American Journal of Medical Case Reports, 2023, Vol. 11, No. 3, 49-51
Available online at http://pubs.sciepub.com/ajmcr/11/3/2
Published by Science and Education Publishing
DOI:10.12691/ajmcr-11-3-2

Empyema Secondary to Lactobacillus Casei: A Case Report

Ahmad El-Gammal[1,*], Ahmad Subahi[1], Hussein Gaith[1], MD Hanady Dass[2]

[1]Department of Internal medicine, Beaumont Hospital, Dearborn, MI
[2]Division of Infectious Disease, Department of Internal Medicine, Beaumont Hospital, Dearborn, MI
*Corresponding author: ahmadelgammal93@gmail.com

Received January 19, 2023; Revised February 25, 2023; Accepted March 07, 2023

Abstract Lactobacilli are anaerobic or facultative, Gram-positive bacilli that commonly colonize the gastrointestinal and genitourinary tracts. The most common species of Lactobacillus are Lactobacillus casei and Lactobacillus rhamnosus. Although Lactobacillus species are generally thought to be protective and nonpathogenic microorganisms, they can lead to significant life-threatening infections in immunocompromised patients, labeling them as opportunistic pathogens. We present a case of pathogenic Lactobacilus casei causing an empyema in an immunocompromised patient, which is the first reported case of this nature.

Keywords: *lactobacilus, empyema, lactobacilus casei*

Cite This Article: Ahmad El-Gammal, Ahmad Subahi, Hussein Gaith, and MD Hanady Dass, "Empyema Secondary to Lactobacillus Casei: A Case Report." *American Journal of Medical Case Reports*, vol. 11, no. 3 (2023): 49-51. doi: 10.12691/ajmcr-11-3-2.

1. Introduction

Lactobacilli are anaerobic or facultative, Gram-positive bacilli that commonly colonize the gastrointestinal and genitourinary tracts. The most common species of Lactobacillus are Lactobacillus casei and Lactobacillus rhamnosus [1]. Although Lactobacillus species are generally thought to be protective and nonpathogenic microorganisms, they can lead to significant life-threatening infections in immunocompromised patients, labeling them as opportunistic pathogens. The most common infections caused by lactobacilli are bacteremia, endocarditis, and abscesses. [2] Previous case reports have described bronchopulmonary infections due to other Lactobacillus species [3,4,5], however, Lactobacillus casei has not been particularly identified as a causative organism in empyema. Additionally, empyema due to Lactobacillus casei is usually refractory to medical therapy alone and requires surgical intervention to affect cure. Herein, we report a unique case of Lactobacillus casei empyema for two reasons: this is the first case of pathogenic Lactobacillus casei causing empyema, and the unusual transient clinical response to medical therapy without surgical intervention.

2. Case Presentation

We report a 65-year-old man with a significant history of tobacco smoking and COPD who underwent evaluation for right lung mass three months prior to this admission. Chest computerized tomography (CT) -guided biopsy at that time revealed a new diagnosis of squamous cell carcinoma. Oncology treated the patient with chemotherapy and radiation. He was then maintained on immunotherapy with Pembrolizumab.

The patient presented to our hospital three months later complaining of severe shortness of breath. Upon presentation, vital signs were as follows: temperature was 97.7 °F, pulse 92 beats per minute, respiratory rate 18 breaths per minute, oxygen saturation 99% on room air, and blood pressure 118/94 millimeters of mercury. Although the patient was saturating well at rest, he was complaining of severe exertional dyspnea. A CT of the chest revealed a large right-sided pleural effusion with loculation suggestive of empyema. The patient received ceftriaxone and azithromycin. He subsequently underwent drainage of the pleural fluid and chest tube placement. The drainage was purulent in nature. The patient continued to be severely short of breath while on 3 liters of oxygen and repeat vitals showed a blood pressure of 95/56, pulse 101, temperature 98.9 °F and oxygen saturation 94% on 3 liters of oxygen. Repeat imaging showed rapidly reaccumulating pleural fluid despite the presence of a well-functioning chest tube. The infectious diseases specialist evaluated the patient and added vancomycin pending pleural fluid culture results.

Three days after the specimen was collected, pleural fluid cultures grew Lactobacillus casei. Another set of cultures was sent via aspiration of a fresh sample of pleural fluid two days after the first culture was collected and grew Lactobacillus casei for the second time. A third sample was obtained seven days after the second culture and grew Lactobacillus casei and Prevotella oris three days later.

At that point ceftriaxone, azithromycin and vancomycin were discontinued. Instead, the infectious diseases specialist

started piperacillin-tazobactam to cover lactobacillus and other anaerobes. Thoracic surgery evaluated the patient and recommended video-assisted thoracotomy for evacuation of the empyema and pleurodesis. The patient declined the intervention and elected conservative medical management. Over the course of the following week, the pleural effusion became more stable. The patient's clinical symptoms improved; he became less short of breath with decreasing oxygen requirements. The patient was discharged home with six weeks of intravenous piperacillin-tazobactam in a stable condition.

One week following discharge, the patient followed up outpatient at the infectious disease clinic. His condition remained stable; however, he was still complaining of shortness of breath but with no changes to oxygen requirement. Discussion was held regarding surgical options, which he continued to decline. In addition to the six weeks course of intravenous piperacillin-tazobactam, an additional five weeks of clindamycin was added after completing the first course.

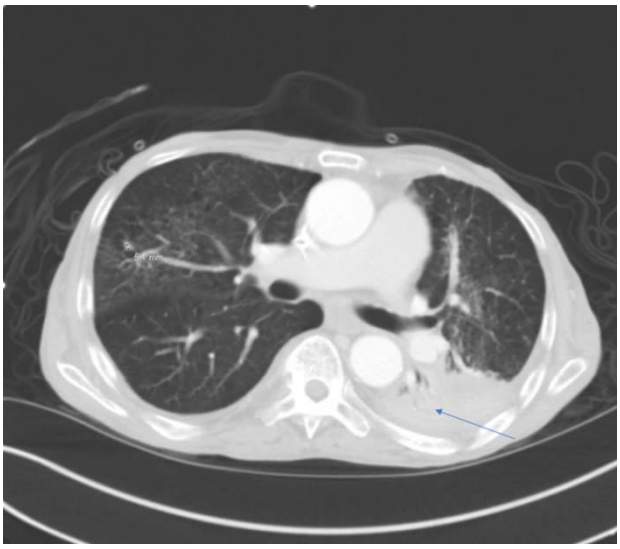

Figure 1. CT of the chest demonstrating left sided subpulmonic effusion

3. Discussion

Lactobacilli are gram-positive, non-motile, non-spore forming, facultative, anaerobic rods that mainly grow in milk and dairy products but can also be found colonized in the human gastrointestinal and genitourinary tract [1]. The common belief is that Lactobacilli are generally non-pathogenic, and hence are incorporated in multiple probiotic products. However, lactobacilli have been demonstrated to be involved in pathological entities such as bacteremia and endocarditis, and less commonly pneumonia and empyema [2]. A literature review demonstrated 15 cases of lactobacillus-associated pneumonia, with empyema only being reported in four of those cases [3,4,5,6]. A large majority of cases are associated with an immunocompromised condition, such as cancer, chemotherapy-induced neutropenia, and diabetes. To tie this to our case, the patient had an established diagnosis of stage III lung cancer and has been receiving immunotherapy with pembrolizumab as well as radiation therapy, making him a susceptible host for this infection.

Empyema is a life-threatening infection that typically arises in the setting of pneumonia. Risk factors include lung cancer (such as in our case), alcoholism, and medical conditions associated with aspiration (eg. neurological disorders, coma). Prior case reports have demonstrated empyema with *Lactobacillus delbrueckii* and *Lactobacillus gasseri*. [7] As per our review, this is the first case to date of a *L. casei* cultured from an empyema. The patient also had *Prevetolla* cultured from the fluid, however there is no clear documented association between *Prevotella* and *Lactobacillus* species.

Despite the advent of a variety of antibiotics, the mainstay of empyema management remains surgical drainage. In our case, the patient declined the thoracic surgeon recommendation of video-assisted thoracoscopic surgery (VATS). He opted for medical treatment with antibiotics and was therefore started on a 6-week course of piperacillin-tazobactam followed by a 4-week course of clindamycin. The patient demonstrated a transient clinical response to antibiotics alone, however he elected hospice care and soon passed away.

4. Conclusion

This case demonstrates the importance of recognizing Lactobacilli casei as an important and evolving pathogenic lactobacillus species in humans, especially in those that are immunocompromised. The role of surgical intervention in those cases remains to be determined as more cases of empyema due to Lactobacillus casei evolve.

Conflict of Interest

None of the authors have any conflicts of interest to declare.

Disclosure of Funding

None of the authors have any source of funding to declare.

References

[1] Trenton R. Schoeb, Chapter 8 - Gnotobiotics and Inflammatory Bowel Disease, Editor(s): Trenton R. Schoeb, Kathryn A. Eaton, In American College of Laboratory Animal Medicine, Gnotobiotics, Academic Press, 2017, Pages 391-409, ISBN 9780128045619,

[2] Bayer AS, Chow AW, Betts D, Guze LB. Lactobacillemia – report of nine cases. Important clinical and therapeutic considerations. *Am J Med* (1978) 64(5): 808-13.

[3] Rahman M. Chest infection caused by *Lactobacillus casei* ss rhamnosus. *Br Med J (Clin Res Ed)* (1982) 284(6314): 471-2.

[4] Namnyak SS, Blair AL, Hughes DF, McElhinney P, Donnelly MR, Corey J. Fatal lung abscess due to *Lactobacillus casei* ss rhamnosus. *Thorax* (1992) 47(8): 666-7.

[5] Cannon JP, Lee TA, Bolanos JT, Danziger LH. Pathogenic relevance of *Lactobacillus*: a retrospective review of over 200 cases

[6] Doern CD, Nguyen ST, Afolabi F, Burnham CA. Probiotic-associated aspiration pneumonia due to *Lactobacillus rhamnosus*. *J Clin Microbiol* (2014) 52(8): 3124–6.

[7] J. P. Cannon, T. A. Lee, J. T. Bolanos, and L. H. Danziger, "Pathogenic relevance of Lactobacillus: A retrospective review of over 200 cases," *European Journal of Clinical Microbiology and Infectious Diseases*, vol. 24, no. 1, pp. 31-40, 2005.