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# Freshwater-Associated Vibrio Breast Abscess in an Adolescent Girl: A Case Report

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## Abstract

*Vibrio* species are Gram-negative bacteria typically associated with marine, brackish or freshwater environments. Though soft tissue infections from halophilic *Vibrio* are well described, breast abscesses caused by freshwater-associated *Vibrio* spp. are exceptionally rare. We report the case of a 13-year-old girl who developed a *Vibrio cholerae* non-O1, non-O139 breast abscess (susceptible to ceftazidime, ciprofloxacin and doxycycline) one week after swimming in a local freshwater creek. Ultrasound confirmed a 1.8×1.5×1.5 cm loculated collection requiring percutaneous drainage, and cultures yielded *Vibrio* species. The patient improved following ultrasound-guided aspirations and targeted antimicrobial therapy (ciprofloxacin/doxycycline). This case highlights the importance of rigorous infectious exposure assessment and non-reliance on empiric treatment regimens.

**Categories:** General Surgery, Epidemiology/Public Health, Infectious Disease
**Keywords:** australia, breast, infection, paediatric, regional, vibrio

## Introduction

*Vibrio* species are Gram-negative, motile bacteria that can be found in both fresh and brackish waters [1]. *Vibrio* organisms most strongly associated with soft tissue infections are typically halophilic variants that are inoculated following seawater exposure [2]. Breast abscesses due to halotolerant *Vibrio* organisms after freshwater exposure are exceedingly rare. Existing literature on atypical organisms causing breast abscesses demonstrates the importance of considering environmental pathogens in atypical presentations of breast infection. Contemporary reviews confirm that while *Staphylococcus aureus* is the predominant cause of breast infections [3], unusual organisms may occur in association with environmental exposure, trauma or immunological risk factors. Additionally, breast abscess development usually occurs in the context of clinical risk factors, particularly breaches in the breast skin, lactation, smoking and immunosuppression. This case study highlights an unusual case of breast abscess development due to an atypical organism from an atypical exposure in a patient with no risk factors for abscess development.

## Case Presentation

A 13-year-old previously healthy girl presented to a rural hospital with a three-day history of a painful right breast lump with associated redness, swelling and fevers. One week prior, she had been swimming in a local freshwater creek. She had no exposure to ocean water. She denied breast trauma, insect bites or prior breast infections. Examination at this time revealed a 3 cm erythematous indurated area in the peri-areolar region at 7 o'clock. There were no external breast wounds nor any other focus of inoculation. Her observations were as follows: heart rate 95 bpm, blood pressure 110/70 mmHg, temperature 38.5°C and oxygen saturation 99% on room air. At this centre, no imaging was available, and the patient was managed empirically with oral flucloxacillin 500 mg four times daily for five days with a planned outpatient ultrasound scan. Four days later (and prior to imaging), the patient re-presented to this rural centre due to increasing pain. Examination now revealed a 7 cm region of erythema in the peri-areolar area, with associated tenderness and fluctuance. The patient was advised to present to the regional referral centre for specialist management. An ultrasound at this time revealed a 1.8×1.5×1.5 cm thick-walled collection in the retro-areolar location of the right breast (Figure *1*).

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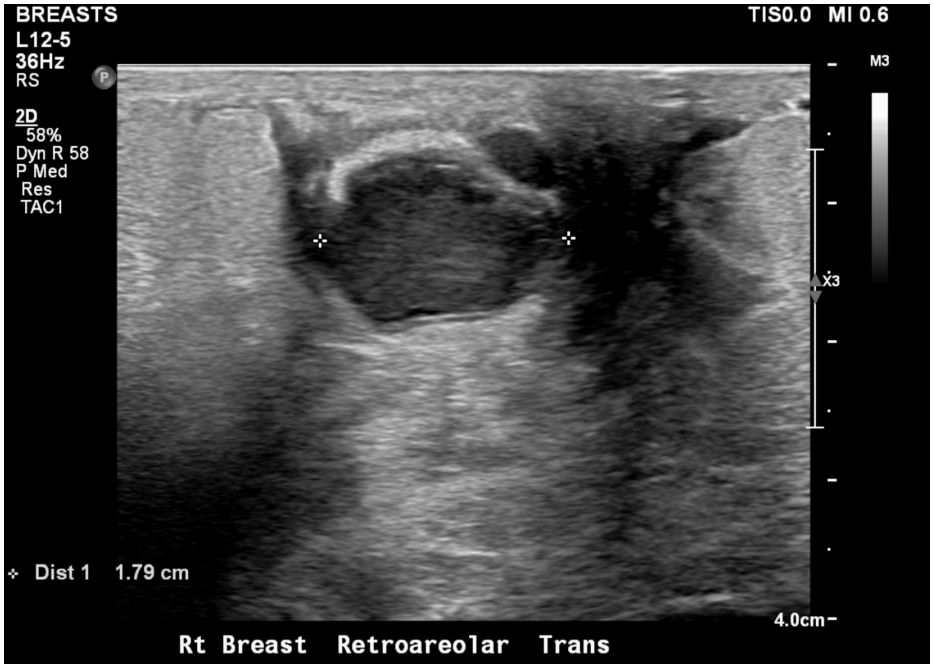



**FIGURE 1: Ultrasound examination of the breast revealed a 1.8×1.5×1.5 cm thick-walled hypodense lesion with internal septation, consistent with a breast abscess in this context.**

The patient proceeded to ultrasound-guided aspiration of the abscess. Five millilitres of purulent material was aspirated and sent for microscopy, culture and sensitivity testing. This sample grew *Vibrio cholerae*. Further polymerase chain reaction (PCR) testing revealed the causative organism to be a non-O1, non-O139 *Vibrio* species, which was sensitive to ceftazidime, ciprofloxacin and doxycycline. Blood investigations at this time showed a normal white cell count and raised C-reactive protein (CRP) (12 mg/L; normal <5 mg/L). Blood cultures taken at this time had no growth. Following her microscopy result, the patient had a two-day course of intravenous ciprofloxacin (400 mg eight-hourly) and was discharged with a 10-day course of oral doxycycline (100 mg twice daily) as recommended by the specialty paediatric infectious disease service. She improved rapidly during this period. Follow-up at two weeks with clinical examination and repeat ultrasound scan demonstrated complete resolution of erythema and resolution of the abscess cavity sonographically. No further drainage was required.

## Discussion

This case demonstrates an extremely rare presentation of a *Vibrio* breast abscess in an immunocompetent adolescent after freshwater exposure. While breast abscesses are well described in lactating women, they are uncommon in children, and occurrence due to environmental Gram-negative pathogens is exceptional. Additionally, the *Vibrio* species most associated with soft tissue infections are typically halophilic (e.g. *V. vulnificus*), which are commonly seen following marine and coastal water exposure, not freshwater, as was seen in this case. This case reminds clinicians that freshwater exposure still poses a risk for invasive infection due to non-halophilic *Vibrio* species, even in the absence of obvious skin breach.

The diagnosis of atypical breast infection requires a high index of suspicion, especially when initial therapy fails or the exposure history is unusual. As was seen in this case, imaging confirms the presence of a drainable collection, while microbiological culture is essential for identifying atypical organisms and guiding targeted therapy. Management principles mirror those for other soft tissue *Vibrio* infections: prompt drainage of pus, coupled with sensitivity-directed antibiotics.

Additionally, this case highlights three key challenges of providing quality care in a rural setting: access and accessibility to quality healthcare and a patient's life context in determining causes of ill health.

One of the challenges of healthcare delivery in regional centres is access to medical investigations. This was explored in a 2024 review into the status of healthcare delivery in regional Australia [4] which identified geographic isolation, limited infrastructure and workforce shortages as barriers to care and noted that better healthcare access could have prevented higher hospitalisation rates [4]. In this case, the patient presented at a rural facility without the imaging required for diagnosis and treatment, delaying the identification of the culprit organism.

Secondly, this case emphasised the importance of understanding the broader patient context in determining the cause of a non-responsive illness. Deeper conversations with the patient and her family linked the swimming event to the breast abscess enabling effective and appropriate management. While a patient of this age and medical history presenting with these symptoms is an anomaly, thus encouraging further investigation, it demonstrates that considering lived experience provides important insights in determining and improving care delivery.

## Conclusions

This case highlights a rare *Vibrio* breast abscess in a healthy adolescent following freshwater exposure. It emphasises the importance of environmental exposure history, microbiological confirmation and appropriate surgical and antimicrobial management. Education of regional primary care providers and increased health service infrastructure, particularly imaging technology, may help prevent delays in the management of other atypical soft tissue infections.

## Additional Information

### Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

**Concept and design:** Patrick C. Litchfield, Louise M. Litchfield

**Acquisition, analysis, or interpretation of data:** Patrick C. Litchfield, Louise M. Litchfield

**Drafting of the manuscript:** Patrick C. Litchfield

**Critical review of the manuscript for important intellectual content:** Louise M. Litchfield

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