



## **Introduction:**

Welcome to CUGH's bi-weekly clinical case-series, "Reasoning without Resources," by Prof. Gerald Paccione of the Albert Einstein College of Medicine. These teaching cases are based on Prof. Paccione's decades of teaching experience on the medical wards of Kisoro District Hospital in Uganda. They are designed for those practicing in low resource settings, Medicine and Family Medicine residents, and senior medical students interested in clinical global health. Each case is presented in two parts. First comes a case vignette (presenting symptoms, history, basic lab and physical exam findings) along with 6-10 discussion questions that direct clinical reasoning and/or highlight diagnostic issues. Two weeks later CUGH will post detailed instructors notes for the case along with a new case vignette. For a more detailed overview to this case-series and the teaching philosophy behind it, see [Introduction to "Reasoning without Resources"](#). Comments or question may be sent to Prof. Paccione at: [gpaccion@montefiore.org](mailto:gpaccion@montefiore.org)

**Note:** If you would like to be notified when a new case is posted (along with instructor notes for the previous one), send your e-mail to Katherine Unger at [kunger@CUGH.org](mailto:kunger@CUGH.org).

## **About the Author:**

Dr. Gerald Paccione is a Professor of Clinical Medicine at the Albert Einstein College of Medicine in the Bronx, New York. His career has centered on medical education for the past 35 years – as a residency Program Director in Primary Care and Social Internal Medicine at Montefiore Hospital, and director of the Global Health Education Alliance at the school. He has served on the Boards of Directors of Doctors for Global Health, Doctors of the World USA, and the Global Health Education Consortium. Dr. Paccione spends about 3 months a year in Uganda working on the Medicine wards of Kisoro District Hospital where he draws examples for the case studies.

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## **CASE 50 – Coughing Blood III**

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A 56 year old man presents after coughing up blood for 2 days.

He works as a farmer, previously having worked seasonally in Kampala in his 20's and 30's. He has been drinking heavily "his whole life" but has never been hospitalized as an adult.

He was in his usual state of fully functional health until 5 days prior to admission when he felt weak, developed a high fever and shaking chills, vomited twice and had diarrhea (yellow, watery, 3-5 times/day). The following morning he awoke with progressively severe, left-sided chest pain without radiation that was worse with breathing. The next day (3 days prior to admission) he began producing white-yellow sputum tinged with blood, lost his appetite, and took to bed. The day prior to admission he began coughing up only blood and needed assistance to come to the hospital.

There is no history of weight loss, smoking, shortness of breath, chronic cough, prior loss of consciousness or seizures. He has not received an HIV-test.

### **Physical Exam:**

Looks ill, tired, coughing up clots of congealed blood

BP: 140/75   HR 100   R32   T 99F oral   Pulse Ox 86

Eyes: No conjunctival icterus; no pallor; Fundi: benign

Mouth: no thrush; dentition normal;

Neck: no nodes; thyroid normal; no JVP visible at 30 degrees

Lungs: left upper lobe anterior-axillary tubular sounds with crackles; otherwise clear;

Heart: PMI 5<sup>th</sup> ICS, MCL; S1, S2 normal, no murmurs, rubs, gallups

Abdomen: liver span 13 cm, 3 cm below the costal margin, non-tender, no splenomegaly or masses;

Neurologic: normal cranial nerves, motor, sensory, cerebellum, gait

**1. What is the “*frame*” in this case (i.e. the key clinical features from the history and physical that the final diagnosis must be consistent with)?**

- 5 days of progressive symptoms
- left pleuritic pain
- fever, chills, vomiting, R32
- blood streaked sputum initially, now pure blood
- heavy ETOH
- upper lobe tubular breath sounds

**2. What is the clinical significance of the social-demographic context of the patient’s illness, and the following features of his history and physical exam?**

- **Pleuritic pain with fever, onset over hours**
- **Vomiting/diarrhea (yellow, watery, 3-5 times/day)**
- **RR 32**
- **T 99 p.o**
- **Copious bloody sputum**
- **Alcohol abuse**
- **LUL anterior-axillary tubular breath sounds**
- **axillary crackles/consolidation**
- **congealed bloody hemoptysis**
  
- *Two key social elements include:*
  - *Location in Uganda increases the likelihood of both tuberculosis and underlying HIV disease*
  - *Alcoholism increases the probability of various pulmonary infections (see below)*
  
- *Pleuritic pain with fever, onset over hours: suggests a pleural-based inflammatory process, rapidly developing and therefore probably caused by pyogenic organisms*
  
- *Vomiting/diarrhea (yellow, watery, 3-5 times/day): non-specific, without signs of invasive gastrointestinal disease (e.g. blood, mucous, tenesmus, tenderness); in this context, likely a sign of endotoxemia/cytokines induced by bacteremia/pneumonia.*
  
- *RR 32: sepsis, pneumonia, pleuritic pain; all stimulate the RR and cause a respiratory alkalosis; evolving over days, a sign of an acute process.*

- *T 99 p.o.: likely to be falsely low due to high RR (which lowers oral temperature by .5-1 degree centigrade on average). With an increased RR or suspected pneumonia, temperature should be taken rectally if documenting fever will make a difference diagnostically. Additionally, in almost all infections, fevers are intermittent. (Typhoid with progressive rising fevers is a common exception.)*
- *Copious bloody sputum: suggests a small to medium artery bleeding rather than the microcirculation which is the source of “blood-streaked sputum” from the most common cause of hemoptysis, bronchitis.*
- *Alcohol abuse: two types of “necrotizing” pneumonia, a cause of gross hemoptysis, are more common in alcoholics:
 
  - a) *necrotizing aspiration pneumonia (anaerobic +/- aerobic oral flora): is a more severe form of the common “aspiration pneumonia” – characterized by microabscesses, parenchymal necrosis and rapid progression. Its clinical presentation is the opposite of the indolent bacterial abscess, another type of anaerobic infection due to aspiration that usually presents with weeks to months of constitutional symptoms;*
  - b) *klebsiella pneumonia, an infrequent cause of community-acquired pneumonia (CAP) seen in compromised hosts (alcoholics, diabetics, etc), with upper lobe predominance.**
- *LUL anterior-axillary tubular breath sounds: “tubular” sounds imply rapid transmission of sound waves from the large airways through solid (consolidated) tissue without the dampening effect that alveolar air produces. Higher pitch waves are not filtered out and the result is a higher “tubular” sound with an I/E ratio of 1:1-1:2 (reflecting the proximal airways, rather than the distal 2:1 ratio); the anterior location is atypical for TB, which usually affects the better oxygenated posterior segment of the upper lobes or superior segment of the lower lobes. Upper lobe localization is common in both klebsiella and aspiration syndromes (but both are also more common in posterior segments).*
- *axillary crackles/consolidation: a complete lung exam requires examining the axilla bilaterally, the site of lateral lung segments and (often overlooked) sites of pneumonia;*
- *congealed bloody hemoptysis: mucoid mix of purulence and blood, “currant jelly” hemoptysis is a classic sign of klebsiella pneumonia.*

**3. What is the most likely etiology of gross hemoptysis in this patient and why?  
Why are other possibilities in the differential diagnosis less plausible?**

*The most likely etiology of gross hemoptysis in this patient is necrotizing pneumonia caused by a pyogenic organism - strongly inferred by the acuity of the presentation with fever and signs of sepsis preceding the hemoptysis.*

*The most likely specific etiologies of necrotizing PNA in this alcoholic patient are Klebsiella or a mixed aerobic/anaerobic infection from aspiration. Other etiologies include Staph aureus which usually presents after a flu-like viral syndrome, or rarely Nocardia (if he were HIV (+)). Cavitory PNA can be caused by Pneumococcus when fulminant inflammation causes thrombosis of a bronchial artery and subsequent necrosis of tissue with bleed. Although a rare complication of pneumococcal CAP, pneumococcus is the second most common etiology of cavitory pneumonia (aspiration is the first) due to its high frequency as a cause of CAP.*

*TB is always a consideration in a patient with hemoptysis in Uganda, and a pyogenic pulmonary abscess is always a possibility in a heavy drinker from anaerobic aspiration. However the acuity of the process in this patient almost rules out these chronic conditions that present insidiously.*

*Other causes of gross hemoptysis, such as lung cancer, pulmonary emboli/infarction, vasculitis, or mitral stenosis are highly unlikely given the days-long time course of presentation, lack of risk factors for PE or cancer and an exam with consolidation, no associated symptoms/signs of vasculitis, and no preceding symptoms of dyspnea.*

#### **4. What tests would you do, how would you treat, and how would you determine the success of therapy?**

- *Gram stain and AFB smears should be done. Gram stain has less than 50% sensitivity for Klebsiella or pneumococcus, particularly in the presence of gross hemoptysis, and aspiration pneumonias have mixed oral flora with gram (+) cocci that can mimic staphylococci. Thus, initial therapy should be empiric, not guided by the results of the gram stain. However, gram stains demonstrating the gram (-), encapsulated, stubby cigar-shapes of Klebsiella, the clusters of Staphylococci, or fields of gram (+) encapsulated diplococci (Pneumococcus) can increase confidence in an etiologic diagnosis and, after the patient stabilizes, can aid the selection of more focused therapy.*

*As unlikely as TB seems from the timing of this patient's presentation, AFB smears are indicated for 3 reasons: a) The history can be inaccurate especially in an alcoholic, focused only on the immediate past. b) Chronic TB can compromise the patient and invite super-infection with pyogenic organisms. c) Especially if the patient is HIV (+), TB can present more acutely.*

*An HIV test is indicated for 2 reasons: a) it might expand the differential (as mentioned above). b) Pneumonia is a risk factor for HIV, especially in Africa.*

- *Initial treatment should cover all possible etiologies of necrotizing pneumonias: Klebsiella, anaerobic aspiration, Staph and cavitory pneumococcus. The patient was started on a cephalosporin with an aminoglycoside and clindamycin. (Although the aminoglycoside can partially treat TB, the drug would be essential in treating the much more likely and acutely fatal Klebsiella, thus necessary.)*
- *In this patient, the following clinical parameters should be followed to assess success of therapy:*

- overall well-being/ appetite/ability to ambulate independently
- fever maximum (although normal on admission, 6 hrs later temperature was 102.8)
- respiratory rate
- amount of hemoptysis
- resolution of pleuritic pain
- resolution of tubular sounds/ crackles
- (– WBC, usually not available in district hospitals)

*The HIV and AFB tests were negative, and the gram stain showed mixed flora. On the above antibiotics, he began to feel significantly better by the 3<sup>rd</sup> day, regained his appetite, and had less pain. Respiratory rate slowed by day 2, and temperature returned to normal on day 5. He stopped producing bloody sputum (day 4), and was ambulating on day 5.*

### **Suggested Readings:**

- Marik PE. Aspiration pneumonitis and aspiration pneumonia. N Engl J Med 2001;  
 Bartlett JG, Gorbach SL. The triple threat of aspiration pneumonia. Chest 1975; 68:560344:665.  
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 Wen-Liang Yu, Chuang YC Clinical features, diagnosis, and treatment of Klebsiella pneumoniae  
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