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# Inflammatory Mastitis in Implant Breast Carriers-A New Form of Presentation of Covid-19: Case Report

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**Case report**
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## Abstract

**Introduction:** Today with more than 190 million confirmed cases and more than 4 million deaths worldwide, SARS-COVID-19 has become an unprecedented challenge. Its molecular structure, spread-forms, and clinical presentation are areas of continuous study due to its constant change and new forms of presentation and dicipation. A clinical case with COVID-19 disease with bilateral non-lactating inflammatory mastitis in a patient with breast implants is presented.

**Discussion:** Depending on its etiology, mastitis can be classified as infectious (septic or bacterial) and non-infectious (aseptic or inflammatory). Non-infectious or inflammatory mastitis is not related to the infection of a pathogen. This group can be related to mammary duct ectasia, inflammatory cross-reaction and foreign bodies. A new etiology has been reported as post-COVID-19 vaccination mastitis; however, mastitis has not been documented during coviD-19 infection. We can hypothesize that the pathophysiology of our case can involve a cross-reaction to the viral peak protein of 1273 amino acids with antigens found on the surface of microtextured implants or related in a loss on the homeostasis in the production and secretion of Brain-Derived Neurotrophic Factor (BDNF) and Nerve Growth Factor (NGF) during COVID-19 infection.

**Conclusion:** Mastitis represents a common pathology before and during the COVID-19 pandemic. Although they are considered different entities, mastitis could be considered a rare manifestation fo COVID- 19 disease. Its approach, diagnosis and treatment must be timely and protocolized through a multidisciplinary group.

**Keywords:** Mastitis; Breast; COVID-19; Breast-Implant; Cross-Linked

**Abbreviations:** WHO: World Health Organization; ICTV: International Committee on Taxonomy in Viruses; MRSA: Methicillin-Resistant S Aureus; FBC: Full Blood Count; SIRS: Systemic Inflammatory Response Syndrome; DIR: Delay Inflammatory Reaction; NGF: Nerve Growth Factor; BDNF: Brain-Derived Neurotrophic Factor.

## Introduction

At the end of 2019 a new strain of coronavirus was isolated after a sudden outbreak of atypical pneumonia, called Severe Acute Respiratory Syndrome Coronavirus-19 (SARS-COVID-19), thus by the World Health Organization (WHO) and by the International Committee on Taxonomy in Viruses (ICTV) [1]. Shortly after its appearance, COVID-19 turned into a pandemic infection emergency in March 2020 [2,3].

Nowadays, with more than 190 million confirmed cases and more than 4 million deaths worldwide [4], SARS-COVID-19 molecular structure, spread-forms, incubation time, clinical presentation and related manifestations are widely known. The last ones, includes general malaise, headache, fever, cough, myalgia, diarrhea, among others. On

the other hand, mastitis is an inflammatory breast disease that can be lactational or non-lactational, related or not to infection, however it is not generally known as a clinical manifestation of COVID-19 disease.

This report is to present a case with COVID-19 disease with among other symptoms presented with bilateral non-lactating inflammatory mastitis in a patient with silicone breast implants.

## Case Report

A 30 years old previously healthy woman with a history of uneventful microtextured silicone bilateral breast implant placement on August 2020 (Motiva RSC 590cc, Establishment Labs, Costa Rica). On July 5th 2021, she presented rhinorrhea and diarrhea followed by dry cough and intense headache the next day. Intermittent fever up to 38º C that lasted for 2 days initiated 48 hours after first symptoms. A PCR test for covid was performed, giving a positive result. She started treatment by a neumologist based on Acetaminophen, pulse oximeter follow-up and home isolation protocol.

On July 11th anosmia was added to her symptoms along with an increasing bilateral breast pain. Five days later erythema, breast swelling and severe pain was present. Patient contacted her plastic surgeon and sent a self-made (selfie) photograph where inflammatory bilateral mastitis was evident (Figure 1a). Full blood count shows leukocytosis with a predominance of lymphocytes, B-type natriuretic peptide was in 104 pg / mL. Imaging studies were performed, such as: chest x-ray where the presence of 4 nodular infiltrates in both lungs was evidenced, as well as a bilateral breast ultrasound with a report of breasts with a mixed ultrasound pattern, without evidence of rupture of implants.

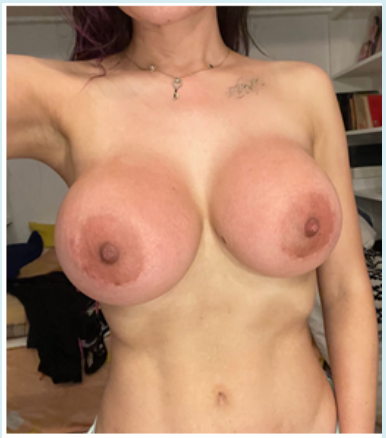

**Figure 1a:** Inflammatory bilateral mastitis.

A mutlidisciplinary treatment was initiated with Betametasone 8mg IM single dose, followed by prednisone 5 mg orally once a day, colchicine 0.5 mg orally twice a day for three days followed by 0.5mg for three weeks. Montelukast 10mg orally once daily.

After 48 hours of treatment erythema diminished (Figure 1b) but swelling and pain persisted for 5 days. One-week later recovery was reported as complete and two weeks after mastitis treatment was initiated no inflammatory disease was noted on physical examination (Figure 1c). Patient is recovering uneventfully from COVID-19 and mastitis up to date, anosmia is still present.

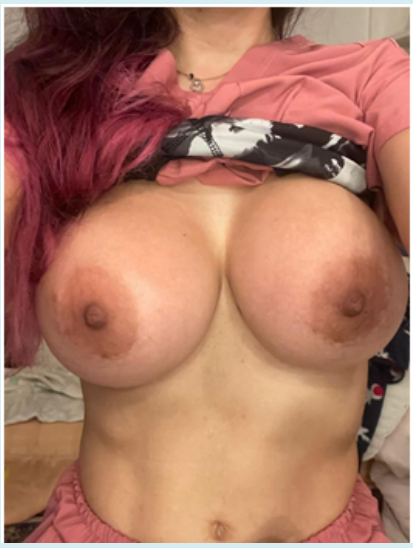

**Figure 1b**: Erythema diminished 48 hours after treatment began.

**Figure 1c**: One-week after treatment, complete recovery was reported.

## Discussion

Mastitis represents a relatively frequent pathology. This is defined as an inflammatory process of the breast, associated or not with infection [5]. It can affect the female gender in any age group, having a frequency peak during the lactation period, with a global prevalence that varies between 1 to 10% [6-8]; however, a Cochrane review suggested that it could reach up to 33% [9].

Depending on its etiology, mastitis can be classified as infectious (septic or bacterial) and non-infectious (aseptic or inflammatory). The infectious entities, as its name indicates, is secondary to an infectious process predominantly by bacteria that colonize the skin associated with a risk factor (breastfeeding, nipple lesions, traumatic injuries, among others). Methicillin-resistant S. aureus (MRSA) represents the most common agent, followed by coagulase negative staphylococci and gram-negative bacilli, less frequently Bartonella henselae, mycobacteria (TB and atypical mycobacteria), Actinomyces, Brucella, fungi (Candida and Cryptococcus) and parasites. Up to 15-40% of infectious mastitis can be of polymicrobial etiology, especially associated with anareobic pathogens (Clostridium, Propionibacterium, Labacteroides, Veillonell and Fusobacterium) [10-12]. Around 0.4 - 11% will evolve in breast abscesses [13,14] and 1-2% in ductal fistulas [15]. For the development of infectious puerperal mastitis, a loss of integrity of the primary barriers of the nipple-areola complex is necessary, associated or not with stasis/overproduction of milk.

Non-infectious or inflammatory mastitis is not related to the infection of a pathogen. This group can be related to mammary duct ectasia (plasma cell mastitis and peri-ductal mastitis), inflammatory cross-reaction and foreign bodies (i.e. breast implants and adjuvant disease) [16,17]. Controversially, granulomatous mastitis is considered within this large group of mastitis. However there has been corynebacteria isolation in this entity [18].

Recently, a new etiology has been reported as post-COVID-19 vaccination mastitis, which according to Ming Low, et al. [19] have been found in up to 3.4% of the breastfeeding mothers. Post-COVID-19 Vaccination Mastitis diagnosis is usually clinically after a complete medical history and a thorough physical examination. Symptoms usually include mastalgia, erythema, increased temperature and locoregional sensitivity, edema and lymphadenopathy, which can be found in up to 5.7% according to recent research 19 vs 0.3% reported by the Pfizer-BioNTech COVID-19 trial and the CDC [20,21]. Depending on the degree of severity of the mastitis, it may or may not be associated with fever, deterioration of the general condition and even sepsis. This last one, is associated with severe forms such as necrotizing mastitis, as reported by Kamagate, et al. [22] regarding late medical attention during the COVID-19 pandemic.

Complementary studies in the approach to mastitis usually include a full blood count (FBC) with differential, especially in patients with signs of systemic inflammatory response syndrome (SIRS), recurrent infection, recurrent mastitis or abscess suspicion. Ultrasound represents the first-choice imaging study, and can be diagnostic and therapeutic in breast collections when accompanied by fine needle aspiration. It is indicated in patients with suspected abscess, ductal ectasia and breast implants complications (seroma, rupture, hematoma, among others) [17,23]. If there is discharge from the nipple or during lactation periods, culture with an antibiogram and cytological study is recommended to rule out infectious and non-infectious etiology, as well as to administrate targeted antibiotic therapy [17].

We can hypothesize that the pathophysiology of our case can involve a cross-reaction to the viral peak protein of 1273 amino acids with antigens found on the surface of microtextured implants, similar to what Munavalli, et al. [24] reported with delay inflammatory reaction (DIR) to dermal fillers of hyaluronic acid, which would explain his bilateral condition or by a mechanism described by Demers-Mathieu [25], consisting in a loss of homeostasis in the production and secretion of Brain-Derived Neurotrophic Factor (BDNF) and Nerve Growth Factor (NGF) during COVID-19 infection, which conditions susceptibility increased for the development of mastitis. However the mechanism remains uncertain.

In this pandemic era, now more than ever, the key point in the treatment of mastitis must be based on an early and timely diagnosis to avoid complications secondary to the late search for medical attention, coinciding with that reported by Gamonal-Limcaoco, et al. [26] and Masroor, et al. [27].

The specific treatment will depend on the underlying cause. Antibiotics should be given early as long as an infection is suspected. Amoxicillin with clavulanic acid or clindamycin occupy the first line of treatment, reserving the use of vancomycin in case of no improvement in the condition [17].

Surgical treatment is usually reserved for persistent abscesses despite fine needle drainage or collections >5 cm in diameter. If necrotic tissue is present, it must be debrided urgently [28]. In patients with breast implants, if the underlying etiology is due to complications of the implant, its surgical removal with placement of drains is suggested. In the case of recurrent abscesses, the presence of Mycobacteria should be ruled out [29-31]. The authors do not recommend the use of implant salvage protocols due to their low efficacy and high recurrence [32,33].

The use of corticosteroid is recommended for granulomatous mastitis, however it is a drug that suppresses the immune system as reported by Dağ, et al. [33] and caution must be taken when using during the first stages or mild disease. In our case management was carried out by a neumologist with the initial treatment for mild COVID disease. After at 16 days of initial contact with SARS-COVID-19 patient consulted the senior author regarding five days with breast pain, swelling and erythema as it main concern. With pulse oximetry over 90% and no other symptom besides anosmia and since theoretically after 16 days virus has been eliminated in inmunocompetent patients we initiated steroids promptly. Our patient had a good response to treatment and mastitis resolved within 7 days.

After resolution of the acute event, follow-up of the condition, especially in women over 40 years of age, should be complemented with imaging studies (ultrasound or mammography) in order to rule out underlying malignant etiology [10,13]. In our case in the acute phase the ultrasound showed no evidence of collections.

The complications of mastitis will depend on of the evolution time, severity of the condition, chronicity and the chosen therapeutic method. Therefore, a timely diagnosis and a protocolized treatment based on medical evidence is reiterated. Complications include breast abscesses, breast implant exposure, significant breast deformity, recurrent infections, recurrent abscesses, necrotizing soft tissue Infection, ductal fistulas, and poor aesthetics postoperative scarring. In some patients, the deformity may be so significant that a functional mastectomy is recommended [10,17,24].

## Conclusion

Mastitis represents a common pathology before and during the COVID-19 pandemic. Although they are considered different entities, the inflammatory response to the virus may have had triggered the inmune response seen in inflammatory mastitis so it could be considered a rare manifestation fo COVID- 19 disease. Its approach, diagnosis and treatment must be timely and protocolized through a multidisciplinary group, in order to further mitigate the complications described in the natural history of the disease, which may have serious repercussions on breast morbidity and aesthetics.

To the authors knowledge breast implant related inflammatory mastitis has not been reported in association or originated during COVID-19 infection however due to the pandemic its incidence may have been underreported due to the lack of seeking medical attention due to fear of disease infection within medical ambients or focus in other critical areas during infection. Future observations could evaluate its incidence as an atypical symptom in Covid-19 infection, meanwhile it is crucial to take it in terms of the diagnostic approach of mastitis.

## Funding

None

## Conflicts of Interest

None declared

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