

# Empyema Necessitans Caused by *Mycobacterium tuberculosis* in an Immunocompetent Patient

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## ABSTRACT

A 22-year-old man, a recent immigrant from Mexico, was admitted to a Wisconsin hospital because of a swelling of the chest wall and right axilla. Originally, it was thought to be a skin infection with *Staphylococcus aureus*. When the treatment was unsuccessful, the patient returned to the hospital and the abscesses were found to have been caused by *Mycobacterium tuberculosis*. Furthermore, there were pleural collections and it was thought that he had a manifestation called empyema necessitans, an extension of purulent pleural liquid through adjacent tissues to form an abscess on the thoracic wall.

## INTRODUCTION

With the influx of immigration to the United States, there has been an increase in patients presenting with illnesses that are less common in the general population. Tuberculosis is one of these infections and must be on the differential diagnosis in order to expedite diagnosis and management. Reporting to the local health department is necessary for optimal treatment and protection of the public health of the local community. From 1993 to 2009, immigration from Mexico has produced the largest number of cases of tuberculosis in the United States.<sup>1</sup> Between 2000 to 2006, 45.4% of all immigrants to Wisconsin came from Mexico.<sup>2</sup>

## CASE

A 22-year-old man presented to his primary care physician's office with a chief complaint of mild swelling, pain, redness, and warmth in his right axilla which he had noticed for the past few weeks. The symptoms had been worsening over that time, but he had never noticed anything similar to this in the past. He was diagnosed with hidradenitis suppurativa, and discharged home with instructions to use warm compresses along with analgesics as needed.

Two months later, the patient presented at a local urban emergency department (ED) with an increase in swelling, warmth,

pain, and redness. He was afebrile, had a normal white blood cell count, and had no signs or symptoms of infection anywhere else. He was diagnosed with an abscess, and underwent incision. A swab for culture and sensitivity was sent to the lab, and he was sent home on 2 empiric antibiotics, trimethoprim-sulfamethoxazole and cefalexin. The wound grew out *Staphylococcus aureus*, sensitive to the prescribed antibiotics.

Three months later, he presented to the same ED with a reaccumulation of the axillary abscess. But in addition, he complained of new swelling, warmth, redness, and pain to his right upper and lower chest wall. Each of the new areas of swelling were measured at about 10 cm in diameter. These were also given incision and drainage, with culture and sensitivity sent to the lab. Complete metabolic panel, complete blood count, protime, and international normalized ratio (INR) were all within normal limits. A computerized tomography (CT) scan of the abdomen and pelvis showed multiple circumscribed hypoattenuating lesions with peripheral enhancement in the right anterior chest wall, right paraspinal muscles, retroperitoneum, and right pleura likely representing abscesses (Figure 1). Upon further investigation by a second radiologist, it was determined that the chest wall lesion was directly anterior to the pleural abscesses. A connection between them was not seen directly, but could not be ruled out. He was admitted to the medical/surgical floor and placed on intravenous vancomycin. Considering immunosuppression, we obtained an HIV test which was negative. We then asked for infectious disease consultation who recommended that we send the aspirated fluid for acid-fast bacilli, which turned out positive. An interferon-gamma release assay test was also obtained, and came back positive, confirming infection with *Mycobacterium tuberculosis*. Eventually, aspiration of one of the pleural abscesses, along with gastric aspirates, also grew *M tuberculosis*.

The patient denied any medications, allergies, medical, surgical, or family history. He did admit to occasional alcohol use along with intermittent smoking of cigarettes. He denied any drug use including intravenous drugs. The patient had recently immigrated from a small village in northern Mexico and did not

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**Figure 1.** Computerized Tomography Scan of the Abdomen and Pelvis.

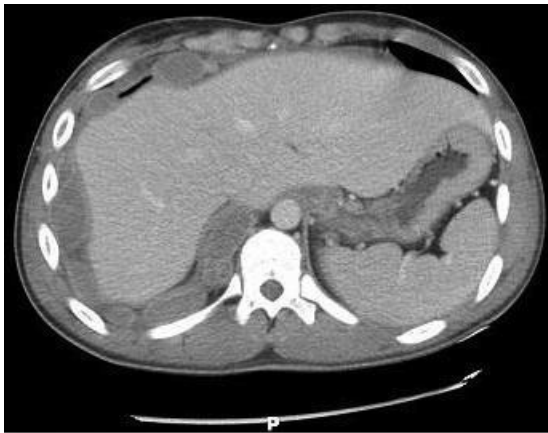
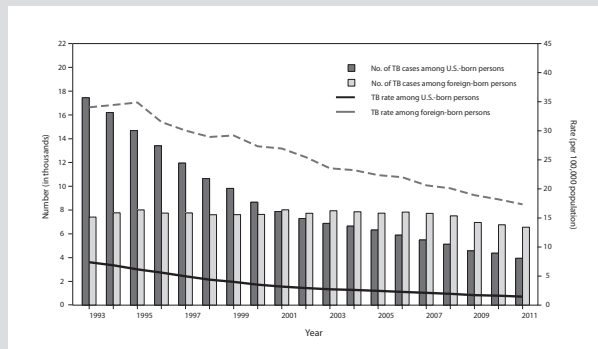


Image courtesy of Aurora Health Care, Centricity EMR

**Figure 2.** Number and Rate of Tuberculosis (TB) Cases Among U.S.-born and Foreign-born Persons, by Year Reported — United States, 1993–2011.\*



Source: National Tuberculosis Surveillance System

\* Data are updated as of February 22, 2012. Data for 2011 are provisional

know of any tuberculosis in the village or in any of his immediate family members.

When the diagnosis of tuberculosis was confirmed, he was started on rifampin 300mg by mouth daily, isoniazid 300mg by mouth daily, pyrazinamide 1500mg by mouth daily, and ethambutol 1200mg by mouth daily, along with pyridoxine 50mg by mouth daily. His skin lesions improved over his hospital stay and he was discharged to home. With the help of the county health department, his treatment was continued for 6 months. At that time, a repeat CT scan of his chest showed improvement of the pleural tuberculous abscesses.

## DISCUSSION

Across the United States, the rate of tuberculosis in 2010 was 3.6 cases per 100,000 population.<sup>3</sup> According to the Wisconsin Department of Health Services, between 2003 and 2010, there were 1.28 cases of tuberculosis per 100,000 population, or an aver-

age of 71.8 cases per year statewide.<sup>4</sup> In 2009, 9% of the cases had both pulmonary and extrapulmonary symptoms.<sup>5</sup> Sixty percent of the cases occurred in Southeastern Wisconsin, 58% in males, 65% in ages 25-64, 70% in minorities, 78% in HIV-negative patients, and 58% in foreign born patients. Our patient fit into all of these groups. Even though the rate of tuberculosis across the United States has been falling for both American and foreign-born residents, the proportion of those cases in foreign-born individuals is on the rise (Figure 2).<sup>6</sup>

Empyema is a pleural effusion containing pus occurring as a complication of a respiratory disease. It can be caused by various types of infections, including an entity called tuberculous pleuritis. Empyema necessitans is defined by the extension of an empyema through the parietal pleura, into surrounding tissue, finally burrowing to the chest wall and setting up a connection between the pleural infection, and the subcutaneous tissue.<sup>7</sup> CT is the imaging modality of choice to visualize empyemas, but the connection between the empyema and the skin is rarely seen.<sup>8</sup> Treatment for tuberculous empyema necessitans is usually all of the same medications as for any form of primary tuberculosis, but might also include drainage.

## SUMMARY

Tuberculosis is a rare cause for skin abscesses, but one of the major etiologic agents in empyema necessitans. Even though the prevalence of tuberculosis in Wisconsin is just under half that of the rest of the United States, clinicians should still be ever mindful of the various manifestations of this disease. Prompt identification of cases will mean faster treatment, and fewer public health exposures.

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## REFERENCES

1. CDC. *Reported Tuberculosis in the United States, 2009* Atlanta, GA: US Department of Health and Human Services, CDC; October 2010. <http://www.cdc.gov/tb/statistics/reports/2009/pdf/report2009.pdf>. Accessed April 18, 2013.
2. Parol R. *Mexican Immigration in the Midwest, Meaning and Implications*. Chicago, IL: The Chicago Council on Global Affairs; 2009.
3. Sahn SA, Iseman MD. Tuberculous empyema. *Semin Respir Infect Dis*. 1999;14(1):82-87.
4. Wisconsin Department of Health Services. Wisconsin Tuberculosis Cases by Public Health Region and by County, 2003-2010. <http://www.dhs.wisconsin.gov/tb/statistics/DocsStatistics/TBCaseByCounty2010.pdf>. Accessed April 18, 2013.
5. Wisconsin Department of Health Services. Active Tuberculosis Disease. Wisconsin, 1997-2009. <http://www.dhs.wisconsin.gov/tb/statistics/DocsStatistics/WI-TBdata-2009.pdf>. Accessed April 18, 2013.
6. Centers for Disease Control and Prevention. Trends in tuberculosis — United States, 2011. *MMWR Morb Mortal Wkly Rep*. 2012;61(11):181-185. <http://www.cdc.gov/mmwr/pdf/wk/mm6111.pdf>. Accessed April 18, 2013.
7. Kono SA, Nauser TD. Contemporary empyema necessitatis. *Am J Med*. 2007;120(4):303-305. DOI: 10.1016/j.amjmed.2006.09.019
8. Glicklich M, Mendelson DS, Gendal ES, Teirstein AS. Tuberculous empyema necessitans. Computed tomography findings. *Clin Imaging*. 1990;14(1):23-25.

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