

Case Study: An infant with severe cough

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History

- A male infant, one of dizygotic twins delivered at 36 weeks of gestation
- Admitted to a community hospital at 21 days of age with a 1-day history of cough, coryza, vomiting, cyanosis, and episodic limpness followed by spells of apnea that responded to physical stimulation

Physical Examination

- Temperature: 37.5°C
- Respiratory rate: 60/min
- Fine crackles bilaterally
- Occasional spells of cough with cyanosis
- Spells with apnea and bradycardia
- Treatment
 - Intravenous ampicillin and gentamicin
 - Oxygen supplementation

Clinical Course

- Deterioration over first 7 hours required intubation
- Transfer to Yale-New Haven Children's Hospital Pediatric ICU
- Blood gases on 100% inspired O₂
 - pH 7.25, PO₂ 73%, PCO₂ 21.6%
- White blood cell count
 - 9,800, 39% lymphocytes, 41% neutrophils
- Cultures of blood, cerebrospinal fluid, and urine- no growth

Clinical Course

- After 6 days extubated
- Continued episodes of bradycardia, thick nasopharyngeal secretions
- Chest x-ray: collapse of right upper lobe
- After 3 more days reintubated
- **Infectious Diseases Consultation Requested**

- Further history (obtained by infectious diseases fellow)
 - Mother had coryza-like symptoms with a severe protracted cough in the peripartum period

Diagnosis

- A nasopharyngeal swab was collected from the infant
 - Culture positive for *Bordetella pertussis*
 - Direct fluorescence antibody (DFA) test positive for *B. pertussis*

Treatment and Morbidity

- Erythromycin ethyl succinate
 - Patient
 - Contacts
 - Twin sister (also developed pertussis)
- The patient was intubated for 6 weeks
- Apneic spells and cough resolved after three months
- Hospitalization continued because of poor weight gain, vomiting and poor feeding
 - Hospitalized a total of 4 months

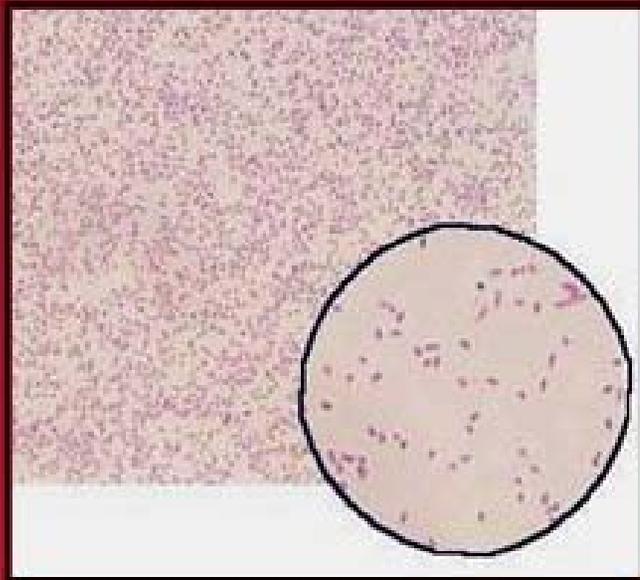


Convulsions, Seizures, Vomiting Result from Poor Oxygenation

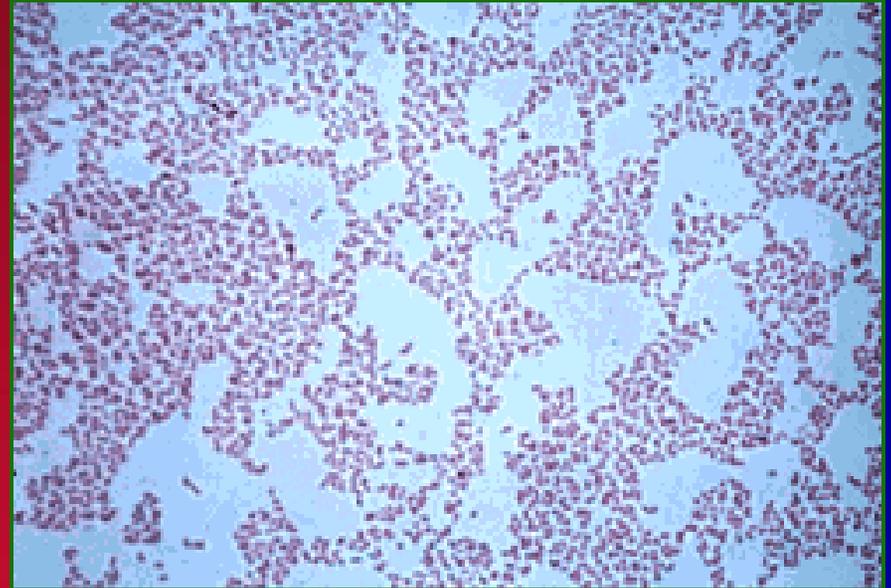


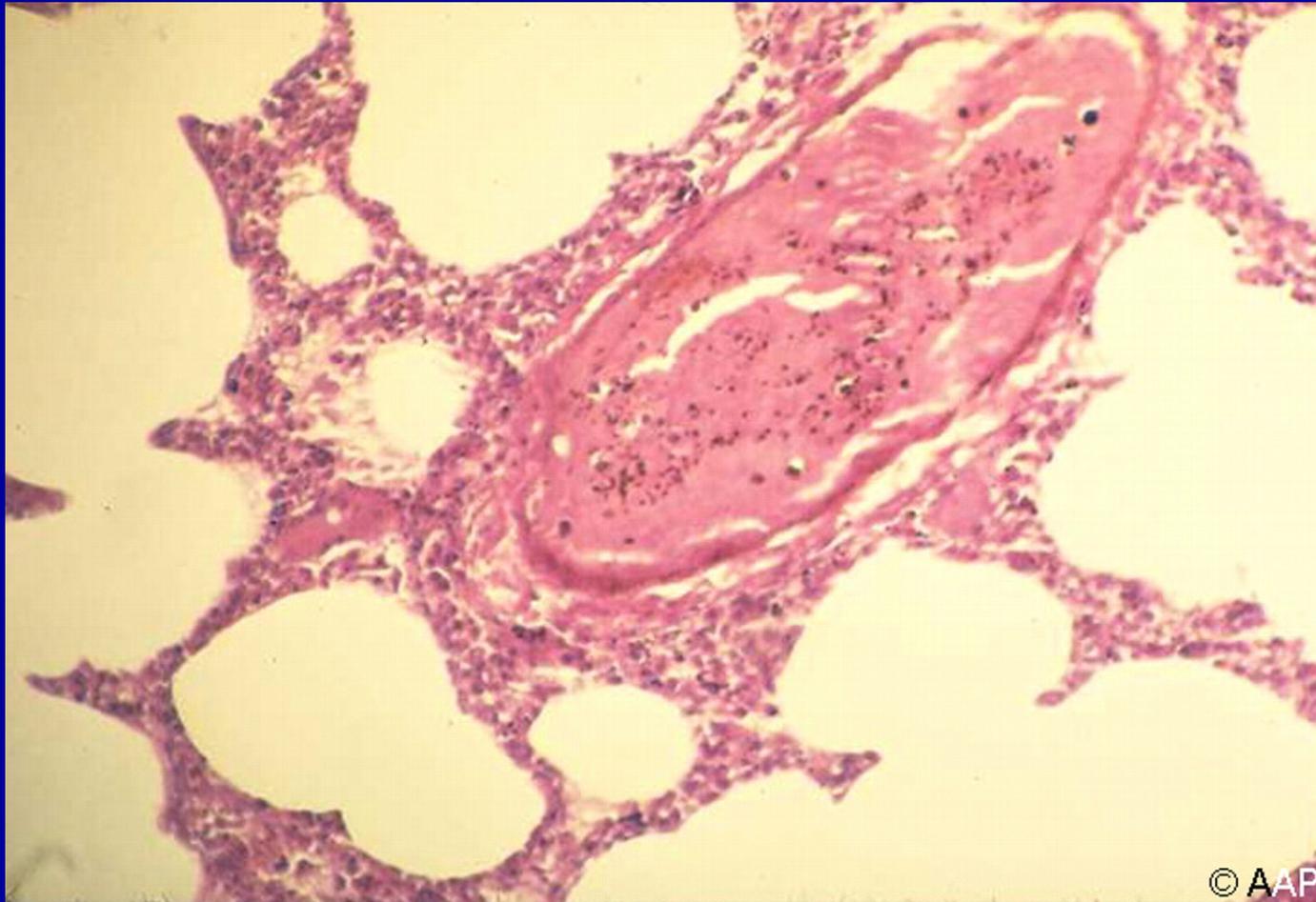
A child displaying pertussis symptoms

Gram stain morphology



Gram Stain:
Gram Negative
Bordetella sp.

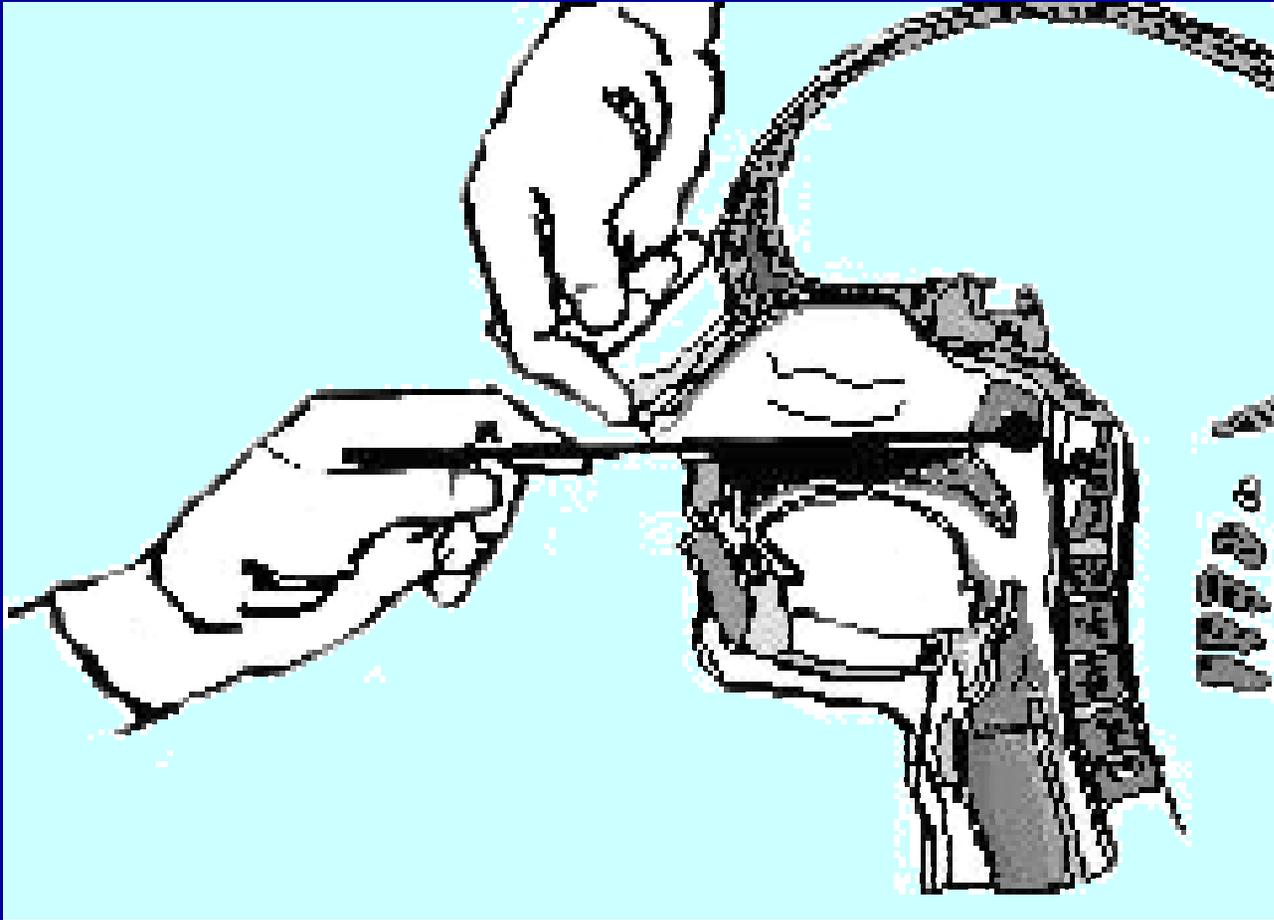




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Bronchiolar plugging and alveolar dilatation of pertussis pneumonia in an infant that died

Sample Collection



Collection of a nasopharyngeal sample from the posterior nasopharynx

Pertussis Culture



**Growth on Charcoal Agar
(Regan-Lowe medium)**



**Growth on Bordet-Gengou
(BG) Agar**

Pertussis Culture

- Remains the “gold standard” for diagnosis
- Ideally collected first few weeks after cough onset, but can be performed further out
- Requires a nasopharyngeal swab collected from the posterior nasopharynx
 - Use either a Dacron™ or calcium alginate swab
 - Samples should be immediately placed in Regan-Lowe transport media following collection

Culture Submission

- Culture is performed by various commercial entities & the Connecticut Department of Public Health Laboratory (DPHL)
 - Results typically 3–14 days from sample receipt
 - Collection kits can be preordered at no cost from DPHL at (860) 509-8501
 - Shelf life of Regan-Lowe transport media is 3 months, must be refrigerated
- DPHL runs DFA in concert with culture for quicker presumptive results
 - Results in 1–3 days
- Cost is \$31.50 for culture & DFA

Pertussis PCR

- Highly sensitive, rapid turn-around time
- Not validated among laboratories
- Several “false outbreaks” reported (Massachusetts, New Hampshire, New York, etc.)
- Best used as a presumptive assay in conjunction with culture

Pertussis Serology

- No serologic method for diagnosis of pertussis has been validated between laboratories or been approved for diagnostic use in the U.S.
- Anti PT-IgG antibodies may be most useful component of serology, but must be interpreted in light of age and vaccination status of patient

Pertussis Testing Algorithm

Duration of cough	Children (< 11 years old)	Adults (> 11 years old)
≤ 21 days	Nasopharyngeal (Culture and / or PCR)	Nasopharyngeal (Culture and / or PCR)
> 21 days	Nasopharyngeal (Culture and / or PCR)	PCR or consider serology

Pertussis reporting

- Pertussis is a rapidly reportable disease on the day of recognition or strong suspicion of disease
 - Report by telephone to the Department of Public Health (DPH) and local health department
 - Complete the PD-23 and mail to DPH and local health department
 - For more details visit:
http://www.dph.state.ct.us/BCH/infectiousdise/pdf/Vol27No1_FNLCLR.pdf