**Surgical Indications and Continuity for Kids (SICK) ECHO 2018-2020**
**Neck Swelling in Children**
**8/15/2019**
**Gregory Demuri, MD**
*Provided by the University of Wisconsin–Madison Interprofessional Continuing Education Partnership (ICEP)*

**Intended Audience:**
Primary care physicians

**Objectives:**
As a result of this educational regularly scheduled series, learners will be able to:
1. Assess and correct physiological and psychological problems that may increase surgical risk for regional pediatric patients.
2. Give the patient and significant others complete learning and teaching guidelines regarding the surgery.
3. Instruct and demonstrate exercises that will benefit the pediatric patient postoperatively.
4. Plan for discharge and any projected changes in lifestyle due to the surgery.

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# Neck Swelling in Children

Gregory DeMuri M.D. F.A.A.P.


University of Wisconsin
SCHOOL OF MEDICINE
AND PUBLIC HEALTH

# Disclosures

- I have no conflicts of interest to declare
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# Neck Swelling in Children

- Differential Diagnosis
- Diagnostic Considerations
- Treatment

# Neck Swelling - DDX

- Congenital and acquired cysts
- Neoplasms
- Cervical adenitis
  - Acute bilateral adenitis
  - Acute unilateral adenitis
  - Subacute/chronic bilateral adenitis
  - Subacute/chronic unilateral adenitis

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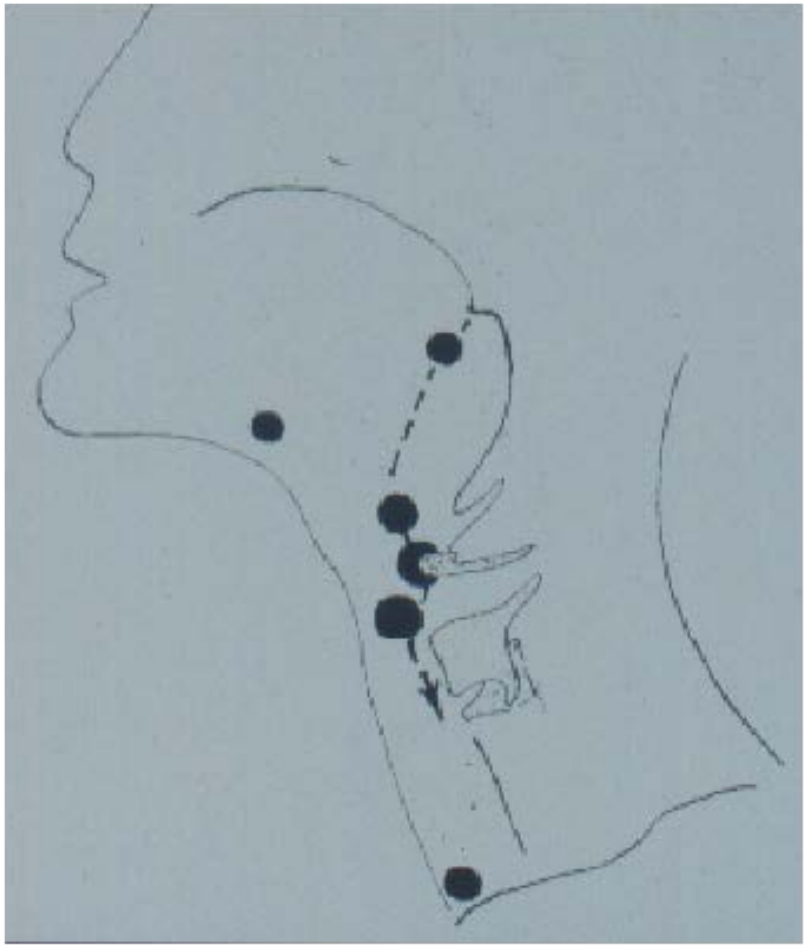
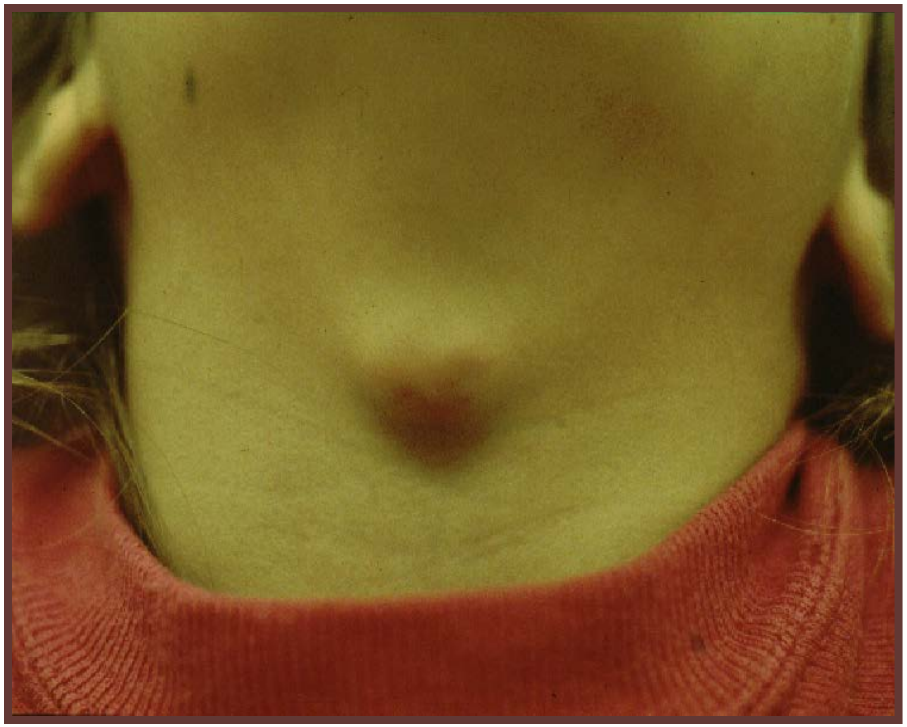
# Congenital and Acquired cystic structures

- Congenital and acquired cysts
  - **Thyroglossal duct cysts**
  - **Ectopic thyroid**
  - Laryngocele
  - Branchial cleft cyst
  - Cystic hygroma

# Thryoglossal duct cysts

- Midline (+/- 2 cm)
- Cystic
- Non-tender
- Move up and down with swallowing
- Follow tract of thyroid migration





Diagnosis confirmation/ surgical planning

- CT
- Ultrasound
- MRI

Treatment

- Surgery
- Sistrunk procedure

# Thyroglossal duct cysts - infection

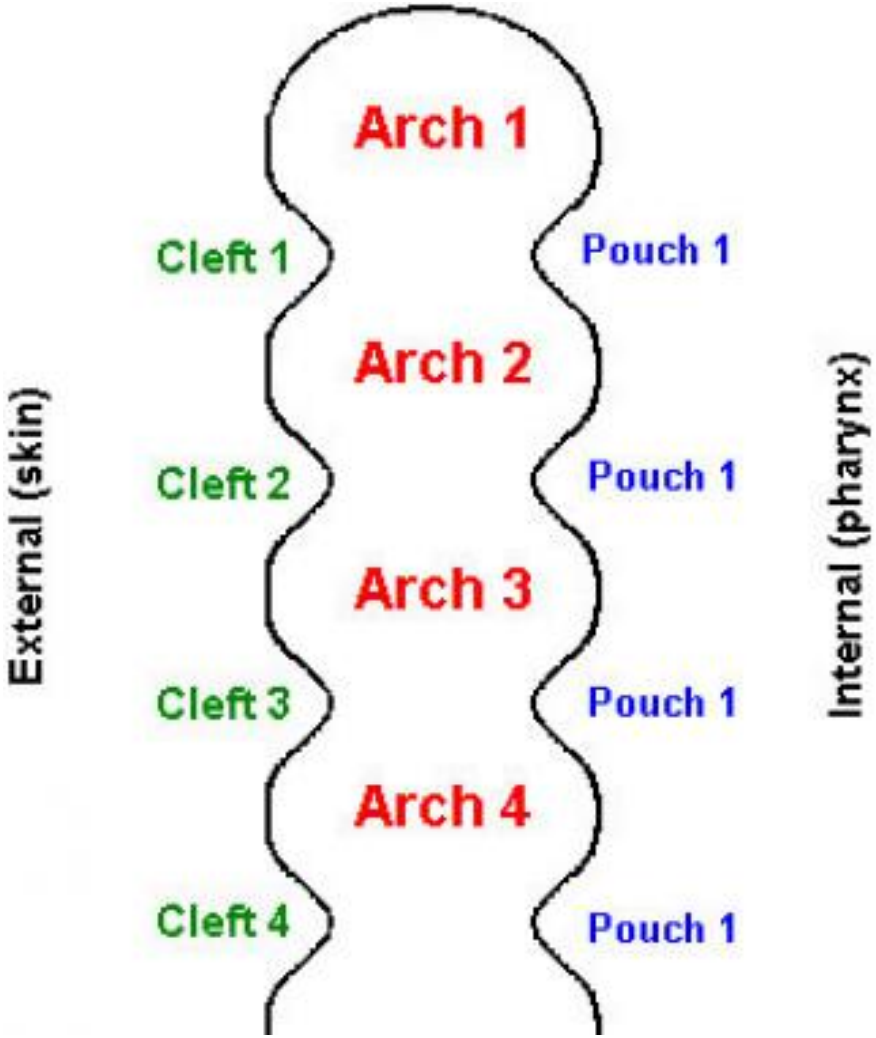
- Most  do not become infected
- Oral flora
- Antibiotics
  - Ampicillin/sulbactam
  - Ceftriaxone/clindamycin
- Surgery- not when inflamed

# Laryngocele

Reddy Int J. Head Neck Surg 2008

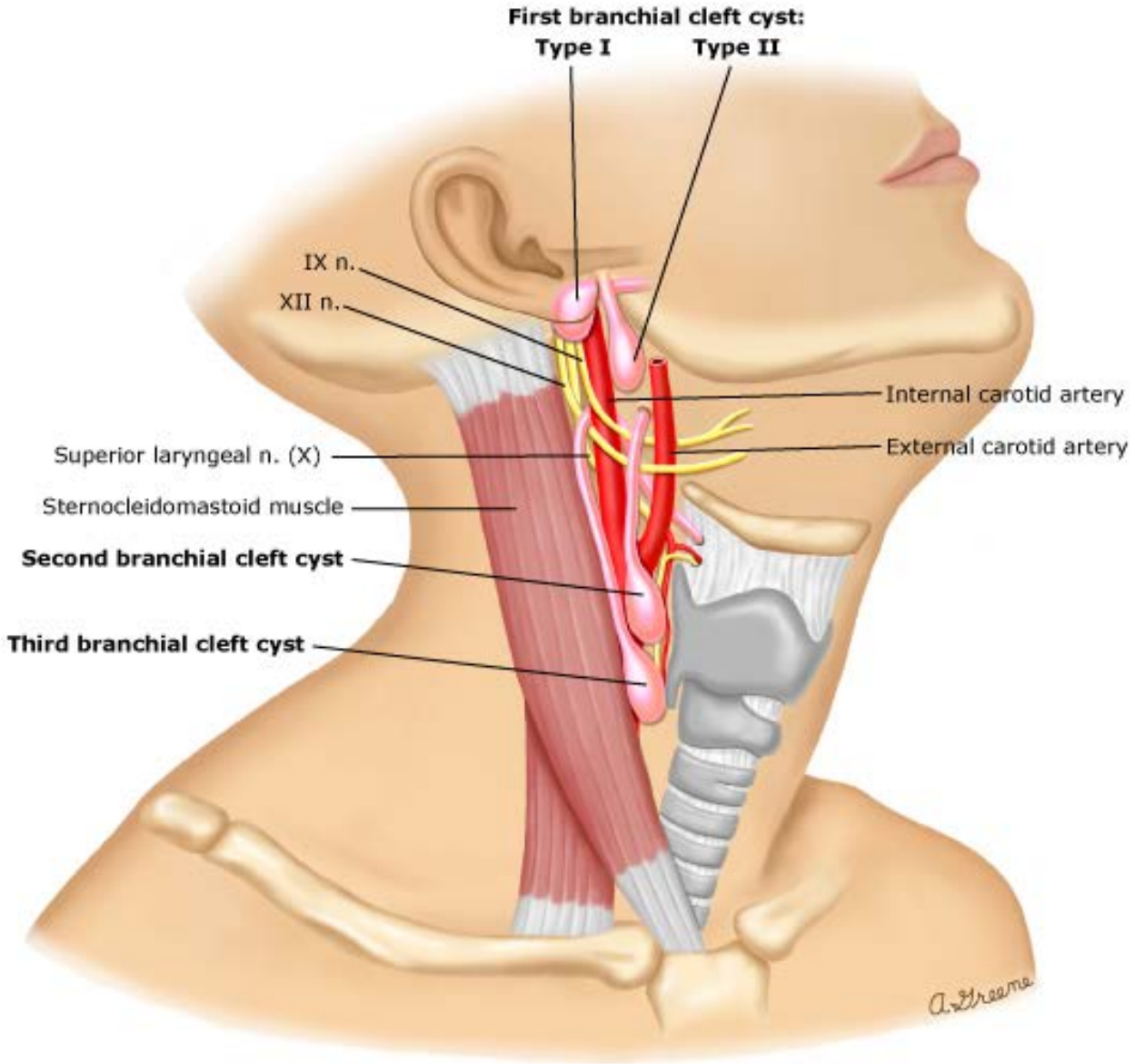
# Congenital and Acquired cystic structures

- Congenital and acquired cysts
  - Thyroglossal duct cysts
  - Ectopic thyroid
  - Laryngocele
  - **Branchial cleft cyst**
  - Cystic hygroma
  - Hemangioma


Arch 1
Cleft 1
Pouch 1
Arch 2
Cleft 2
Pouch 1
Arch 3
Cleft 3
Pouch 1
Arch 4
Cleft 4
Pouch 1
External (skin)
Internal (pharynx)

Medscape

# Branchial cleft cysts

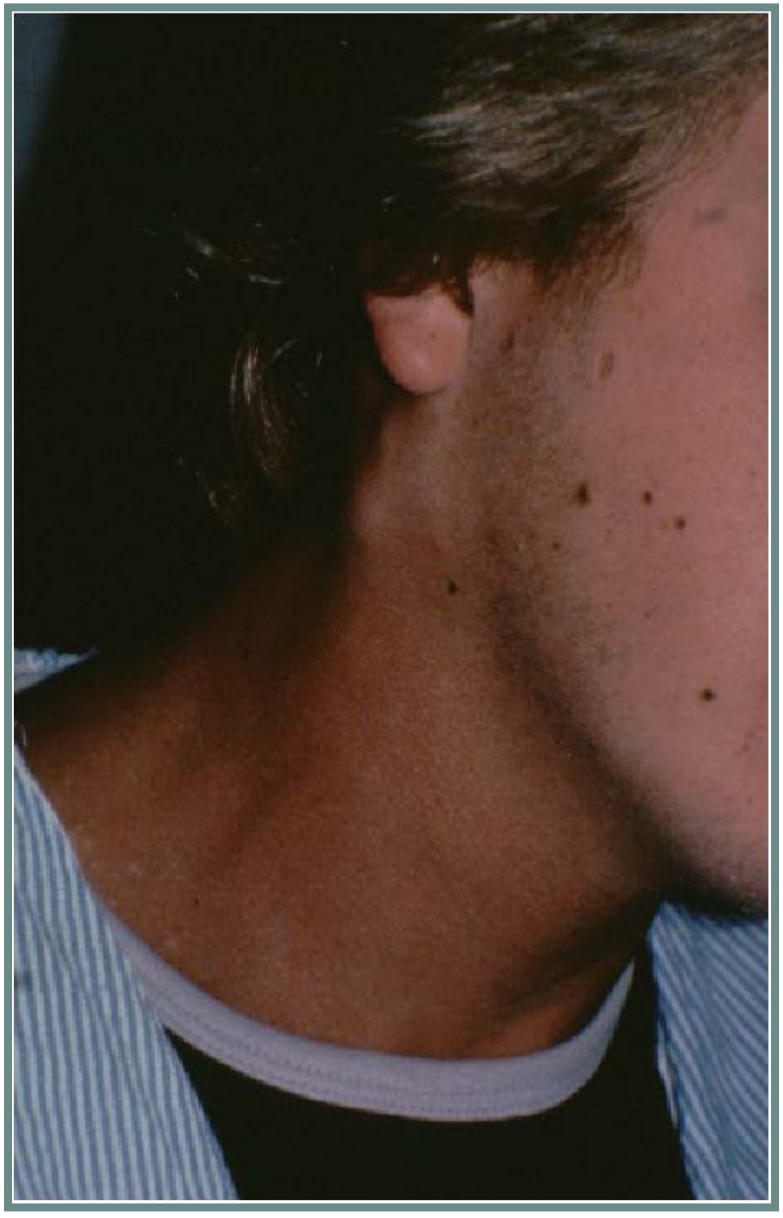


# Branchial Cleft Cysts

- Cystic lateral neck mass
- Anterior to sternocleidomastoid
- May have fistula/sinus
- Often present with infection

# Branchial cleft cysts

- Cyst
  - Tract has no connection to skin or pharynx
- Sinus
  - Tract connects to either skin or pharynx
- Fistula
  - Tract extends completely from skin to pharynx



# Branchial Cleft Cyst-Treatment

- Complete excision
- Recurrence common
- Antibiotics if infected (defer surgery)
  - Amoxicillin/clavulanate
  - Ampicillin/sulbactam
  - Ceftriaxone/clindamycin
  - Meropenem/ertapenem

# Congenital and Acquired cystic structures

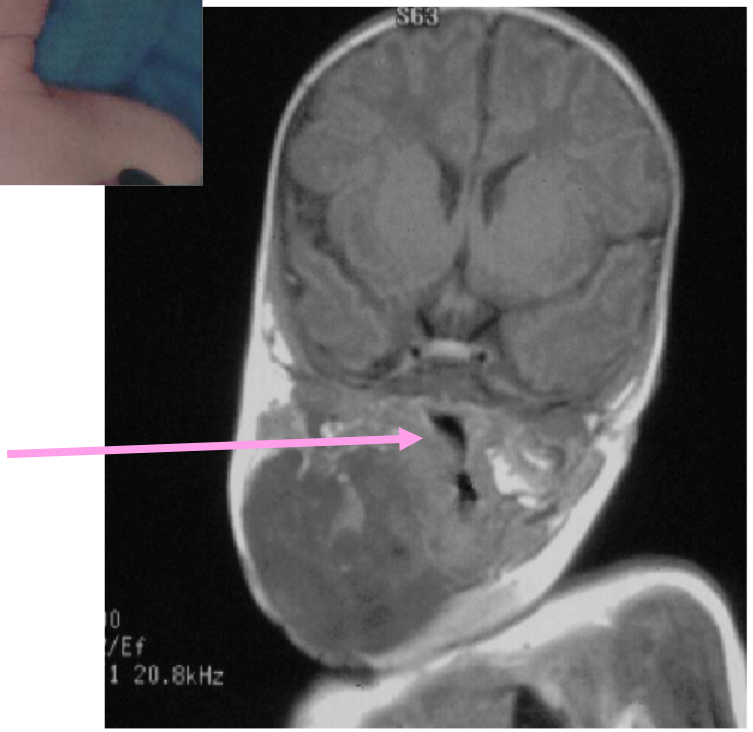
- Congenital and acquired cysts
  - Thyroglossal duct cysts
  - Ectopic thyroid
  - Laryngocele
  - Branchial cleft cyst
  - **Cystic hygroma**
  - Hemangioma

# Cystic Hygroma

## aka lymphangioma aka lymphatic malformation

- Developing lymphatic channels that fail to connect to surrounding lymphatic and venous drainage systems
- Usually present at birth
  - 90% detected by age 2 yrs
- Do not spontaneously involute
- Commonly have some angiomatous element
- Surgical excision vs. injection therapy

# Lymphatic malformation




0cm


S99
14M
MF:

# Cystic Hygroma - therapy

- Spontaneous regression rare
- Surgical excision
- Sclerotherapy
  - Bleomycin
  - Doxycycline
  - OK-432 (picibanil)
- Infection
  - Group C and G streptococci
  - Group A streptococci
  - *Staphylococcus aureus*

# Antibiotic Treatment of Infected cystic hygroma

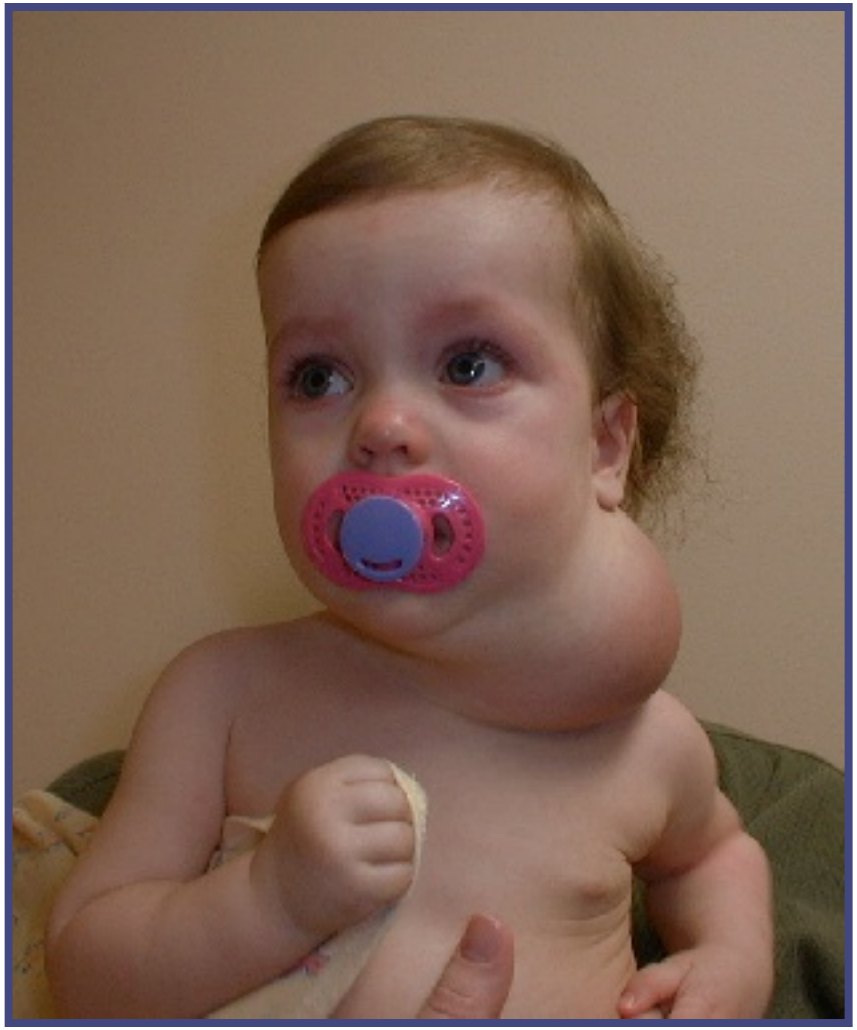
**Oral**

- Cephalexin
- Dicloxacillin
- Amoxicillin/clavulanate
- ? Clindamycin
- Linezolid

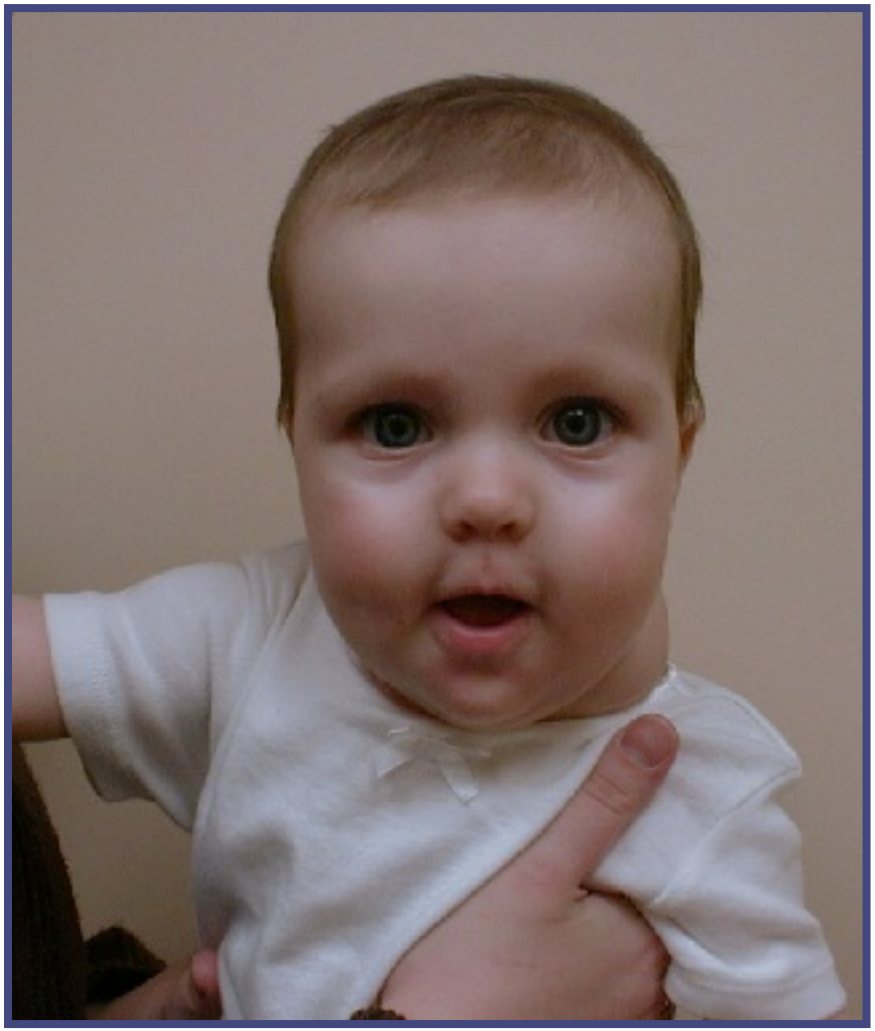
**Intravenous**

- Vancomycin (MRSA)
- Daptomycin
- Nafcillin/oxacillin/cefazolin
- ?clindamycin

- Sclerotherapy – Picibinal (OK-432)



Pre injection



Post injection #1

# Congenital and Acquired cystic structures

- Congenital and acquired cysts
  - Thyroglossal duct cysts
  - Ectopic thyroid
  - Laryngocele
  - Branchial cleft cyst
  - Cystic hygroma
  - **Hemangioma**

# Hemangiomas

- Generally appear during the first 6 months of life
- Proliferate up to age 2 yrs
- ~95% involute by age 5 yrs
- Active treatment if vision or airway is threatened, or bleeding complications occur
  - Steroids, propanolol, laser, embolization, excision

http://cr2chicago.weebly.com

# Neck Swelling - DDX

- Congenital and acquired cysts
- Neoplasms
- Cervical adenitis
  - Acute bilateral adenitis
  - Acute unilateral adenitis
  - Subacute unilateral/chronic adenitis
  - Subacute/chronic bilateral adenitis

# Neck neoplasm

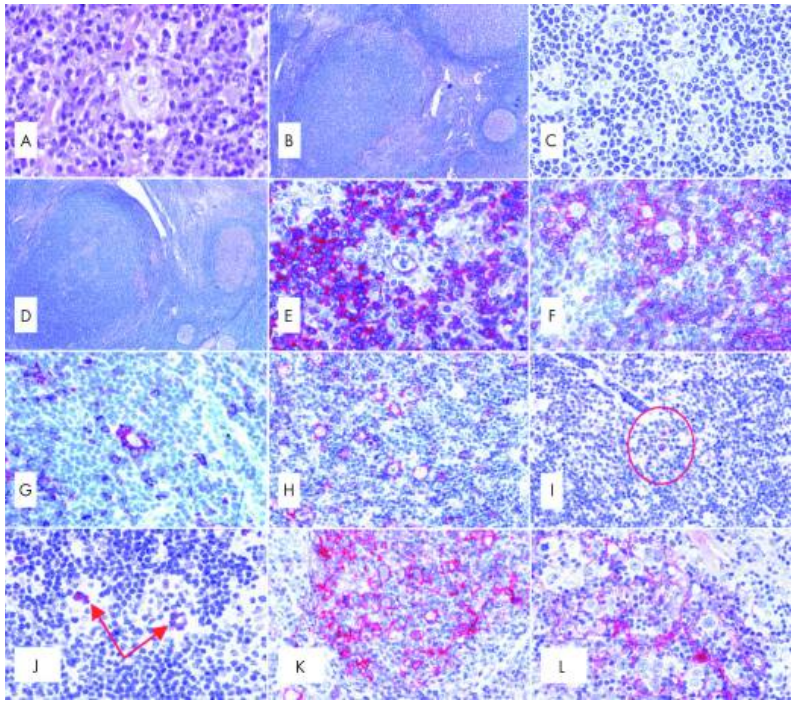
- Lymphoma
- Leukemia
- Rhabdomyosarcoma
- Parotid tumor
- Thyroid tumor
- Neuroblastoma
- Nasopharyngeal carcinoma

# Neck neoplasm

- Worrisome signs!
  - Firm
  - Nontender
  - No erythema
  - Other adenopathy / organomegally
  - Non mobile
  - Solid on imaging

# Evaluation for neck neoplasms

- Imaging
  - CT
  - MRI
- CBC
- LDH
- Biopsy
  - Tissue is the issue!

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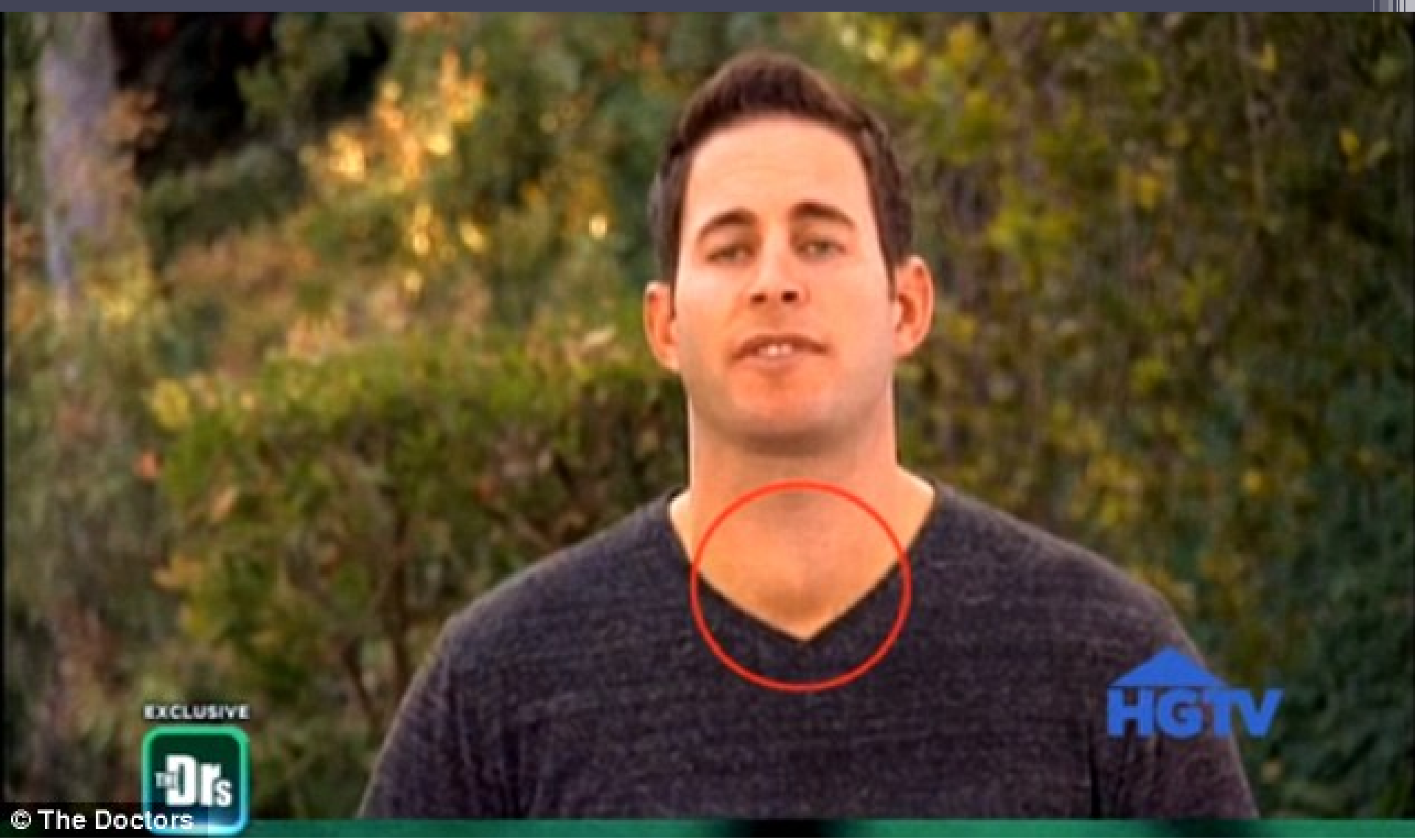


Daily Mail

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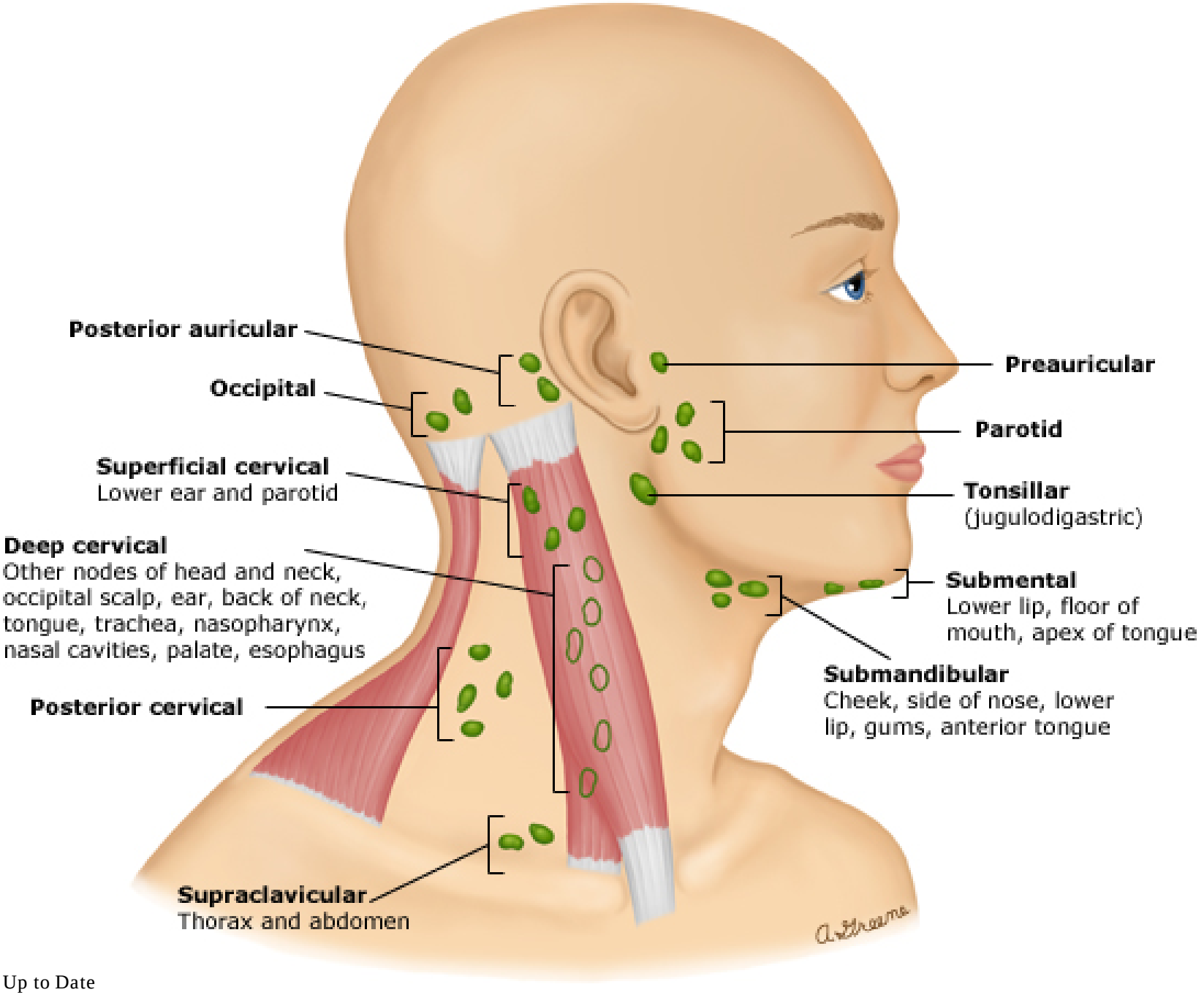
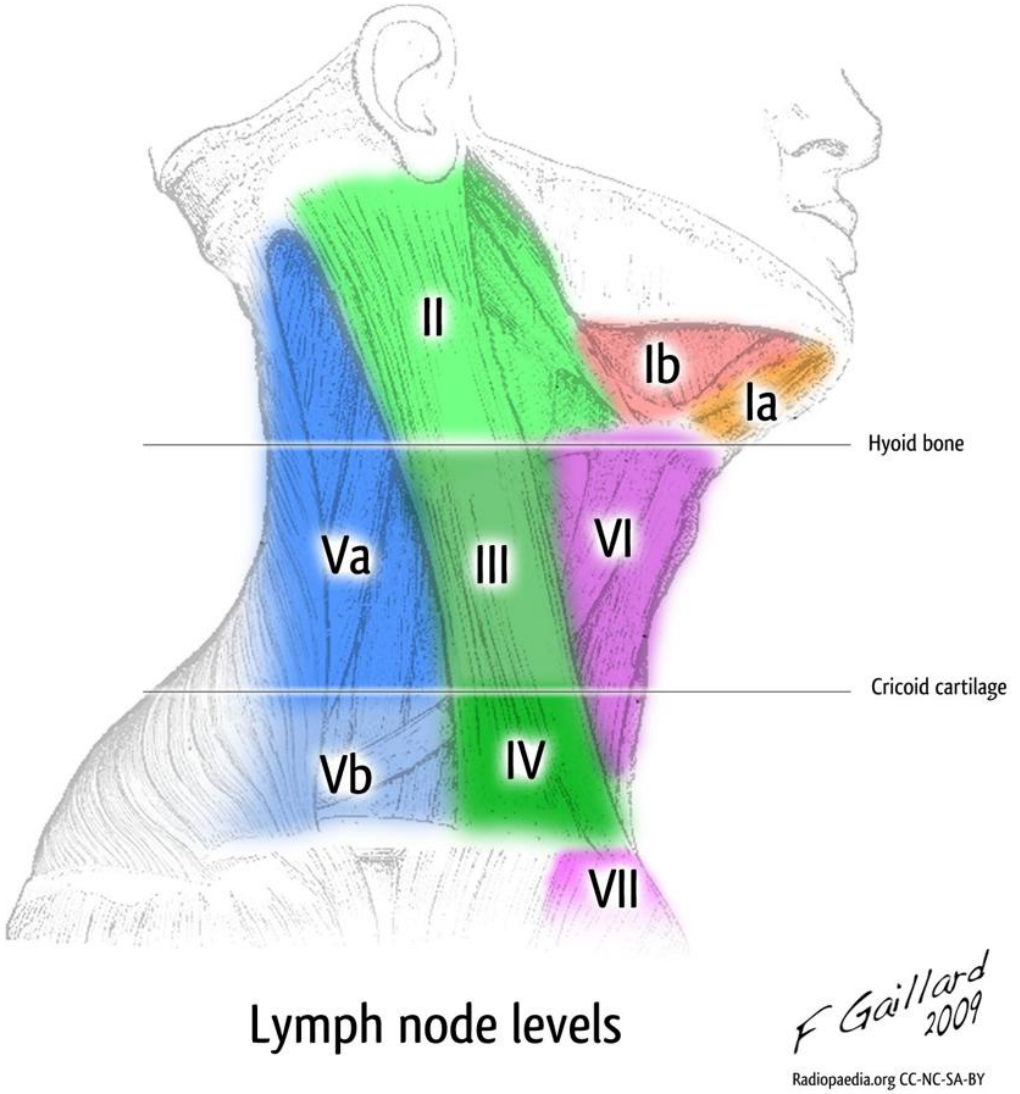



Source: Up to Date




Courtesy of A.Prof Frank Gaillard, Radiopaedia.org, rID: 9618

# Neck Swelling - DDX

- Congenital and acquired cysts
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  - **Acute bilateral adenitis**
  - Acute unilateral adenitis
  - Subacute unilateral/chronic adenitis
  - Subacute/chronic bilateral adenitis

# Acute Bilateral adenitis

- Acute respiratory viruses
  - Flu, adeno, corona, paraflu, entero, rhino, mpv, rsv
- Herpesviruses
  - HSV,  EBV, CMV, HHV-6
- Rarer viruses
  - Parvo, roseola, measles,  rubella, mumps, HIV
- Bacteria
  - Group A strep, *Archanobacterium*,  *Mycoplasma*, gonorrhea
- Other
  - Kawasaki Disease

# Acute Bilateral adenitis

- Almost always other symptoms
  - Rash, cough, pharyngitis etc.
  - Exception – EBV, CMV, HIV
- Rarely the predominant complaint
- Resolves spontaneously though may last 4-6 week.

# Viral adenitis

# Acute Bilateral adenitis

- Management
  - Expectant
    - “Don’t just do something, stand there”

# Neck Swelling - DDX

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  - **Acute unilateral adenitis**
  - Subacute unilateral/chronic adenitis
  - Subacute/chronic bilateral adenitis

# Acute suppurative adenitis

- Young – infants and toddlers
- Fever –usual
- Warm, tender
- +/- fluctuant
- +/- redness

# Acute suppurative unilateral adenitis

**Common**

- Group A streptococcus
- *Staph aureus*
- anaerobes

**Rare**

- Kawasaki
- Tularemia
- Group B streptococcus
- *Pasteurella (*animal bite)
- *Yersinia pestis*
- Gram neg rods
- Anthrax

# Acute unilateral adenitis - evaluation

- Mostly physical exam
- CT or USN if abscess or  complication suspected


Se:5
OM S50.5
Im:23 +C
DFOV 14.0cm
STND/I
R
6
8
R
kV 120
mA 220
Adult Head
3.0mm
Tilt 0.0

# Acute pyogenic adenitis - treatment

- Oral
  - Amox/clav,  cephalexin, clinda, linezolid
- Intravenous
  - Vancomycin, ox/nafcillin, cefazolin, amp/sulbactam
- Serial Imaging – Ultrasound
- Drainage
  - Clear abscess
  - Time to “ripen”

# Acute pyogenic adenitis- set the stage

- Type 1
  - Improve with oral/IV antibiotics in a 2-3 days
- Type 2
  - Improve with IV antibiotics in 5-7 days
  - Full resolution in 2-3 weeks
- Type 3
  - Form abscess and need drainage

http://wholehorsevetservices.com

# Neck Swelling - DDX

- Congenital and acquired cysts
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  - Acute bilateral adenitis
  - Acute unilateral adenitis
  - **Subacute/chronic bilateral adenitis**
  - Subacute/Chronic unilateral adenitis

# Subacute/chronic bilateral lymphadenitis

**Common**

- Epstein-Barr / mono
- CMV

**Not so common**

- HIV
- Toxoplasma
- M. tuberculosis
- Syphilis
- Brucellosis
- Histoplasma
- Malignancy
- Autoimmune disease

# Evaluation of bilateral cervical lymphadenopathy

**History /PE**

- Ill contacts
- Sexual history
- Cat exposure
- Diet history
- Travel / geography
- Raw Milk / dairy
- Family history
- Other adenopathy
- Organomegally

# Evaluation of bilateral cervical lymphadenopathy

**Laboratory - TITRATE**

- None .....or
- EBV serology panel
- EBV serum PCR
- CMV serology / serum PCR
- HIV antibody screen
- Toxoplasma antibody
- Tuberculin skin test or IGRA
- VDRL / RPR
- Histoplasma serology /urine Antigen
- CBC and differential
- ESR
- ANA
- Chest xray
- Other Imaging?

# Neck Swelling - DDX

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  - Acute unilateral adenitis
  - Subacute/chronic bilateral adenitis
  - Subacute/Chronic unilateral adenitis

# Subacute/chronic unilateral adenitis

**Fairly Common**

- Non-tuberculous mycobacteria (NTM)
- Cat Scratch Disease

**Less common**

- Toxoplasma
- *M. tuberculosis*
- Actinomycosis
- Nocardia
- Sporotrichosis
- Kikuchi Disease

# Non-tuberculous cervical adenitis

- Source – water, soil, food, animals
- Microbiology
  - *M. avium* complex (MAC)
  - *M. haemophilum*
  - Others – rare

# Non-tuberculous cervical adenitis

- Age 1-5 years
- Submandibular nodes most common(87%)
- Unilateral (99%)
- Non-tender
- Fluctuance - late
- Slowly enlarging (over weeks)
- Fever rare
- Skin: pink>>>violaceous and thin>>parchment like>>>sinus


1/4 x

# Suspected NTM cervical adenitis

- Evaluation may be made on history and physical alone
- Lack of response to beta-lactams/clinda
- Imaging, if done:
  - USN – decreased echogenicity, liquifaction, matted nodes, soft tissue edema
  - CT- central hypodensity, lack of fat stranding
- TST (PPD)
  - 5-15 mm variable
  - IGRA- negative

# NTM cervical adenitis-management

- Expectant management
  - Resolve in 8-12 months with minimal scar
- Complete surgical excision
  - Risk to facial nerve, other structures
  - Send mycobacterial smear/cultures
  - Histopathology including CSD stain
  - Fungal smear and culture
  - PCR
  - Scar
- Antimicrobial therapy
  - Doesn’t help (much)!

# NTM cervical adenitis caveats

- It's not cancer, really.
- Do not incise!  (to rule out cancer)
- Do not aspirate
- Less is more!
- Antibiotics don't work well
  - Rifabutin /clarithromycin when excision not feasible

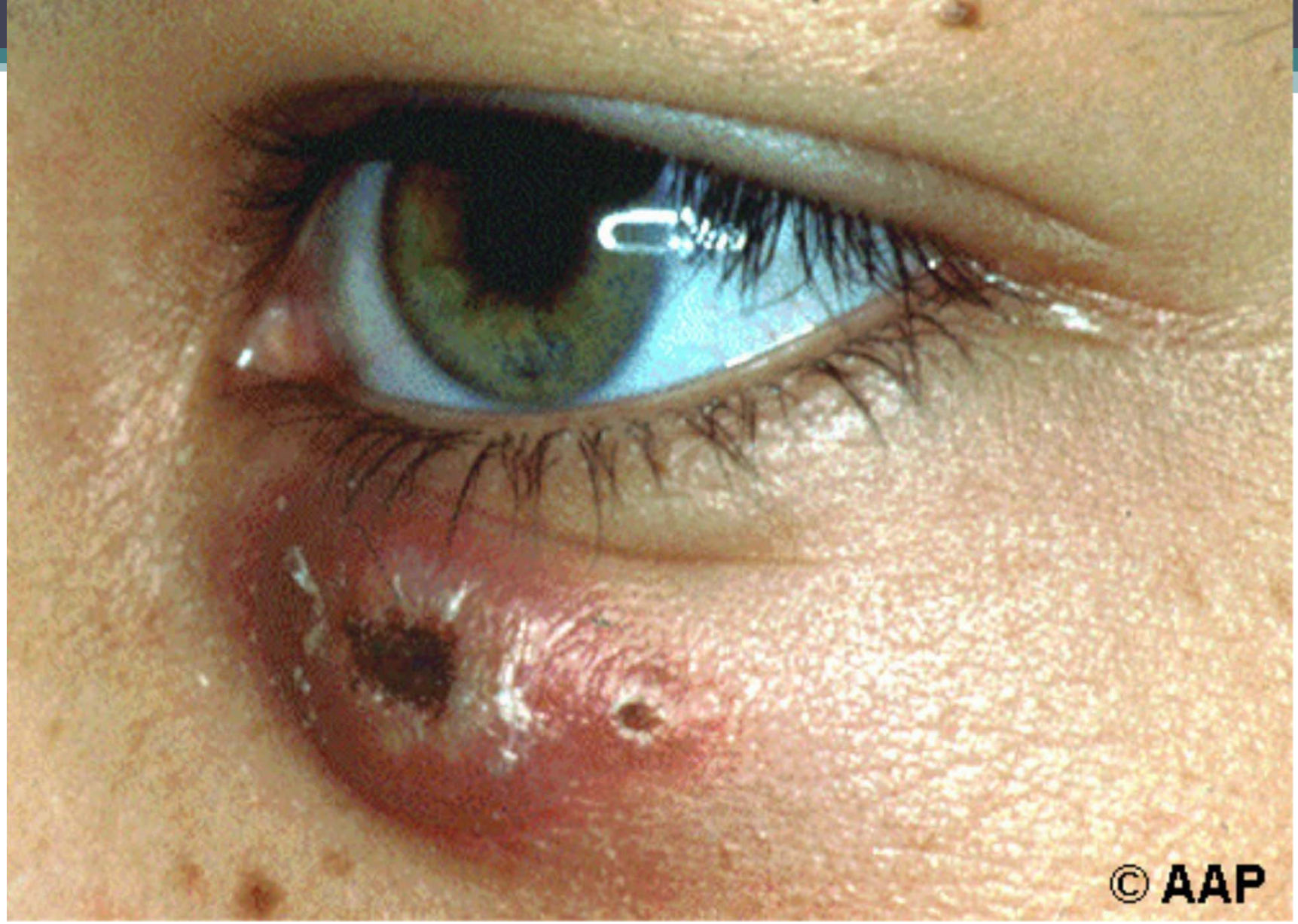
Author: Scrofula of the neck. From: Bramwell, Byrom Edinburgh, Constable, 1893 Atlas of Clinical Medicine. Source: National Library of Medicine

# Cat scratch Disease

- Cause – *Bartonella henselae*
- Source – cats – bite or scratch
  - Causes intraerythrocytic bacteremia in cats
  - Persists in cat for months to years
  - Kittens>>adult cats
  - Fleas may play a role

# Cat scratch Disease - manifestations

- Cutaneous lesion at site of inoculation ( not always)
- 3-10 days after bite/scratch
- Vesicle or papule or pustule
- Regional node enlargement ( draining site)
  - Tender
  - Overlying erythema
  - Solitary ( 85%)
  - Resolves 1-4 months
- Fever
- Conjunctivitis ( head inoculation)




2015 AAP Redbook

# Cat scratch Disease – Dx and Tx

## Diagnosis

- Serology
  - IgG and M
  - False positives and negatives
  - Acute and convalescent (2 weeks)
- Culture and PCR – on tissue
- Histopathology
  - Warthin Starry stain

## Treatment

- None or
- Azithromycin x 5d
- Clarithromycin 7-10 d
- TMP/SMX 7-10 days
- Surgery usually not indicated

Stewie and Zoey

# Summary: Neck nodes- when to worry

- Growing over weeks – months
- Other adenopathy
  - Supraclavicular
  - Axillary
  - Inguinal
- Hepato or splenomegaly
- Systemic symptoms- weight loss, night sweats, lassitude
- Hard, non – mobile, non-tender

Image:wikipedia