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Recurrent Bilateral Breast Abscess in Immunocompetent Women: A Case Report and Literature Review

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Introduction

Breast abscess is a localized pocket of infection containing pus tissue; that commonly affects women of reproductive years with age ranging from 18-50 years. It is divided into a lactation and non-lactation infection. It can affect overlying skin as a primary event or secondary to a lesion such as sebaceous cyst [1]. Breast abscesses are typically caused by bacteria, most commonly *Staphylococcus aureus.* Other causes include mycobacterial and fungal infections [2]. There have been few reports of different infections caused by *Salmonella spp.* in recent years and a single case of bilateral breast abscess caused by *E. coli* and few by *Proteus mirabilis,* to our knowledge, there were no cases reported with recurrent breast abscesses caused by *Kocuria kristinae*. We present an unusual case of recurrent bilateral breast abscess caused by multiple organisms in an immunocompetent non-lactating patient.

Case Report

A 41-year-old Non Diabetic Saudi single female presented through the emergency department October 2015 complaining of progressive breast pain for 15 days' duration and a lump in the left breast. The patient denied history of fever, nipple or skin changes. On physical examination, she was cachectic and had left breast erythema, and tender mass. Admitted under the impression of mastitis with abscess. Further history taking was insignificant (negative history of fever, night sweats, smoking, alcohol or illicit drug use, trauma, nipple piercing, insect bite, nor swimming in public pools), apart from repeated visit to GIT clinic for weight loss and anorexia. She also denied history of ever being sexually active. In her family history, her aunt suffered from breast cancer. Laboratory investigations revealed elevated white blood cells (lymphocytes), total bilirubin, & ESR. She was managed with IV antibiotic & incision drainage done. The culture isolated Pseudomonas aeruginosa (Table 1).

Table 1: From October 2015 till January 2018 patient admitted ten times with repeated bilateral breast abscess.

October 2015	LT breast	*E coli/ Pseudomonas aeruginosa*
November 2015	RT + LT Breasts	*E coli/ Proteus mirabilis*
January 2016	RT Breast	*E coli/ Pseudomonas aeruginosa*
September 2016	LT Breast	*E coli/ Proteus mirabilis*
September 2016	RT Breast	*Ecoli/Kocuria ristinae/ Salmonella*
July 2017	RT + LT Breast	Mixed organisms
July 2017	LT + RT Breast	*Proteus mirabilis*
August 2017	LT Breast	*Proteus mirabilis*
November 2017	RT Breast	*E coli/ Proteus mirabilis*
January 2018	RT Breast	*KlebsiellaPneumoniae/ Citrobacter* species

She noted flu like symptoms prior to each attack. She noticed that her attacks were mostly when her weight decreases since she's underweight with history of weight loss and decreased appetite over the last few years. Her height is 156.5cm and her weight varies between 37-47kg making her average BMI= 17 which is considered underweight (She currently weighs 38kg). She was investigated thoroughly for the decrease in appetite and weight loss and nothing found except positive H Pylori stool antigen each time. Hepatitis profile, HIV test, and TB tests were negative as well as cancer screening. IgG, IgM, IgE, are normal level. Anti endomysial antibodies and Antigliadin antibodies are negative. Breast biopsy was negative for cancer or chronic inflammatory condition.

Discussion

The main concern of most of the women presenting with breast symptoms, including lumps, is likelihood of cancer, however, most breast masses are benign including fibrodenomas, fibrocystic condition, intraductal papilloma and breast abscesses [1]. WHO report on mastitis in 2000 clearly indicates that mastitis and abscesses are more common in lactating versus non-lactating women and NHS choices website article on breast abscesses, stated that "Breast abscesses are very uncommon in women who are not producing milk." Non-lactational breast abscesses can be divided into two broad groups, Peripheral and Areolar.

Breast abscess in non-lactating women had limited data in the literature [4]. the most significant risk factor for non-lactating breast abscess is diabetes mellitus (DM), smoking and immune suppression which was not identified as a risk factors in our case. Granulomatous mastitis another underlying diagnosis with high recurrence rate. Most common microorganism isolated from breast abscess is Staph [21-23]. Aureus other rare bacteria species can be found in immunocompromised patent. In our case, the identifiable organisms were *Salmonella sp., Pseudomonas arignosa*, *E. coli, Proteus mirabilis, Klebsiella pneumoniae, Citrobacter species* and *Kocuria kristinae* in different occasions.

Salmonella typhi bacteremia is occasionally associated with extra intestinal disease. It is capable of forming abscesses in various organs such as liver, subcutaneous tissue, muscles and skin. The pathogenesis of abscess formation is not well established [24]. The possible causes may be infective bile from carriers, hematogenous spread from distant site, and lym¬phatic spread from gastrointestinal tract. Bilateral breast ab-scesses due to *Salmonella typhi* are a rare presentation. However, the present case was not associated with a detectable bacteremia in the past [3]. It is well known that the most common cause of community-acquired urinary tract infection is E. coli.

However, it is a rare occurrence of a breast abscess caused by *E. coli. Proteus mirabilis* is most often associated with infections of the genitourinary tract. Breast abscess formation with Proteus mirabilis is uncommon. This infection is more common in diabetic patients who also have an increased risk of abscess recurrence [9]. The treatment of breast abscess during the non-lactating period is controversial in the literature, especially regarding such rare infections. For an early abscess presenting as an indurate mass, a course of antibiotics may suffice. For a mature abscess (e.g., fluctuant mass), surgical intervention along with antibiotics is indicated. The following table summarizes literature review of 24 cases of breast abscess of Non Staph [25]. Aureus rare microorganisms in Non lactating woman, however, almost all of them have identifiable risk factors which lack in our case (Table 2).

Table2: Literature review of 24 cases of breast abscess.

S. No:	Name	Age	Gender	Organism	Side	Co-morbidities/ risk factors	Important Information
1	Bilateral Breast Abscess Caused by *E. coli* in a Non-lactating Woman: A Rare Case [6]	36	Female	*E. coli*	bilateral	She had been diagnosed with urinary tract infection about 10 days ago	
2	A Rare Case of Tubercular Breast Abscess in a Young Immunocompetent ssNon- Lactating Female [8]	22	Female	*M. Tuberculosis*	Right	Patient is a resident at an endemic area	Patient had history of intermittent fever, loss of appetite and loss of weight for 5-6 weeks prior to presentation
3	A Rare Case of Breast Abscess Due To *Salmonella Typhi [3]*	60	Female	*Salmonella typhi* growth sensitive to Amikacin/ Ampicilinsulbactam/ Cefepime/ Ceftazidime/Pipataz/Imipenam	Right	Patient was a diabetic on irregular treatment	
4	Bilateral Breast Abscesses due to *Salmonella enterica* Serotype Typhi [9]	29	Female	Salmonella typhi sensitive to chloramphenicol, cefotaxime, ciprofloxacin, and co-trimoxazole but resistant to ampicillin and nalidixic acid	Bilateral	It was associated with a detectable bacteremia in the past	
5	Bilateral brucellar breast abscess in a 48-year-old woman [10]	48	Female	*Brucella* species	Bilateral	Patient was involved in stockbreeding on a farm	Patient had history of night sweats for the previous 2 years

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6	Breast abscess due to *Actinomyces europium [11]*	67	Female	*Actinomyces (A. europaeus)* and a mixed anaerobic flora composed of Gram-negative rods and Gram-positive cocci that were not further characterized	Left	None identified	Patient had undergone uncomplicated open heart surgery to receive a prosthetic aortic valve for severe aortic stenosis 2 months prior
7	Breast abscess due to *Actinomyces* europaeus [12]	43	Female	*Salmonella enterica* serotype *Typhimurium*. The microorganism was susceptible to ampicillin, ciprofloxacin, trimethoprimsulfamethoxazole, erythromycin, chloramphenicol, ceftazidime, and ceftriaxone.	Right	The patient had a history of 5 years of RA and was on prednisone therapy.	The patient had history of diarrhoea for approximately 3 days and did not receive any antibiotic treatment 2 months prior to presentation
8	Breast Abscess in a Man Due to *Salmonella enterica* Serotype Enteritidis [13]	70	Male	*Salmonella enterica* serotype Enteritidis sensitive to amoxicillin-clavulanic acid, ceftriaxone, trimethoprim-sulfamethoxazole, and ciprofloxacin	Left	Patient is non-insulin-dependent diabetic	The patient had history of an episode of severe acute gastroenterocolitis 10 months earlier with signs of acute renal failure
9	Brucellar breast abscess [14]	63	Female	Brucella	Left	Patient had a history of unpasteurized cheese consumption	
10	*Fusarium solani* Breast Abscess [15]	55	Female	*Fusarium solani*	Right	Patient is a diabetic on irregular therapy for 6 years	Patient worked in paddy field and carried hay bundles between her right arm and her breast. *Fusarium solani* spores from the hay probably gained entry through minor abrasions sustained while working in the field
11	*Cordylobia rodhaini* infestation of the breast: Report of a case mimicking a breast abscess [16]	17	Female	*Cordylobia rodhaini* Parasite.	Left	The patient returned from a voyage in Ghana fourteen days prior to the first presentation	
12	First report of *Actinomyces europaeus* bacteraemia result from a breast abscess in a 53-year-old man [17]	53	Male	*Actinomyces europaeus* and *Porphyromonas*	Right	The patient was diabetic and smoked 20-30 cigarettes a day. She had recurrent cutaneous abscesses, mainly in the axillae and the groin	Other identified comorbidities were obesity, chronic obstructive pulmonary disease and schizophrenia
13	Identification of *Propionibacterium* avidum from a breast abscess: an overlooked etiology of clinically significant infections [18]	37	Female	*Propionibacterium avidum* sensitive to amoxicillin, amoxicillin-clavulanic acid, ceftriaxone and levofloxacin and resistant to clindamycin.	Right	The patient had undergone bilateral reduction mammoplasty for symptomatic hypertrophy	
14	Male Breast Abscess Secondary to Actinomycosis: A Case Report [19]	24	male	Actinomycosis neuii	Left	Medical history of Human Immunodeficiency Virus (HIV) and syphilis	The patient underwent bilateral reduction mammoplasty for gynecomastia eight years previously.

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15	Melioidosis breast abscesses [20]	46	Female	*Burkholderia pseudomallei*	Right	Travelling to Aruba and direct contact with an iguana and multiple mosquito bites	Past medical history of recurrent breast cysts, which resolve on their own
16	*Mycobacterium Fortuitum* and Anaerobic Breast Abscess Following Nipple Piercing: Case Presentation and Review of the Literature [21]	17	Female	*Mycobacterium Fortuitum -Prevotalla melanogenica*	Right	Nipple piercing	
17	*Mycobacterium fortuitum* breast abscess after nipple piercing [22]	21	Female	*Mycobacterium fortuitum* -nocardia species	Left	Nipple piercing and swimming in algae water	
18	Periprosthetic Breast Abscess Caused by *Streptococcus* pyogenes After Scarlet Fever [23]	32	Female	*Streptococcus pyogenes* (GAS)	Right	History of breast reconstruction with implant and scarlet fever	History of mammary Paget disease with high-grade ductal carcinoma in situ (DCIS G3), treated with right mastectomy and axillary node dissection, underwent an immediate breast reconstruction by insertion of 350-mL saline textured McGhee style 133 LV implant. -2 months later, she developed fever and sore throat, 2 days later, she developed a rash on the neck and chest. After laboratory investigations, she was diagnosed with scarlet fever and treated accordingly
19	*Proteus mirabilis* Breast Abscess A Case Report and Review of the Literature [24]	43	Female	*Proteus mirabilis*	Right	History of chemotherapy, hypertension, smoking 7-pack-year; she drank alcohol 2 days a week. - She felt her boyfriend's poor dentition had a role in the development of this infection	History of adenocarcinoma of the colon status post hemicolectomy and 6 cycles of chemotherapy
20	Recurrent *Corynebacterium kroppenstedtii* Breast Abscess in a Young Asian Female [25]	36	Female	*Corynebacterium kroppenstedtii*	Right	History of mild trauma (collision with her 2-year-old child)	History of hemithyroidectomy for benign thyroid nodules.- She had recurrent breast abscess for 3 times
21	*Salmonella enterica serovar* Typhi in breast abscess: A case report [26]	60	Female	*Salmonella typhi*	Not noted	Diabetes	There was no past history of chest pain or abdominal pain

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22	*Salmonella typhi* Breast Abscess: An Uncommon Manifestation of an Uncommon Disease in the United States [27]	28	Female	*Salmonella typhi*	Right	Eating undercooked chicken several weeks' prior presentation at a take-out place, But denied any gastrointestinal symptoms	She denied recent trauma but had a penetrating stick injury to the right breast as a child.
23	*Salmonella typhi* Breast Abscess: An Uncommon Manifestation of an Uncommon Disease in the United States [7]	52	Female	*Corynebacterium xerosis. -Staphylococcus aureus. -Proteus mirabillis. - Streptococcus viridans*	Not noted	Wegener's granulomatosis	5 recurrent episode of breast abscess.- Idiopatic granulomatous mastitis was the suspicious diagnosis and a mastectomy was performed.- Two weeks later, the patient showed a widespread erythematous and petechial vasculitic rash with areas of confluence together with well-demarcated areas of ulceration affecting her legs. She referred throat pain and ear ache. Further investigations findings were Compatible with Wegener's granulomatosis
24	Breast abscess with lethal septicemia due to Pseudomonas aeruginosa in a patient with AIDS [28]	21	Female	Pseudomonas aeruginosa	Not noted	HIV	HIV infection had been confirmed 6 years earlier

Conclusion

Any case of a recurrent breast abscess in a non-lactating female must be heavily evaluated, in terms of clinical, laboratory and imaging assessment for any possible under lying risk factors can be identified. Keeping in mind the absence of such risk factors does not rule out rare or recurrent breast infections as it is the case in our patient whom after thorough investigation we could not find any identifiable risk factor.

The combination of medical and surgical management helps in such a case when supported by a microbiological culture and sensitivity report.

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