



CLINDAMYCIN: AN EFFECTIVE TREATMENT FOR GRANULOMATOUS MASTITIS CAUSED BY *CORYNEBACTERIUM KROPPENSTEDTII* IN A PREGNANT PATIENT

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ABSTRACT

Corynebacterium spp. are Gram-positive bacteria, and recent studies have proposed a potential link between granulomatous mastitis and *Corynebacterium kroppenstedtii* infections, posing a challenge in selecting appropriate antibiotics, particularly in pregnant women. A young pregnant woman presented with a palpable lump in her left breast. Subsequent assessment revealed the presence of necrotising granulomatous mastitis attributed to *C. kroppenstedtii*. Initially treated with amoxicillin/clavulanate, the patient showed no improvement. Consequently, clindamycin was administered based on culture and sensitivity results, which resulted in a favourable response with no recurrence of symptoms. This report aims to emphasise the efficacy of clindamycin as a treatment option for granulomatous mastitis caused by *C. kroppenstedtii*.

KEYWORDS

Clindamycin, granulomatous mastitis, *Corynebacterium kroppenstedtii*, pregnancy

LEARNING POINTS

- Alternative antibiotics for treatment of granulomatous mastitis can be effective.
- The safety and efficacy of antibiotics in pregnancy is important.

INTRODUCTION

Corynebacterium spp. are Gram-positive, catalase-positive bacteria that are facultatively anaerobic, non-motile and rod-shaped^[1]. Several *Corynebacterium* species have been implicated in diseases in humans. Specifically, *Corynebacterium kroppenstedtii* differs from most other corynebacteria because its cell membrane lacks fatty acids

known as mycolic acids, requiring a lipophilic environment to thrive. Genetic studies indicate that lipophilicity is the organism's major pathogenic characteristic. Consequently, lipid-rich breast tissue provides an ideal environment for *C. kroppenstedtii* to thrive and cause granulomatous mastitis^[1]. Granulomatous mastitis is an inflammatory disease of uncertain cause, considered a rare benign breast ailment.



It is particularly frequent in young parous women, usually within a few years following pregnancy^[2]. Recently, a link between granulomatous mastitis and local *C. kroppenstedtii* infections has been proposed^[2]. Cases have been recorded worldwide since 2003. According to NCBI, the majority of cases have been documented in post-partum uniparous or multiparous non-pregnant women. Here, we report a case of granulomatous mastitis resulting from *C. kroppenstedtii* infection in a pregnant woman, describing the clinical presentation, the course of the disease and the management approach in accordance with our infectious disease consultation team.

CASE DESCRIPTION

A 31-year-old woman presented to the hospital with a one-week history of a painful mass and swelling in her left breast, without any fever, nipple discharge, skin changes or redness. She had no history of a similar presentation. Upon examination, a hard mass was found at 9 to 2 o'clock from the upper inner quadrant to the upper outer quadrant of the left breast, along with left breast tenderness. The nipple was normal, and no palpable lymph nodes were present. Basic laboratory findings showed an elevated white cell count with a neutrophilic predominance and elevated C-reactive protein. An ultrasound of the breast was requested and revealed multiple pockets of collections representing abscesses with associated reactive left axillary lymph nodes, representing BI-RADS 3. Accordingly, a core biopsy of the left breast was performed, revealing necrotising granulomatous mastitis. The patient was prescribed amoxicillin/clavulanate and discharged. However, 2 weeks later, she presented again with an increasing mass size, pain, and erythema. Physical examination showed a large, tender mass occupying the whole breast with mild erythema. While an inpatient, she was switched to clindamycin. Incision and drainage were performed, revealing a large loculated cavity with a substantial amount of pus occupying all quadrants. It was washed and sent for culture and histopathology. The culture showed *C. kroppenstedtii* sensitive to clindamycin, and the histopathology revealed granulomatous mastitis with micro abscess formation (Fig. 1).

The infectious disease team reviewed the case and

recommended keeping her on clindamycin for a total of 4 weeks. She was followed up in the clinic after completion of treatment and reported an improvement in her overall condition, with no left breast pain or swelling.

DISCUSSION

Corynebacterium kroppenstedtii is a Gram-positive lipophilic rare bacteria and is a natural habitat of the skin flora. It is commonly found in fat-rich breast tissues because its dependence on lipids provides a favourable environment for its growth and development^[3].

Mastitis is considered to be a benign breast inflammation process and the incidence rate has been reported as high as 33%. It is characterised based on histological features. Non-puerperal mastitis refers to inflammation of the breast tissues not related to pregnancy and is further subdivided into two main groups: periductal mastitis, which is the most common type, and granulomatous lobular mastitis. It is identified as a rare chronic benign inflammation of the breast tissues, usually presenting in childbearing women with long-term breast pain and swelling, and is commonly associated with breast abscesses^[4].

Recently, an association between *Corynebacterium* and inflammatory breast tissue disease has been established. In 2003, Taylor et al. observed and isolated 14 patients presenting with mastitis mediated by *C. kroppenstedtii*^[5]. In 2016, Poojary et al. reported the identification of ten isolates of *C. kroppenstedtii* in women presenting with breast abscesses^[6]. Tauch et al. conducted a study on the microbiological features of *C. kroppenstedtii* in which they described 42 clinical cases reported with *C. kroppenstedtii* infection. Of these 42 cases, 37 isolates (88%) originated from breast clinical samples^[7]. Multiple risk factors have been suggested to affect the chances of contracting the disease. These include women of childbearing age, breast trauma, smoking, and oral contraceptives. In 2015, Kutsuna et al. reported two cases of nulliparous women presenting granulomatous mastitis with hyperprolactinemia hypothesising the possibility of deranged hormones playing a role in the disease^[2,8]. Of note was that most patients presented in these studies were non-lactational women. Some were observed in the post-partum period and

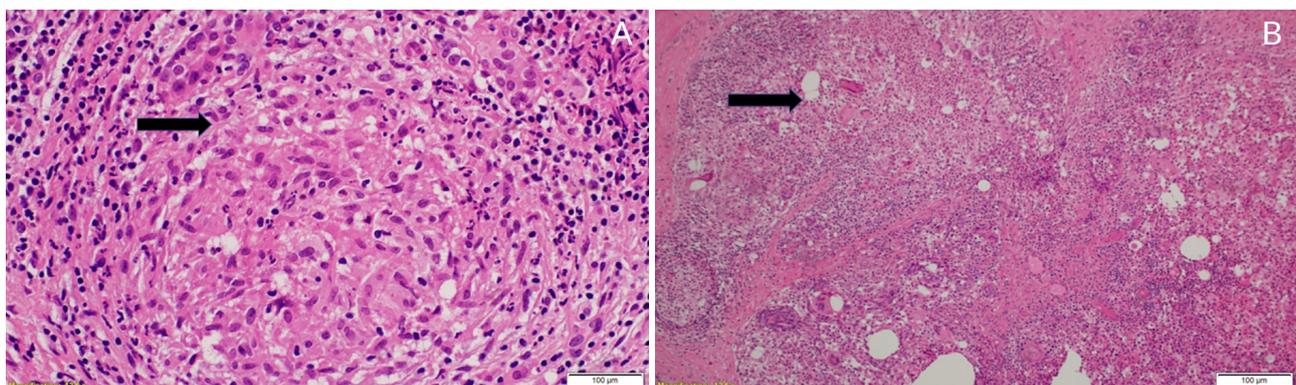


Figure 1. Histopathology slides. A) Lobulocentric inflammation with non-necrotising granulomas and multinucleated giant cells (hematoxylin & eosin, ×40). B) Non-necrotising granulomas (hematoxylin & eosin, ×40).

others were nulliparous. Our patient presented during her pregnancy and although pregnancy has been postulated to be a risk factor, there is a paucity of reported cases of granulomatous mastitis in pregnant women. To our knowledge, this is the first reported case in the Middle East region of granulomatous mastitis in a pregnant woman.

Diagnosis of *C. kroppenstedtii* is conducted through a number of tests because it is difficult to isolate and identify^[1]; detection might be underestimated. In some cases, standard microbiological tests are not enough, and patients require further testing with possible aspiration if abscesses are present. In some cases, histopathology of the breast tissue affected is required to aid the diagnosis due to the idiopathic granulomatous mastitis mimicking breast cancer^[9]. Our patient had an ultrasound which showed multiple pockets in the breast and reactive lymph nodes representing BI-RADS 3, and a core biopsy revealed necrotising granulomatous mastitis. She was prescribed a prolonged course of amoxicillin/clavulanate and was discharged but presented to the hospital again despite 2 weeks of antibiotics. No clear guidelines are present on how to approach a patient with idiopathic granulomatous mastitis and many treatment options have been tried in reported cases. These include antibiotics; the most used were doxycycline, amoxicillin (with and without clavulanic acid), ciprofloxacin and cefuroxime, and in some cases, tetracycline was used with favourable outcomes. Other cases, which did not respond to antibiotics, required a more invasive approach including excisional surgery, and incision and drainage^[7]. The use of steroids was also deemed appropriate after Jorgensen and Nielsen reported improvement of symptoms in two cases that received a course of steroids^[10].

After 2 weeks of antibiotics and during her second admission, our patient required an incision and drainage of the affected breast. Samples were sent to be cultured for histopathology. The culture grew *C. kroppenstedtii* sensitive to clindamycin, and histopathology revealed granulomatous mastitis. The patient was then discharged on clindamycin for 4 weeks and was followed up after completion of the course; she reported complete resolution of her symptoms. This scenario showed that there might have been an element of no response to a certain class of antibiotics, and that together with a source control patient, it showed a good response. This approach might be used as a guide for further studies and cases conducted in the future, especially in pregnant patients where options for antibiotics are limited.

CONCLUSION

Corynebacterium kroppenstedtii has been linked to granulomatous mastitis, and the choice of antibiotics, especially in pregnant women, has always been challenging. Navigating the delicate balance between effective treatment and maternal-foetal safety is paramount in such cases. Our patient was treated with clindamycin based on the results of culture and sensitivity analysis. The subsequent administration of clindamycin yielded favourable outcomes,

signifying its efficacy in addressing the infection caused by *C. kroppenstedtii*. This nuanced treatment approach not only resolved the immediate medical concern but also offers valuable insights for prospective research endeavours.

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