



the Clinical Chemist

What Is Your Guess?

A Case of Yellow Airway Secretions and Oral Fluid

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A 52-year-old woman with a history of radioembolisation and chemotherapy for colorectal liver metastases presented with severe coughing, dyspnea, and production of yellow sputum. She was treated for pneumonia with antibiotics and corticosteroids, but coughing persisted for several weeks. During bronchoscopy, yellow airway secretions were observed. The physician recovered a fluid specimen from the oral cavity (Fig. 1) and requested laboratory analysis to determine its origin (pulmonary or gastric aspirate).

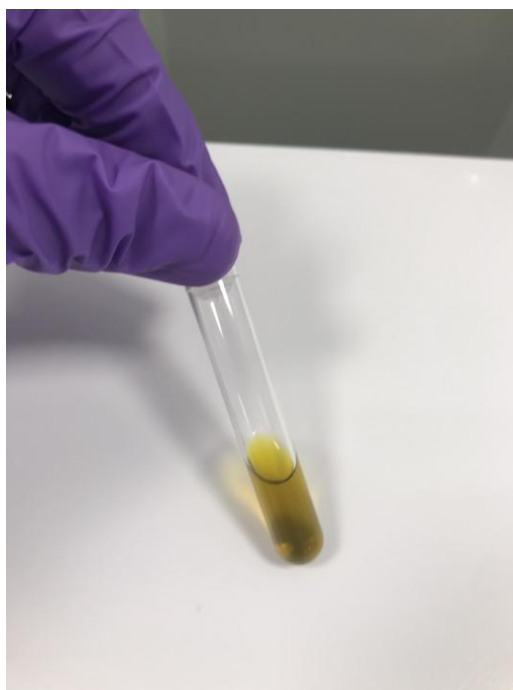


Fig. 1. Fluid from the oral cavity sent in for analysis.

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Questions

1. What laboratory tests can be used to determine whether a fluid is sputum or gastric content?
2. What substance might explain the yellow discoloration?
3. How can this substance be found in the airways?

The answers are below.

Sputum is biochemically identifiable by secretory IgA, whereas gastric fluid has a characteristically low pH (<3), although this may be somewhat higher in patients being treated with drugs which inhibit gastric acid secretion (1, 2). The pH (7.21) did not match gastric fluid, while the color and icteric index were suggestive of bilirubin. The fluid contained increased concentrations of direct bilirubin (217 $\mu\text{mol/L}$; 12.7 mg/dL) and bile acids (>180 $\mu\text{mol/L}$). Based on the laboratory results, a magnetic resonance cholangio-pancreatography was performed and a bronchobiliary fistula causing bile leakage into the right lower lobe was observed.

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References

1. Janssens PMW. Recognizing and differentiating uncommon body fluids: considerations and tools for a proper practical approach. *Clin Chim Acta* 2017;471:6–11.
2. Wiggins J, Hill SL, Stockley RA. The secretory IgA system of lung secretions in chronic obstructive bronchitis: comparison of sputum with secretions obtained during fiberoptic bronchoscopy. *Thorax* 1984;39:517–23.