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 O$_2$
  • pH 7.25, PO$_2$ 73%, PCO$_2$ 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
A child displaying pertussis symptoms

Convulsions, Seizures, Vomiting Result from Poor Oxygenation
Gram stain morphology

Gram Stain:
Gram Negative
Bordetella sp.
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

<table>
<thead>
<tr>
<th>Duration of cough</th>
<th>Children (&lt; 11 years old)</th>
<th>Adults (&gt; 11 years old)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 21 days</td>
<td>Nasopharyngeal (Culture and / or PCR)</td>
<td>Nasopharyngeal (Culture and / or PCR)</td>
</tr>
<tr>
<td>&gt; 21 days</td>
<td>Nasopharyngeal (Culture and / or PCR)</td>
<td>PCR or consider serology</td>
</tr>
</tbody>
</table>
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/infectiousdisease/pdf/Vol27No1_FNLCLR.pdf