



Respiratory Tract Infections

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*The most common pediatric conditions

Common Cold (Coryza)

- Nasal discharge
- Cough
- Fever
- Less than 1 week duration
- Rhinovirus, corona virus, RSV

Pharyngitis

- Sore throat, fever, cough
- Pharynx is inflamed, lymph nodes enlarged.
- Usually viral etiology, adenovirus, rhinovirus
- In older children group A beta hemolytic streptococcus.

* Be careful → The pharynx differs from the tonsils

Tonsillitis

- A form of pharyngitis, with involvement of the tonsils.
- Common pathogens are group A hemolytic streptococcus
- Viruses like Epstein Barr virus (infectious mononucleosis, ~~not~~ 4 years old)
- If bacterial infection diagnosed treatment in penicillin or erythromycin if patient allergic
- Treatment does not prevent post streptococcal nephritis.

* Group A beta hemolytic strep is very sensitive to penicillin

* Pharyngitis and tonsillitis are usually viral
but they can also be bacterial → if bacterial

بني هاي مش بويته، بيجل
complications كيتي (موجودين بصفحة ٥) ← وعشان هيك اذا طلعت strep لازم تتعالج
و عشان هيك مهم نميز اذا كانت viral او strep

Streptococcal Pharyngitis

- Streptococcal tonsillitis characterized by erythema and swelling of the tonsils, exudate, petechia on the palate, tender anterior cervical lymph nodes

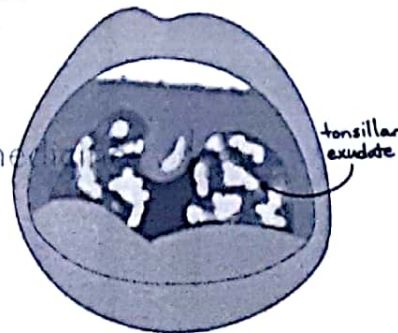
- Can be associated with sandpaper rash.

- Diagnosed with Rapid Antigen Detection Test, and throat culture, sensitivity 63-96, specificity 90-100%

← هاد مش موجود عنا بالقطاع العام، موجود بالخاص
فاحنا عادة اللي منعمله هو انه منطلب Blood culture

Strep Throat (Streptococcal Pharyngitis)

Major Criteria	Add 1 point for each:	
	Minor Criteria	
	1. Fever (subjective or $>38^{\circ}\text{C}$)	
	2. Cough	
	3. Tender lymphadenopathy (anterior cervical)	
	4. Tonsillar exudate	
	5. Age	
	3-14 yrs: Add 1 point	
	15-44 yrs: 0	
	45+ yrs: Subtract 1 point	



Total score

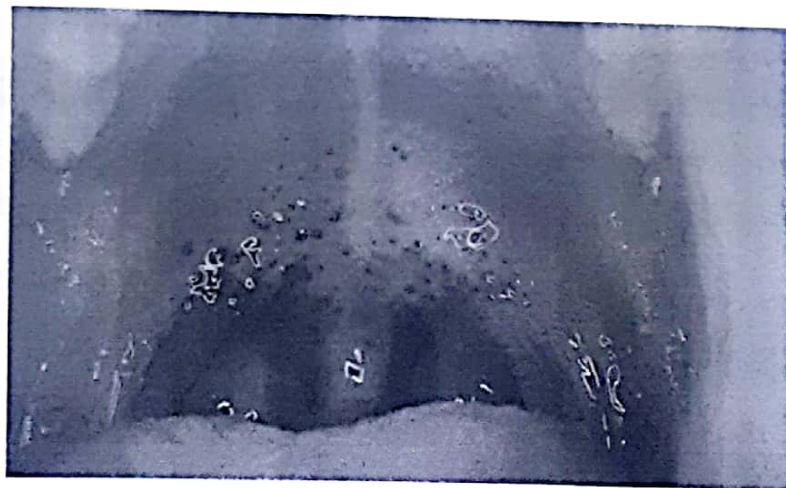
- 0-1 Unlikely strep pharyngitis
- 2+ Throat swab & culture or rapid antigen test
- 4+ Lab confirmation +/- empiric antibiotics

← احنا منفيو
بين ال viral و
ال bacterial عن
طريق
Blood culture
بني عشان الناس
تساعد حالي
تقيم بينهم بالعيادة
clinically
عملوا criteria
(في غير هاي كلان)



Tonsillar exudate

* من مخرجات الفحص



Palatal petichiae



(very common)
Sand paper rash
↳ it is felt more than it is seen

Complications

- complications of strep throat:
- * rheumatic fever, → في معاضة كاملة عليه
- glomerulonephritis (kidney inflammation),
- chorea,
- bacteremia (bloodstream infection) and rarely streptococcal shock syndrome
- in some severe forms of pharyngitis (e.g., severe mononucleosis-pharyngitis)
- airway obstruction may occur
- peritonsillar abscess, retropharyngeal abscess

* Once a pt is diagnosed w/ strep infx (+ve culture) → usually we have 10 days to treat to prevent the complications

بیس جنوری مکمل انکوریس کامل

sinuses → are hollow cavities or openings in the skull

faulty drainage أو بسبب infx *

Sinusitis

- Infection of the sinuses (inflammation or infx swelling of the tissue lining the sinuses)
- Maxillary, Ethmoidal, Sphenoidal, Frontal → develops at 7-8 years of age
- Pathophysiology: Swelling --- inflammation--- infection. * ممكن الواحد يبدأ دشح بعدين يفسد عنده sinus infx → Most common

هذا بهر كل
ممكن إذا الطفل
مريض

- Predisposing factors: Cystic Fibrosis, allergic rhinitis, immunodeficiencies, structural abnormalities → which may interfere w/ draining

→ Pts who have recurrent or chronic sinusitis → think of these predisposing factors

* Sinusitis is usually bacterial

Sinusitis

- Headache
- Fever
- Nasal discharge
- Cough: night time and early morning cough

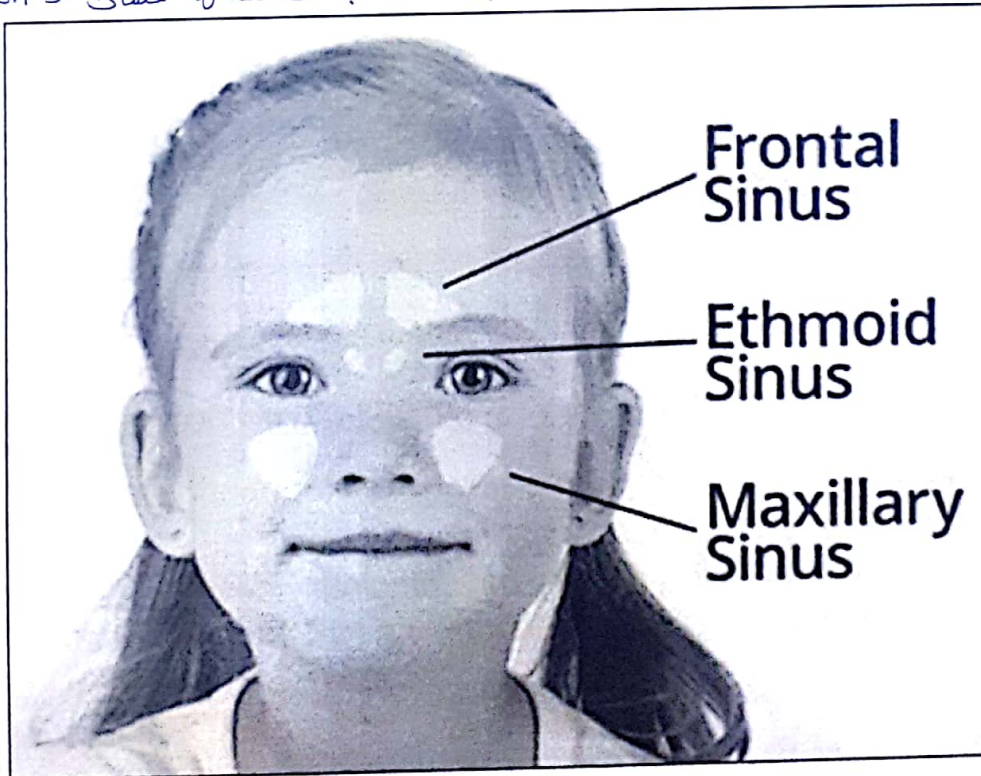
له بصحى الواحد يتكون ال secretions
متجمعة مكان

Sinusitis

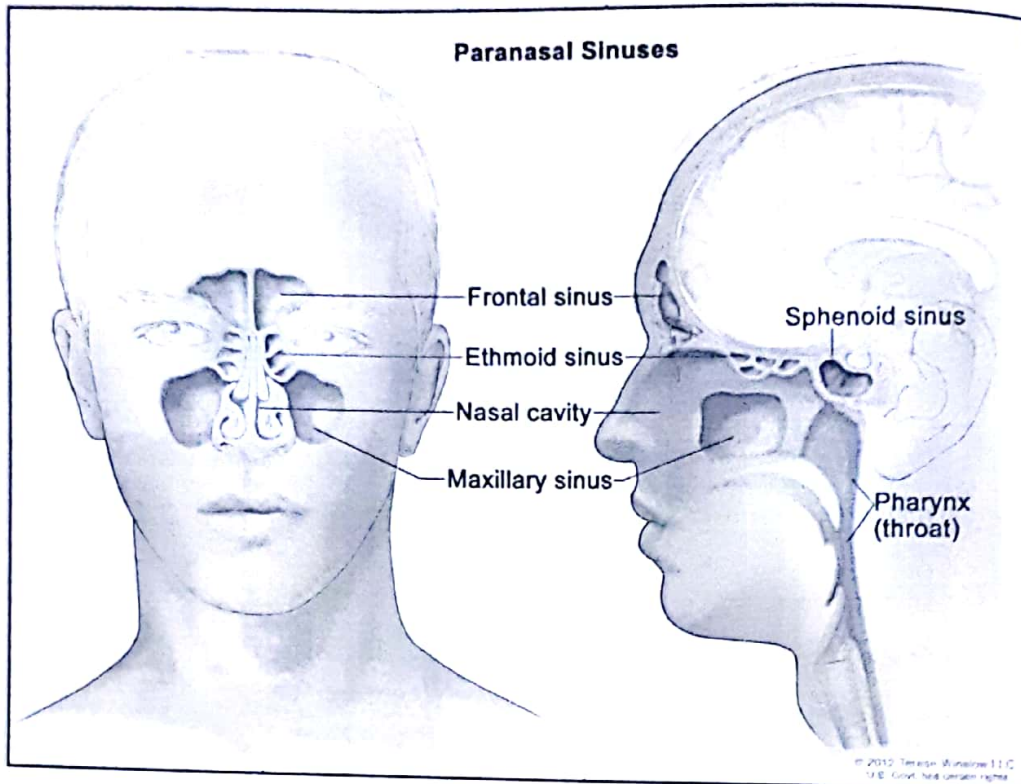
usually bacterial cause
بسي احنا مغاول ما
نغطي Abx عالطالعة
والتأزلة من غير سبب
فحشان هيك في diagnostic criteria

- Diagnostic criteria AAP guidelines 2014
- URI Symptoms of 10 days duration → يعني واحد موشع اله 10 أيام ما بعطيه
بسي واحد موشع اله أسبوعين عالغلب صار عنده sinusitis (بعطيه)
- Or worsening URI symptoms after initial improvement
- Or Severe onset of ~~purple~~ ^{Purulent (Pus)} discharge and high grade fever of 3 days duration
- No imaging necessary في عادة
- Organisms, streptococcus pneumonia, staph aureus, non typable Hemophilus influenza, moraxella catarrhalis
- Physical findings: nasal discharge, post nasal drip, facial tenderness

إذا بدنا نعمل imaging موشع من زمان؟ زمان كنا نعمل x-rays
بسي ما بينوا كلهم (بسي ال maxillary بينوا موشع الباقي من كتر)
* الطريقة الأحسن للتقوير هي ال CT بس ما منجب نستخدمها عشان ال radiation



Just in all direct in the direct through a narrow airway open can do This process obstructs Stridor



- The ethmoid and maxillary sinuses form in the 3rd to 4th gestational month.
- The sphenoid sinuses are pneumatized by 5 years of age
- The frontal sinuses do not appear until the 7th to 8th year of life and are not completely developed until adolescence

Just for you → Pathophysiology of Stridor: Gases produce pressure equally in all directions; however, when a gas moves in a linear direction, it produces pressure in the linear vector forward vector and ↓ the lateral pressure. When air passes through a narrowed flexible airway in a child, the lateral pressure that holds the airway open can drop precipitously (the Bernoulli principle) and cause the tube to close. This process obstructs airflow and produces stridor.

Stridor may result from lesions involving the CVS, the CVS, GIT, or the respiratory tract.

Croup

• Laryngotracheobronchitis بيجي الطفل مجروح صوته

• Mostly viral

→ Type 3

• Parainfluenza is the most common organism, but also RSV, Rhinovirus, influenza

• Pathophysiology: swelling of the subglottic space secondary to the viral infection

→ In children the narrowest part of the airway is the → Subglottis

→ In adults it is the → Glottis (ie vocal cords)

* الذي يفسر انه يفسر في swelling بمنطقة ال subglottis و هذا بسبب انه يفسر في narrowing بال airway ← حاد القيق يجعل زيادة بال resistance (شوية narrowing يتوقع ال resistance كتر) و لهذا السبب منفسر صوت Stridor

Stridor: it is an inspiratory sound (usually), a high-pitched sound caused by turbulent flow of air through a partially obstructed airway

Croup

* واحد عمرو تحت ال 6 أشهر ← بفي بأشياء ثانية

• age 6m-3 years most common, can happen up to 6 years → بعد ال 6 سنين يرضو ببلبي أفكي بأشياء ثانية

• Preceded by upper respiratory tract

* Harsh barking cough, worse at night

• Stridor, non toxic looking → not very ill-looking (because it is a viral infx)

• Management: keep child comfortable, management according to severity

Extra Note

Stridor is heard when there is a partial obstruction of the airway at the level of the supraglottis, glottis, subglottis or trachea.

* An inspiratory stridor is suggestive of a laryngeal obstruction

* Expiratory → tracheobronchial obstruction

* Biphasec → Subglottic or Glottic anomaly

Croup

- Moderate/Severe: Stridor at rest AND
- Moderate intercostal retractions
- Tachypnea
- Agitation/restlessness/tired appearing

The Westley Score: Classification of croup severity

Feature	Number of points assigned for this feature					
	0	1	2	3	4	5
Chest wall retraction	None	Mild	Moderate	Severe		
Stridor	None	With agitation	At rest			
Cyanosis	None				With agitation	At rest
Level of consciousness	Normal					Disoriented
Air entry	Normal	Decreased	Markedly decreased			

Croup

* Management according to severity *

→ anti-inflammatory

• Mild----- Steroids

• Dexamethazone 0.5mg/kg IM (given once)

↳ It's effect lasts for 3 days, but usually takes 4-6 hrs to start working

• Moderate/Severe

• Dexamethazone 0.5mg/kg IM

• Racemic epinephrine /adrenaline → given as an inhaler/nebulizer

↳ An α and β agonist

Arteriolar constrict

↳ Bronchodilation

of BVs (for edema)

* لو اعلى Salbutamol/Albuterol ما رح يفتحه كتر لو احاد عنو croup, كانه هاد بس B agonist

← ما مشغول كتر

Epiglottitis

• Infection of the Epiglottitis, potentially life threatening

→ not very seen now due to vaccination

• Most common organism is Hemophilus influenza, now streptococcus and other species.

• Most common age 2-6years

• Sudden onset of symptoms, high fever, anxious

• Patient toxic looking, drooling, tripod position, leaning forward

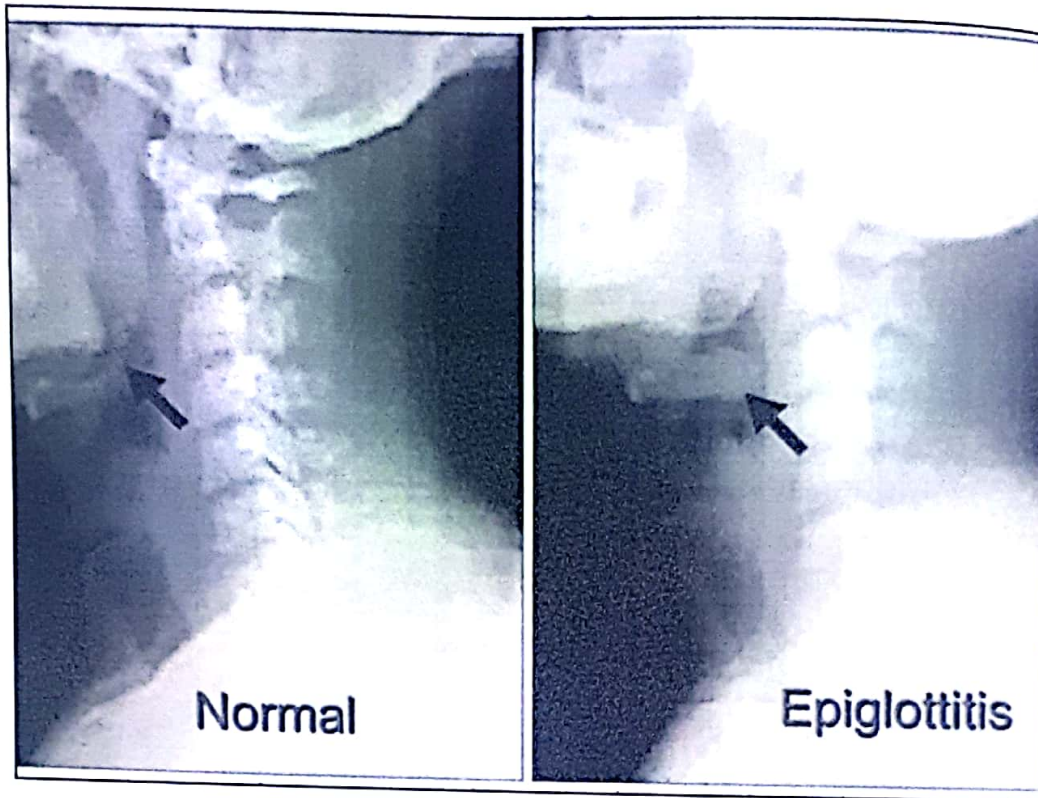
• Do not examine. if sever obstruction send to OR for intubation → to secure airway

• Incidence decreases significantly after Hib vaccination

• IV antibiotics after airway has been secured

← يمكن يسكن
ذوده و يموت!

Bronch
(infiltrate 3)

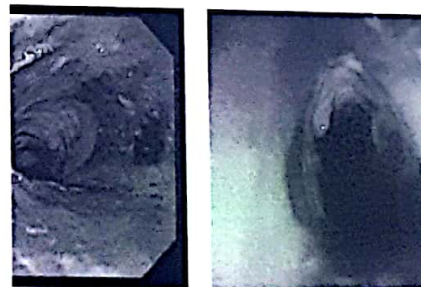


← يصبو ما مشوفها
كثير (بس أكو من
ال epiglottitis)

Tracheitis

- Most likely bacterial in origin
- Staph aureus most common organism
- Sick, toxic looking patient
- Stridor
- Treatment : Admiission, I V antibiotics.

Tracheitis



ما حكيها عننا لأنه ما في كيت حمار
 هي بتيس أكثر بال teenagers و الكبار
 له بيس عندهم prolonged cough (ما يكون في infiltrate)
 و عادة يكون viral

Bronchiolitis

- Very common, 3% of all US infants are hospitalized with bronchiolitis
- Respiratory Syncytial Virus is main pathogen, but also metapneumovirus, rhinovirus
- ^{from birth} Up until 2-3 years of age → هاد العكي بتعلق بجمع الطفل
- Pathophysiology: viral infection of the lower respiratory tract, with inflammation, edema, swelling, increased mucus secretion leading to airway obstruction ش

Bronchiolitis

- Signs and symptoms
 - dyspnea/respiratory distress
- Nasal discharge, cough, fever, shortness of breath, cyanosis, apnea in infants (apnea may precede respiratory symptoms)
- Chest exam wheezing, crackles, retractions, cyanosis → if severe
 يجوا كيت بالشتا →
- Infection has a seasonal pattern, depending on the patients location, in the northern US it is Nov to April
 here in Jordan from december to march or april (in winter)

* The fever is usually low-grade fever (because it is a viral infx)

Note However, some viruses could cause high-grade fever → such as Adenovirus

* الناس اللي ساكنين بالمناطق الاستوائية بيجي عندهم Sporadic Cases

Bronchiolitis

- Diagnosis

حسب ال guidelines

- Viral swab: not indicated for uncomplicated cases. (rapid immunofluorescent)

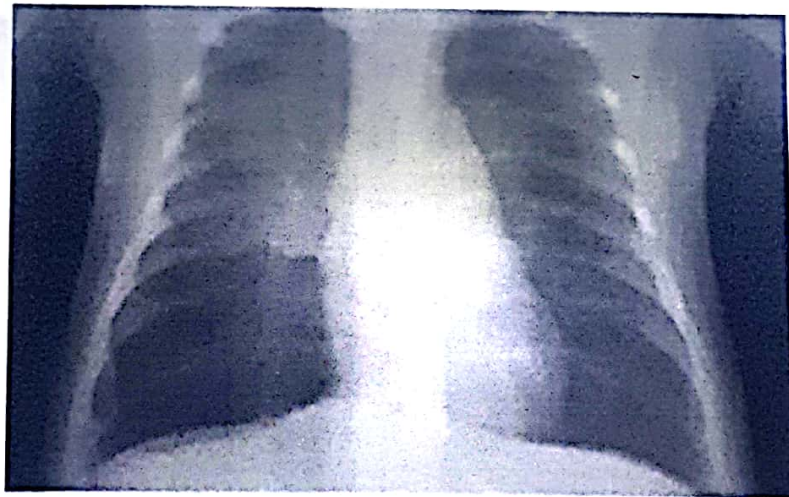
→ WBCs are not very high because it is viral

- CBC and electrolytes normal

→ It can also be normal

- CXR : Hyperinflation, perihilar infiltrates, atelectasis.....but not always routinely indicated

Note : Children normally have more lymphocytes than neutrophils until age 4 then they become like adults (the neutrophils become more than lymphocytes)



Broncholitis

- Clinical course is worsening first 48-72h, then a plateau for 2-3 days followed by improvement, symptoms can last 3 weeks
- High risk patients are premature babies, babies with congenital heart disease, Cystic fibrosis or chronic lung disease
- About 25-50% of patients with Bronchiolitis develop recurrent wheezing
 - ↳ Pts who get bronchiolitis as children have an ↑ risk of developing asthma at an older age (The reason is not known)

هاد الحكي برهنا
عنه اذا اجا مويق
بلش معه المرض
مبارح يكون متوقع
انه ممكن يوزيد
بس اذا كان له
اسبوع مثلاً فإنه
يكون خلص كل
ماله بخف
(مبارح يهر أسوء)

Bronchiolitis

Management

- Treatment
 - Supportive → because it's viral
 - Oxygen, cpap, intubation
 - IV fluid if unable to take PO or too tachypnic (respiratory rate above 60b/min)
 - Superinfection with bacteria is very rare
 - Bronchodilators Albuterol and epinephrine may help, no place for scheduled treatments
 - Steroids are not recommended in previously healthy children
 - Hypertonic saline not routinely recommended

Respiratory

Nutritional

Respiratory

Nutritional

بجتلل عن
اد croup، كل
واحد ال pathophysiology
اله غير.

Note Albuterol ≡ Salbutamol

Bronchiolitis

- Prophylaxis

(Antibody injx)

- Palivisumab, monoclonal RSV antibody, has decreased admission by 50% in high risk infants, given as monthly ~~infections~~ injections

TABLE 2.

Guidelines for Administration of Palivizumab

Infants eligible for palivizumab in the 1st year of life

All infants < 29 weeks gestational age at birth

Infants < 32 weeks gestational age with chronic lung disease of prematurity, defined as > 21% oxygen for at least 28 days after birth

Infant, with hemodynamically significant cardiac disease

Infants eligible for palivizumab until 2nd year of life

Infants on supplemental oxygen for at least first 28 days of life and continuing to require medical intervention such as supplemental oxygen, steroid, and/or diuretic therapy

Infants in whom palivizumab should be considered

Infants with pulmonary abnormality

Infants with neuromuscular disability with inability to clear secretions in lower airways

Children < 2 years of age who will be severely immunocompromised during respiratory syncytial virus season

Infants not eligible for palivizumab

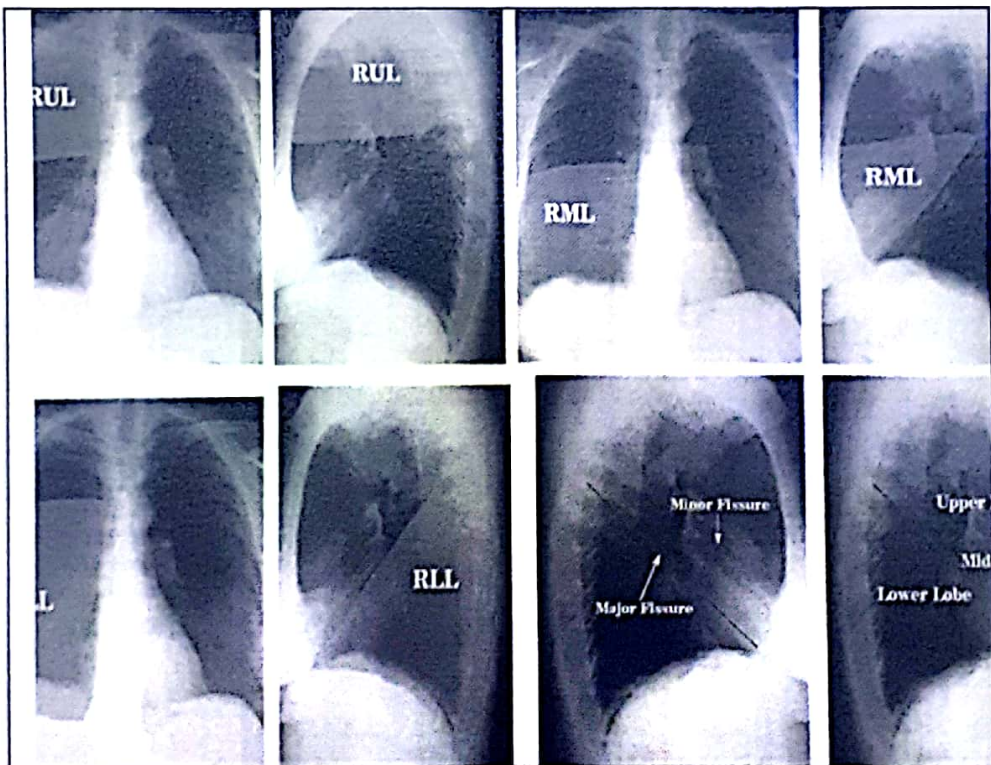
Infants ≥ 29 weeks and otherwise healthy

Any infant who experiences breakthrough respiratory syncytial virus infection despite vaccination

Adapted from Lieberthal and Meissner¹¹

Pneumonia

- Inflammation in the alveolar space
 - Can be bacterial or viral
- النسبة تقريبا نفس بعض





Pneumonia

- Etiology varies by community, in one study 60% were bacterial, 45% viral
 ↳ Usually bacterial etiology
- **Lobar pneumonia**, bronchopneumonia and interstitial pneumonia
 ↳ infiltrates in the whole lung
 ↳ atypical / viral etiology mostly

** THIS TABLE IS VERY IMPORTANT*

Etiology

AGE GROUP	FREQUENT PATHOGENS (IN ORDER OF FREQUENCY)
Neonates (<3 wk)	Group B streptococcus, Escherichia coli, other gram-negative bacilli, Streptococcus pneumoniae, Haemophilus influenzae (type b, * nontypable)
3 wk-3 mo	Respiratory syncytial virus, other respiratory viruses (parainfluenza viruses, influenza viruses, adenovirus), S. pneumoniae, H. influenzae (type b, * nontypable); if patient is afebrile, consider Chlamydia trachomatis
4 mo-4 yr	Respiratory syncytial virus, other respiratory viruses (parainfluenza viruses, influenza viruses, adenovirus), S. pneumoniae, H. influenzae (type b, * nontypable), Mycoplasma pneumoniae, group A streptococcus
≥5 yr	M. pneumoniae, S. pneumoniae, Chlamydia pneumoniae, H. influenzae (type b, * nontypable), influenza viruses, adenovirus, other respiratory viruses, Legionella pneumophila

** Pneumonia can come at any age*

Pneumonia

- Clinical features
 - Cough, fever, shortness of breath
 - Tachypnea and retractions, grunting
 - Decreases air entry or crackles over affected lobe, or may have normal breath sounds

Pneumonia

- Diagnosis
 - Diagnosis is mainly clinical
 - if bacterial
 - CBC may show elevated WBC's, left side shift.
 - Atypical lymphocytes may be seen in viral infections
 - Blood culture only in hospitalized patients
 - for strep pneumonia, blood culture may be +ve
 - CRP elevated in severe disease

Pneumonia

- Postero-anterior
- CXR PA and lateral
- Lobar infiltrate more likely bacterial
- Perihilar scattered infiltrates with hyperinflation and adenopathy most likely viral

Pneumonia

- Treatment

- Oxygen
- IV fluids if unable to do PO feeds
- Antibiotics vary by age, severity
- Newborns ampicillin gentamicin or ceftazidime
- Older children, ampicillin or ampicillin clavulanic acid, in severe cases third generation cephalosporins
- If older than 5 and mycoplasma suspected macrolides can be used
- Always check latest infectious disease guidelines
- If patient is toxic looking add vancomycin

resistance ← ملاحظة ← عن البادون في عن بشكل عام في IDSA 2011
vancomycin ال فمستقيم

Pneumonia

- Influenza pneumonia (viruses)
- Zanamivir (neuraminidase inhibitors)
- Second line is oseltamivir plus rimantidine

Pneumonia

- Chest physiotherapy has no role

Pneumonia

- Complication
- Necrosis
- Abscess formation
- Pneumatocele
- * • Effusions parapneumonic → straw color
↓
* • Empyema

س پانی ←

Pertussis

السعال الديكي

- Pertussis is very common
- In general if cough lasts more than 3 wks (and it isn't asthma) → suspect pertussis

- Bordetella pertussis or parapertussis
- Signs and symptoms
 - 3 stages
 - Catarrhal (URI like symptoms)
 - Paroxysmal (paroxysms of intense cough)
 - Convalescent (Chronic cough)

→ Not hearing a "whoop" in the cough does not exclude pertussis

* The most important thing is → Paroxysmal Cough.

٢٣ * هو مشكلة للصغار أكثر مما هو يجعل مشكلة للكبار، الصغار ممكن تستلهم ال cough و ما
يعرفوا يطلقوا منها ← يدخلوا 1° and 2° apnea (Deadly!)

بإثبات التشخيص يكون
clinical (ما عدا culture
و PCR)
بشيء ممكن بعض المختبرات
تطلع ال titre

Pertussis

- Diagnosis
- PCR nasopharyngeal swab
- Culture of nasopharyngeal swab
- CDC recommends both test for cough >3 weeks
- WBC >10,000 lymphocytes → مش كيتي منشوفنا
هيك عالية
- PCR and culture can be negative after the first few weeks of symptoms WHY?!

Because Pertussis releases toxins that damage the cilia in the respiratory tract

بعد ما يتروج ال pertussis بي اد damage اللي عمله بفل
فالمرتين بتحسن بي يهين regeneration of cilia و هاد الحكي بدو وقت فغشان
هيك هاد التروص بطول و ال cough بتطول شوي حتى بعد ما يروح ال organism

Pertussis

- Prevention
- DTaP at 2,4,6 and 15-18 month and at 4-6 years of age
↑ acellular
- Tdap recommended for children 7-10y as as single dose at 11-18 year, and for adults and pregnant women

* مشكلة ال vaccine مع ال Pertussis انه مش effective

Pertussis

Complications

- * Pneumonia 13% from B pertussis or secondary infection
- Hypoxic encephalopathy 1%
- Otitis media
- Hernia
- Seizures
- Cerebral hemorrhage

Pertussis

• Management

- Antibiotics to hasten irradiation of organism and prevent spread → *دس لازم يكمل ال ٥ أيام عشان*
isolation *دبطل ينقل ، فممنحطهم بالا*
- Erythromycin, clarithromycin, azithromycin

* الأدوية منعطرا مش عشان يتحسن / منعطرا عشان دبطل ويهدى

- It is estimated that the incidence is 50 million cases a year (very common)
- In infants < 3 month mortality is 3%
- Maternal immunity is not transferred to infants