

Breast Implant Illness and *Cutibacterium acnes*: A Case Report

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Summary: Breast implant illness (BII) is a term to describe a wide range of nonspecific symptoms after breast implant placement. At present, no specific diagnostic criteria for BII exist, and there is limited solid understanding of what causes BII. There is some evidence that biofilm infections such as those caused by *Cutibacterium acnes* may play a role in the development of BII. We present a case of a 38-year-old White woman who developed BII symptoms (psychological and integumentary). After en bloc explantation, her tissue cultures resulted in *C. acnes* growth. Plastic surgeons should be aware of this potential complication and discuss it thoroughly with patients before breast implantation. Evidence suggests that biofilm infection with *C. acnes* may play a role in BII development. En bloc explantation is the typical treatment of choice. Plastic surgeons should be aware of *C. acnes* as a potential cause of BII and should counsel patients on the potential risks and remedies for BII. (*Plast Reconstr Surg Glob Open* 2022;10:e4146; doi: 10.1097/GOX.0000000000004146; Published online 28 February 2022.)

Breast implant illness (BII) is a relatively new term used to describe a variety of nonspecific signs and symptoms thought to be associated with breast implants. Symptoms associated with BII described by patients include a wide range of symptoms including but not limited to fatigue, chronic pain, rash, body odor, irregular heart rate, anxiety, neurologic abnormalities, hair loss, and endocrine dysfunction.¹ BII can be described as a “catch all” phrase that groups together a variety of terms, including human adjuvant disease, silicone-induced human adjuvant disease, autoimmune/inflammatory syndrome induced by adjuvant, and silicone implant incompatibility.² These terms historically have been used to describe a link between systemic disease and silicone implants.

Currently, there is minimal epidemiologic and laboratory information to support BII as a single disease entity. BII’s wide range of symptoms, lack of diagnostic criteria, and poor understanding of host and implant interactions

make a diagnosis difficult. This has led to frustration amongst patients presenting various signs and symptoms of BII to their plastic surgeons because their complaints are largely dismissed.

Herein we describe a case of BII with successful resolution of symptoms after en bloc explantation with cultures that were positive for *Propionibacterium acnes*, more currently known as *Cutibacterium acnes*.

CASE PRESENTATION

A 38-year-old White, nonobese woman with hypomastia elected to undergo a bilateral subfascial implant placement. Two grams of intravenous cefazolin were administered before 5 cm inframammary fold incisions. Cautionary dissection was taken down to the pectoralis major, and a subfascial dissection was then carried out. The pocket was irrigated with triple antibiotic solution (cefazolin, bacitracin, gentamicin) and betadine. The implant was placed into the pocket using a Keller funnel, and the tissue was then closed in standard multilayer closure. The implants placed were smooth Allergan Natrelle Cohesive silicone implants filled to 385 cm³.

The patient was doing well upon immediate follow-up, but within 3 weeks of implant placement, the patient started to display central nervous system symptoms. The patient was complaining of brain fog and described it as a “loss of clarity.” In addition, she was complaining of a constant dull pressure of her head described as a “constant hangover.” In addition, the patient started demonstrating psychological symptoms, with a high level of general anxiety and multiple panic attacks. The patient had multiple

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evaluations by her primary care physician after her implant placement to obtain laboratory work. The only abnormality discovered was her total iron binding capacity, which was slightly lower (256 µg/dL) than the normal range (265–497 µg/dL). Of note, the patient was involved in a car accident 5 months after the placement of her implants, after which her symptoms worsened. Finally, the patient started experiencing hair loss, and this was what prompted her to have her implants explanted 8 months from initial placement. Pathology was negative for any malignancy or neoplastic change, but foci of stromal fibrosis was appreciated. Interestingly, the thio broth cultures grew out *C. acnes*. After surgery, the patient did not receive any additional treatment such as antibiotics. Upon follow-up, the patient stated that all her symptoms had resolved and she noticed a change within 1 week from surgery.

DISCUSSION

Infection associated with breast implants occurs in 1.1%–2.5% of patients after aesthetic breast augmentation and up to 35% after breast implant reconstruction following mastectomy.³ Most commonly, these infections are derived from bacteria on the normal human skin flora and can lead to symptoms of fever, acute pain, and marked breast erythema, especially in the acute setting. One particular pathogen of interest is *P. acnes*, which is classically known for its role in the pathogenesis of acne.

Propionibacterium acnes, more currently known as *Cutibacterium acnes*, is a gram-positive rod-shaped bacterium that thrives under anaerobic conditions and is a part of the normal human skin microbiota. Although its association with acne is well understood, its role in a variety of chronic disease pathologies is under investigation. *C. acnes* has the ability to form biofilms around implanted devices, conferring protection against antibiotics and host immune defenses, allowing for persistent infection, leading to an exaggerated immune response. Biofilm formation with *C. acnes* can lead to persistent low-grade inflammation around the implant and can develop into capsular fibrosis, ultimately leading to capsular contracture.⁴ In previous studies, it has been shown that 46% of symptomatic breast implant patients had a positive sonication fluid culture and that from 54% of these positive cultures, *C. acnes* was isolated.⁵

When confronted with BII, plastic surgeons have the option to perform en bloc explantation, explant with total capsulectomy, explant with partial capsulectomy, or open capsulotomy. En bloc explantation is typically the preferred method. One study showed that patients had a statistically significant improvement in their subjective health after explantation.⁶ Lee et al showed that explanted capsules had a 50% higher rate of synoviocyte metaplasia and a six-fold increase in positive culture rate, with the most common organism being *C. acnes*.⁷ Forty-two of their 44 patients relayed improvement or resolution of symptoms after explantation. Wee et al performed a retrospective study of BII patients after explantation and found a significant and consistent improvement across 11 symptom domains, many of which were experienced by our patient.⁸

BII encompasses a wide range of potential symptoms. This makes it difficult to isolate a root cause. One school of thought in explaining BII is biofilm infection. *C. acnes* produces a biofilm that can protect the bacteria from antibiotics and allow for persistent low-grade inflammation, which can cause capsular contracture. Surgeons can use penicillin or linezolid plus rifampin for antibiotic regimens for 7–14 days.⁹ Further investigation into *C. acnes* as a potential cause of BII is warranted, along with identifying any association of active acne patients with BII. Surgeons who perform explantation due to BII should ensure that all capsules are fully cultured in the proper medium, which includes blood, MacConkey, and chocolate agars; CNA with blood; and thioglycollate broth. Thioglycollate broth (Thio broth) contains less oxygen; therefore, it is used for the growth of microaerophilic and anaerobic bacteria (Fig. 1). In addition, atypical mycobacterium may also be related to BII and should be considered in the initial cultures, and should have also been cultured on this patient in retrospect.

CONCLUSIONS

Although the constellation of symptoms surrounding BII can be vague, it is important for the plastic surgeon to address these symptoms. Unfortunately, there are no objective diagnostic tools at this time. Although there is no consistently identified cause for BII, patients who have



Fig. 1. Typical thioglycollate broth medium.

undergone explantation will often have positive cultures with *C. acnes*. Explantation often seems to help reduce or eliminate BII symptoms. Further research is required to learn if infections with *C. acnes* can be prevented or eliminated as a means of reducing the prevalence of BII.

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