

Photo Quiz

(For answer and discussion, see page 2393 in this issue [[doi:10.1128/JCM.02077-13](https://doi.org/10.1128/JCM.02077-13)].)

Mysterious Objects in a Pleural Biopsy Sample from a Patient with Recurrent Pleural Empyema

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FIG 1 Hematoxylin and eosin (H&E) staining of a pleural biopsy sample showing one of multiple egg-like objects.

A 66-year-old woman with a history of mitral valve disease was hospitalized because of pneumonia of the right lung with bilateral pleural effusions. Antibiotic therapy was initiated, and a chest tube was placed into the right pleural cavity. The patient responded well to the treatment and was discharged 3 weeks later. Echocardiography performed during hospitalization showed that mitral valve replacement was indicated, and 7 weeks later, the patient underwent minimally invasive surgery with implantation of an artificial heart valve. The operation was successful, but due to postoperative bleeding, an emergency thoracotomy with medial sternotomy became necessary. On the following day, the patient developed septic shock. An empyema of the left pleural cavity was identified as the most likely focus of infection, and pleural aspirates showed growth of *Enterobacter cloacae*, *Enterococcus avium*, *Pseudomonas aeruginosa*, and *Candida albicans*. Surgical revision including the placement of additional chest tubes and multiple lavages of the pleural cavity led to a clinical and radiological improvement. However, during the following weeks, the condition of the sternotomy wound deteriorated. A computed tomography (CT) scan showed signs of sternum osteomyelitis, and again, drainage of a distinct pleural empyema was required. Sternal swabs grew *Candida albicans* in large numbers. Because conserva-

tive therapy with fluconazole and vacuum-assisted closure systems failed to improve the osteomyelitis and the empyema could not be removed by drainage alone, rethoracotomy was performed on days 91 and 105, respectively. Biopsy specimens were obtained during the surgical removal of pleural fibrosis, and histological examination revealed several egg-like objects (Fig. 1). The patient had lived all his life in Germany and had traveled once to South Africa, 10 years previously. The differential blood count showed no eosinophilia, and IgE levels were normal. Sonography of the abdomen showed a slight hepatomegaly and normal findings for spleen and kidneys.

What could these objects be?

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Answer to Photo Quiz: Tomato Seeds in a Pleural Biopsy Sample after an Emergency Thoracotomy

(See page 2005 in this issue [[doi:10.1128/JCM.02074-13](https://doi.org/10.1128/JCM.02074-13)] for photo quiz case presentation.)

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At first glance, the objects resembled eggs of *Schistosoma haematobium*, but this tentative diagnosis was rapidly discarded, considering the size measurement of 3.7 mm. On closer inspection, the presence of a capsule and the cellular substructure suggested a biological, possibly plant, origin. On the basis of this assumption, DNA from the paraffin-embedded objects was isolated and PCRs targeting internal transcribed spacer (ITS) regions 1 and 2 of the nuclear ribosomal DNA of angiosperm plants were performed (1, 2). Both PCR products proved to be part of the ITS regions of Tomato (*Solanum lycopersicum*). The subsequent microscopic analysis by plant physiologists confirmed the PCR results and identified the objects as tomato seeds.

Parasitic infections of the lung can be caused by various protozoa and helminths. However, parasite eggs are found in the lung only in a small fraction of diseases, namely, paragonimiasis and schistosomiasis (3). Although *Schistosoma* eggs are among the largest eggs of human-pathogenic parasites, they usually do not exceed 200 μm in length, thereby clearly ruling out a parasitic origin for the objects (4).

The detection of plant seeds in the human body is rare. Most often they are found in the bronchial system after they are aspirated or in the gastrointestinal tract as so-called phytobezoars after they are ingested (5, 6). An even less frequent event is the occurrence of plant seeds inside human tissue or body cavities. These rare cases are mostly associated with trauma (e.g., subcutaneous implantation after accidents), rupture of an organ (e.g., perforation of the gastrointestinal tract), or a tumor (especially intestinal tumors), but foreign bodies may also be introduced by iatrogenic measures (e.g., after colonoscopy with accidental perforation or abdominal operations). In the microscopic picture, the unique features of plant material are the existence of cell walls, plastids, and starch which are never seen in human cells (7).

How exactly the tomato seeds entered the pleural cavity of our patient cannot be clarified unambiguously. The most likely route of inoculation is the accidental puncture of an intestinal loop by incorrect chest tube placement during the emergency thoracotomy

on postoperative day 2. The patient was discharged on day 135 after multiple debridements of the infected sternum and coverage of the defect with a muscle flap. Four months later, computed tomography (CT) controls did not show recurrence of pleural empyema.

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