Pediatric Neck Masses

Tony Kille, M.D.
Assistant Professor
Pediatric Otolaryngology
Disclosures

• None
Survival Trends, Age < 15, for common H&N malignancies

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hodgkin disease</td>
<td>52%</td>
<td>90%</td>
<td>83%</td>
<td>88%</td>
<td>92%</td>
</tr>
<tr>
<td>Non-Hodgkin lymphoma</td>
<td>18%</td>
<td>26%</td>
<td>56%</td>
<td>69%</td>
<td>78%</td>
</tr>
<tr>
<td>Soft tissue sarcomas</td>
<td>NA</td>
<td>44%</td>
<td>67%</td>
<td>NA</td>
<td>75%</td>
</tr>
<tr>
<td>Rhabdomyosarcoma</td>
<td>NA</td>
<td>34%</td>
<td>64%</td>
<td>NA</td>
<td>80%</td>
</tr>
<tr>
<td>Neuroblastoma</td>
<td>25%</td>
<td>40%</td>
<td>52%</td>
<td>55%</td>
<td>69%</td>
</tr>
</tbody>
</table>

Reasons for improved survival:

1. Earlier disease recognition
2. Evolution of coherent clinical/pathologic staging systems
3. Establishment of multi-modality treatment protocols
4. Improvement in craniofacial resection techniques
Reasons for improved survival:

1. **Earlier disease recognition**
2. Evolution of coherent clinical/pathologic staging systems
3. Establishment of multi-modality treatment protocols
4. Improvement in craniofacial resection techniques
Goals

1. Review pertinent anatomy & create a short list of pathologies based on anatomic regions

2. Discuss elements of an organized history and physical exam of pediatric neck masses
   • Formulate differential diagnosis
   • Direct further work-up

3. Review a few of the common pediatric neck masses as we go

4. Peds neck mass “algorithm”
Neck Anatomy
Neck Anatomy

• Submental
  • Congenital
    • Thyroglossal duct cyst
    • Lymphatic/vascular malformation
    • Dermoid cyst
  • Inflammatory
    • Lymphadenitis

• Submandibular
  • Congenital
    • Lymphatic/vascular malformation
  • Inflammatory
    • Lymphadenitis (consider atypical myco!)
    • Sialadenitis
    • CF (enlarged submandibular gland)
  • Neoplastic
    • Salivary gland neoplasm
  • Other
    • Plunging ranula
Non-tuberculous (atypical) mycobacterial cervicofacial adenitis

- M. avium-intracellulare, M. bovis
- Slow growing
- Immunocompetent toddlers
- Usually asymptomatic
- Skin involvement (violaceous); fistula formation
- Predilection for submandibular/parotid area; may involve adjacent salivary glands
- Surgery vs antibiotics vs natural course
Neck Anatomy

• **Midline**
  - Congenital
    - Thyroglossal duct cyst
    - Ectopic thyroid
    - Dermoid cyst
  - Inflammatory
    - Lymphadenitis

• **Paratracheal**
  - Congenital
    - Thyroglossal duct cyst
    - Branchial cleft anomalies
  - Inflammatory
    - Lymphadenitis
    - Thyroiditis
  - Neoplastic
    - Thyroid or parathyroid neoplasm
Thyroglossal duct cyst

- Most common congenital neck mass
- Predictable course/location based on embryology
- Slow growing but can become infected
- Moves with swallow and tongue protrusion
Third/fourth branchial cleft sinus

- Rare
- Recurrent lower neck infection and/or thyroiditis; cultures polymicrobial (oral flora)
- Left > right
Third/fourth branchial cleft sinus
Neck Anatomy

• **Supraclavicular**
  - Congenital
  - Lymphatic or vascular malformation
  - Inflammatory
  - Lymphadenitis
  - Neoplastic
  - Lipoma
  - Lymphoma
  - Metastatic (lung, esophagus, renal)

• **Suprasternal**
  - Congenital
  - Dermoid cyst
  - Thymic cyst or ectopic thymus
  - Inflammatory
  - Lymphadenitis
  - Neoplastic
  - Thyroid or parathyroid neoplasm
  - Lipoma
  - Metastatic
Neck Anatomy

- **Posterior Triangle**
  - Congenital
    - Lymphatic or vascular malformation
  - Inflammatory
    - Lymphadenitis
  - Neoplastic
    - Lymphoma
    - Metastatic (nasopharynx)

- **Anterior border of SCM**
  - Congenital
    - Branchial cleft anomalies
    - Lymphatic or vascular malformation
    - Laryngocele
    - Thymic cyst or ectopic thymus
    - SCM tumor of infancy
  - Inflammatory
    - Lymphadenitis
  - Neoplastic
    - Lymphoma
    - Sarcoma
    - Carotid body tumor
Second branchial cleft anomalies

- **Cyst** presents as slow growing mass in upper neck
- Often present into adulthood
- **Sinus or fistula** can have skin pit anywhere along anterior border of SCM
- Tract can extend all the way to ipsilateral tonsil
- Treatment is surgical excision; risk of recurrence if fail to excise entire tract
Lymphoma

- Painless neck mass is most common H&N presentation
- Hodgkin in adolescents; non-Hodgkin in 2-12 yr age group
- Male > female
- Increased concern for lymphoma if:
  - > 3 cm and firm
  - Involving multiple regions
  - supraclavicular or posterior triangle
- Hodgkin associated with EBV
- Non-Hodgkin more likely to have Waldeyer’s involvement
Neck Anatomy

- **Pre-auricular (Parotid)**
  - Congenital
    - Hemangioma
    - Lymphatic or vascular malformation
    - 1st branchial anomaly
  - Inflammatory
    - Lymphadenitis (consider atypical myco!)
    - Parotitis (viral vs bacterial)
  - Neoplastic
    - Parotid neoplasm (benign vs malignant)
    - Lymphoma
  - Other
    - Sjogren’s syndrome
    - Sarcoidosis

- **Post-auricular**
  - Congenital
    - 1st branchial anomaly
  - Inflammatory
    - Lymphadenitis
  - Neoplastic
    - Sarcoma
    - Langerhans histiocytosis
Neck Anatomy

- **Jugulodigastric**
  - Congenital
    - Branchial cleft anomaly
    - Hemangioma
    - Lymphatic or vascular malformation
  - Inflammatory
    - Lymphadenitis
    - Infected branchial anomaly
  - Neoplastic
    - Parotid neoplasm
    - Lymphoma
- Normal
  - Transverse process of C2
  - Lateral aspect of hyoid bone
  - Styloid process
History

- Present at birth?

- What’s the course been?
  - Slow growing (months)
  - Rapidly growing (days)
  - Sort-of rapidly growing (weeks)
  - Fluctuating
  - Recurrent

- Constitutional symptoms present?

- Painful?
History

• Prior radiation exposure?

• Family history of head & neck masses?

• Associated focal head & neck signs/symptoms?
  – Unilateral otitis media or otorrhea
  – Rhinorrhea, nasal obstruction, epistaxis
  – Swallow troubles
  – Voice changes
  – Snoring
  – Proptosis, blurred vision, diplopia
  – Cranial neuropathy
History

- Inflammatory or infectious sources?
  - Associated or preceding URI
  - Sinus, throat, ear, or dental infection
  - Exposure to cats
  - Exposure to non-domestic animals
  - Insect bites
  - Unusual travel
  - Sick contacts
  - Exposure to persons with TB
  - IV drug use
  - Incarceration
Physical Exam

My preferred techniques:

- From behind
- Tilt head as needed
- With swallow/tongue protrusion
- Consider upright vs supine
- Bimanual (if safe)
Physical Exam

• Key findings:
  – Character/consistency
  – Size
  – Relationship to surrounding structures
  – Tenderness
  – Overlying skin change or involvement
Physical Exam

- Good ENT exam
- Axillary or inguinal adenopathy?
- Abdominal exam
Management options

- Observation
- Antibiotics
  - Versus upper respiratory source
    - Augmentin, 2nd generation cephalosporin, azithromycin, etc
- Lab work-up
- Imaging
- Referral
Lab evaluation

- CBC with differential
- PPD
- If history fits, consider:
  - Bartonella (cat scratch disease)
  - EBV
  - Lyme
  - Toxoplasma
  - Brucellosis (cow, goat, sheep)
Imaging

• CXR

• Ultrasound
  – Cystic vs solid
  – Relation to great vessels, trachea, salivary glands, and thyroid
  – Characterize thyroid masses
Imaging

• CT (with contrast)
  – Surgical road-map
  – Evaluate for bone involvement, invasion of adjacent structures, or intracranial extension

• MRI
  – Best for lymphatic or vascular lesions
“Algorithm”

Suspect **congenital** etiology
(TGDC, branchial cleft, lymphatic malformation)

ENT referral
“Algorithm”

Suspect **inflammatory** etiology

- CBC
- Empiric antibiotics

Resolution

Persists or progresses (> approx 3-4 weeks)

- CXR
- PPD
- consider special labs
- consider ultrasound
- consider referral (especially if PPD positive)
Suspect **neoplastic** etiology

- CBC
- CXR
- Consider ultrasound
- Empiric antibiotics?

**Resolution**

**Persists or progresses (> approx 2-4 weeks)**

- Refer to ENT
- Consider heme/onc referral