



## Case report

# Not always a commensal: A case of mastitis by *Corynebacterium amycolatum*



Kalyani Borde<sup>a,\*</sup>, Vishnu Rao<sup>b</sup>, Milap Shah<sup>c</sup>, N Pavani<sup>a</sup>, Mridu Anand<sup>a</sup>

<sup>a</sup> Department of Microbiology, Yashoda Hospitals, Secunderabad, India

<sup>b</sup> Department of Infectious Diseases, Yashoda Hospitals, Secunderabad, India

<sup>c</sup> Department of Pathology, Yashoda Hospitals, Secunderabad, India

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## ABSTRACT

Gram positive rods seen on Gram's stain are often dismissed as skin commensal organisms. Diphtheroids (Non-diphtherial *Corynebacterium* species), as they are collectively called, are taken as harmless bystanders in a skin and soft tissue infection (SSTI). However, emerging evidence has established virulence factors in some of these species leading to various infections.

Here, we describe a case of mastitis in a 43 year old female caused by *Corynebacterium amycolatum*. The organism was seen as thick Gram positive rods on Gram stain and was isolated as a pure growth on Blood agar. Identification was done on Vitek-2 and confirmed by matrix assisted laser desorption-ionization - Time-of-flight (MALDI-TOF). Patient was managed successfully with surgical excision and antibiotics.

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## Introduction

The clinical relevance of non-diphtherial corynebacteria has long been debated. They are almost always present on skin and mucosa, giving them an innocuous status in clinical microbiology [1]. Most of these isolates are not speciated or identified owing to the traditional teaching that Gram-positive rods are contaminants, especially in samples taken from non-sterile sites. However, they are being increasingly isolated from clinical samples as opportunistic pathogens. Species like *C. jeikeium*, *C. minutissimum*, and *C. urealyticum* have been proven as opportunistic pathogens in immunosuppressed patients [2]. However, the clinical significance of isolation from immunocompetent patients is often difficult to interpret [1]. Breast abscess or mastitis is increasingly being reported as an infection caused by diphtheroids [1,3]. Here, we present one such case report of granulomatous mastitis caused by *C. amycolatum*.

## Case report

A 43 year old female presented to surgical oncology outpatient department with the complaints of pain and progressive lump in her right breast since 3 months. There was no history of trauma, weight loss, fever or any family history of breast cancer or diabetes.

She had two children and had not suffered from mastitis in the past. Patient was afebrile, no abnormality was detected on systemic examination. On local examination, the lump was found to be located in the right breast, 5.5 × 4 cm in dimensions and lateral to the areola. It was firm, tender and warm on palpation; marked erythema was present over the skin. There was no nipple discharge or any evidence of sinus or fistula. Fine needle aspiration biopsy was suggestive of acute on chronic mastitis. Surgical excision of the lump was performed and the entire tissue was sent for histopathological and microbiological analysis. Cut section was found to be firm with dilated ducts filled with purulent material on gross examination. Multiple sections showed dense inflammatory infiltrate composed of neutrophils and lymphocytes along with histiocyte clusters. Giant cells were also observed. Few ducts were dilated and filled with debris. A mix of acute and chronic inflammatory cells forming microabscesses with giant cell response was found. This picture was consistent with that of granulomatous lobular mastitis (GLM). There was no evidence of malignancy.

On Gram staining, plenty of neutrophils with scanty Gram positive bacilli were seen arranged in palisades (Fig. 1). Smears for fungal elements or acid-fast bacilli were negative. Aerobic and anaerobic cultures were set up at 37 °C on blood agar, MacConkey agar and Anaeropouch (bioMerieux). After overnight incubation, a pure growth of dry, white colonies was observed on blood agar in aerobic cultures (Fig. 2). The isolate was catalase positive and was identified as *C. amycolatum* by Vitek-2 (bioMerieux). It was further subjected to MALDI-TOF mass spectrometry and was confirmed as

\* Corresponding author.

E-mail address: [k14august@gmail.com](mailto:k14august@gmail.com) (K. Borde).

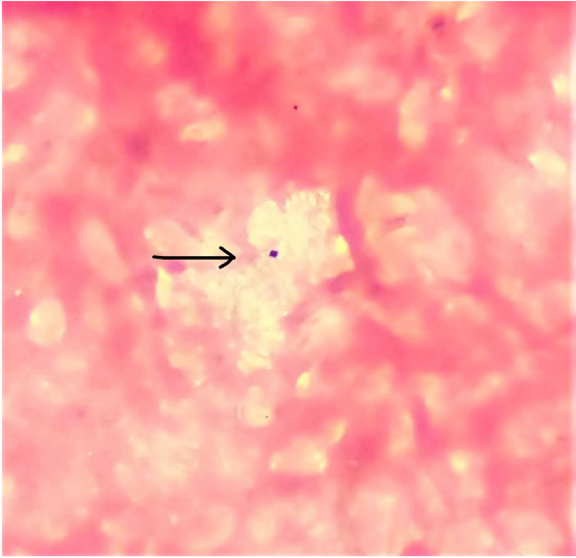


Fig. 1. Gram positive bacilli on direct smear of tissue from the case of mastitis.

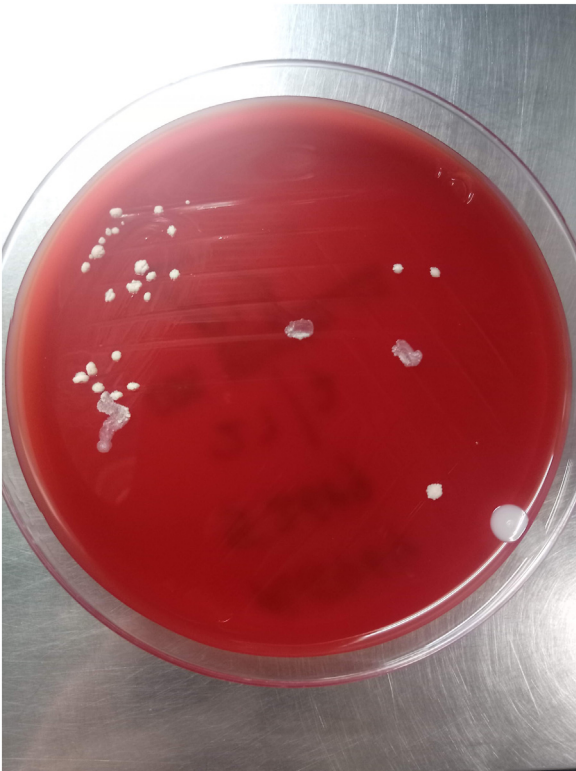


Fig. 2. Pure growth showing dry, white colonies of *C. amycolatum* on aerobic incubation.

*C. amycolatum*. Antimicrobial susceptibility was performed using disk diffusion testing on Mueller-Hinton agar supplemented with 5% sheep blood, adapting interpretive criteria for *Staphylococcus aureus* according to CLSI guidelines [11]. The isolate was found to be susceptible to vancomycin, teicoplanin, linezolid, gentamicin, clindamycin, tetracycline and resistant to penicillin, ceftriaxone, amoxicillin-clavulanic acid and ciprofloxacin. The empiric therapy of amoxicillin-clavulanate was changed to doxycycline based on this result. Patient recovered completely after a 14-day course of doxycycline (200 mg OD) and the lesions healed following the treatment.

## Discussion

*C. amycolatum* derives its name from lack of mycolic acid in its cell wall unlike other corynebacteria. It was first isolated from human skin in 1988 [5]. Despite the absence of corynemycolic acid in the cell wall, 16S rRNA sequencing confirmed its inclusion in *Corynebacterium* genus. It has emerged as an important pathogen in immunocompromised patients and has been identified as a pathogen in cases of neonatal sepsis [6], central venous line - related bloodstream infections [7], endocarditis [8,9], and orbital implant infection [10]. Cases of mastitis caused by *C. amycolatum* have been reported by various authors [1,11,12]. Butta et al. [12] have described a similar case in a patient with a history of post-lactational mastitis. In a study done on diphtheroids from Southern India, *C. amycolatum* was found to be the most common isolate from clinical samples (purulence, catheter tips and urine) [4]. This organism was found to be commonly resistant to penicillins, clindamycin, aminoglycosides and fluoroquinolones. It was found to be less resistant to chloramphenicol, amoxicillin-clavulanate and tetracyclines [3].

Reproductive age group in a female is a major risk factor for granulomatous mastitis. It is mostly considered a disease of unknown etiology with many factors playing together to produce chronic inflammatory changes [3]. Corynebacteria are well associated with this disease. It has been reported sporadically from various parts of the world, making any geographical association difficult to establish.

Lipophilia exhibited by some members of this genus is said to be responsible for their tropism to breast tissue. The argument that diphtheroids could be innocent bystanders is answered by the observation that bacteria are present in the granulomatous lesions from deep inside the tissue and patients respond to antimicrobials [1]. *Corynebacterium kroppenstedtii* was the most common isolate from mastitis followed by *C. amycolatum* and *C. tuberculoosteaticum* as reported by Paviour et al. [1].

The burden of proving *Corynebacterium* isolated in the laboratory as the causative agent lies upon the microbiologist. As this organism is a normal inhabitant of skin, isolation from purulent samples must be accompanied by a strong leukocyte reaction, positive direct Gram stain and isolation in pure culture. If these criteria are met, as in the present case, a disease association could be reported according to Funke et al. [2]. Treating physician should keep this in mind while interpreting the laboratory report.

MALDI-TOF MS has emerged as a robust and reliable tool for species identification among *Corynebacteria* [13]. In the present study, neither CLSI [14] nor EUCAST [15] criteria could be used for interpretation of antimicrobial susceptibility. CLSI requires testing by broth microdilution which is not economical and EUCAST requires use of horse blood which is difficult to procure in this part of the world. There is a need to develop and standardize disk diffusion criteria which could be easily adapted by lower and middle income countries.

Antimicrobial susceptibility testing has become even more important for *Corynebacteria* with the emergence of multi-drug resistant isolates, increased antibacterial pressure could be the reason behind the emergence of such strains [16]. In the present case, species identification helped tailor the therapy. *C. amycolatum* is known to be resistant to beta lactams and accordingly, no zone was observed for beta lactam antibacterials during disk diffusion testing.

The present case was evaluated keeping malignancy, tuberculosis, bacterial infections and ductal ectasia/ periductal mastitis complex in mind. Histopathology was supportive of a chronic inflammatory process. Microbiological investigations helped identify the organism and tailor the antimicrobial therapy for optimum response.

## Conclusion

*C. amycolatum* was isolated from a case of granulomatous mastitis. We need to keep these pathogens in mind before dismissing them as commensals. Scarcity of reports from India could be due to unavailability of proper means to identification or lack of awareness towards the pathogenic potential of diphtheroids. An interdisciplinary approach to diagnosis is important for diagnosing and managing such cases.

## Declaration of Competing Interest

None.

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