emergencies
Vascular

- Jugular vein
  - Thrombosis
  - Thrombophlebitis
- Arterial
  - Dissection
  - Carotid pseudoaneurysm
  - Carotid “blowout”

59 year old with lupus and renal failure developed neck swelling after subclavian CVL placement

Jugular Vein Thrombosis

20 year old female post removal of CVL

Internal Jugular Vein Thrombophlebitis

17 year old with sore throat, left neck swelling, & respiratory distress

Internal Jugular Vein Thrombophlebitis

17 year old with sore throat, left neck swelling, & respiratory distress

Lemierre Syndrome
Neck & Airway Emergencies

**Lemierre Syndrome**

- Lemierre was a French bacteriologist
- In 1936, published 20 cases of throat infections followed by anaerobic septicemia
  - 18 patients died
- Septic thrombosis of facial, EJ, or IJ veins following suprahyoid neck infection

![Andre-Alfred Lemierre](1763-1820)

Neck & Airway Emergencies

**Vascular**

69 year old male 1 week post carotid endarterectomy

Carotid Artery "Blowout" (Pseudoaneurysm)

![Patient post neck dissection & XRT for SCCa](Carotid Artery "Blowout")

Neck & Airway Emergencies

**Summary & Key Points**

- CT is modality of choice for imaging of neck emergencies
- Our role: Identify source, extent, & complications
  - ? Orbital, intracranial, or thoracic spread
  - ? Airway compromise, venous or arterial involvement
- Do not mistake RPS effusion for abscess
- Assess inferior extent of collections in the RPS & for epidural extension if process involves the PVS
- Consider less common entities in the appropriate setting
  - Acute calcific prevertebral tendonitis, necrotizing fasciitis, Lemierre syndrome

Thank You!