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Case Report

Osteomyelitis of sternum and rib after breast prosthesis implantation: A rare or underestimated infection?



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ABSTRACT

Sternum and rib osteomyelitis complicated from breast implant infection is rare. We report a case of early sternum and rib osteomyelitis occurred during breast implant infection managed in an inter-regional referral center for bone/joint infections in the south of France.

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Introduction

Rib osteomyelitis is rare and usually occurs in patients with predisposing factors such as pneumonia and/or lung empyema, chest trauma, chronic granulomatous disease and neutropenia, sickle cell disease, thalassemia or disseminated fungal infections [1–4]. The main causal microorganisms are *Mycobacterium tuberculosis* and *Staphylococcus aureus* [1,2]. We report here the first case of early sternum and rib osteomyelitis occurred during breast implant infection managed in an inter-regional referral center for bone/joint infections in the south of France.

Case report

In July 2014, a 59-year-old women was admitted in into the infectious disease department of the University Hospital in

Marseille for swollen, erythematous, painful breasts with purulent discharge from surgical wound of left breast prosthesis implantation. Fifteen months after weight-loss surgery and advanced diet per bariatric surgery nutritional procedure for morbid obesity (body mass index 41 kg/m²), she has significant loss of 43 kg (body mass index weight 20 kg/m²). There was nothing else notable in her medical history.

Four weeks before her admission, she underwent breast prosthesis implantation, mastopexy and arm lifting surgery in private clinics in the region. One week after surgery, she presented with thoracic pain and purulent discharge from surgical wound. The laboratory investigations revealed high C-reactive protein levels (74 mg/l; normal values ≤5 mg/l), elevated leukocyte count (12,000 μL⁻¹, predominantly neutrophil granulocytes), low hemoglobin concentration (10 g/l; normal = 135–175 g/l), and normal platelet count (480,000 μL⁻¹). The culture of the fluid obtained by percutaneous drainage was positive of *Pseudomonas aeruginosa*. Symptoms persisted despite of 10 days of oral therapy by ciprofloxacin. Breast prosthesis implant have been removed and intravenous antimicrobial treatment of amikacin and ceftazidime was begun.

Fifteen day later, she had been admitted in our unit for persistent of swelling, reddish, painful left breast and purulent

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discharge from surgical wound of left breast implant. Her body temperature was 37 °C, her pulse was 74 beats/min, and her blood pressure was 127/70 mmHg. Laboratory investigations revealed normal values for C-reactive protein (1 mg/l; normal values ≤ 5 mg/l) and normal leukocyte count ($5000 \mu\text{L}^{-1}$), low hemoglobin concentration (10 g/l; normal = 135–175 g/l), and normal platelet count ($300,000 \mu\text{L}^{-1}$). Magnetic resonance imaging (MRI) has shown an inflammation of anterior chest wall in the left side with sternal osteitis (Fig. 1a and b).

She was treated by surgical lavage with debridement, a fistulectomy with costal-chondral resection of infected tissue. The necrotic periosteum and perichondrium tissues and hypovascularized rib were removed (Fig. 1c). A removal of 3rd and 4th left ribs and a partial sternal resection was performed (Fig. 1d). Bacterial cultures of the deep sample were negative. Analyses for *S. aureus* and *M. tuberculosis* by PCR and 16S RNA testing were negative. She was discharged one week after surgery. She received 90 days of treatment with imipenem/cilastatin and ciprofloxacin.

Discussion and conclusion

Mammary implants have been used since the first part of the 20th century. Breast implants are implemented both for breast enlargement and for breast reconstruction, e.g., in women who have undergone mastectomy for breast cancer. More than 200,000 breast implants are placed every year in the United States [5]. The prevalence of infectious complications from breast implants is less than 5% overall but is higher in the case of patients with a previous history of breast cancer treated with radiotherapy and/or immediate reconstructive surgery after mastectomy [5,6].

Recently, we have reported the first 3 cases of chronic rib osteomyelitis as a complication of chronic breast implant infection which was occurred in 8% of breast implant infections managed in our center from 2008 to 2012 [7]. All of chronic rib osteomyelitis cases reported in our previous study were diagnosed during the surgical breast implant removal without prior diagnostic imaging study.

The case reported here is remarkable because the diagnosis of early sternum and rib osteomyelitis was identified by MRI and confirmed by in intra-operatively finding at 4 weeks after breast prosthesis implantation.

Sternal and rib osteomyelitis after breast implantation was a poorly recognized complication, only four cases of osteomyelitis of the rib after breast implantation were reported by including in this case. We supposed that the periprosthetic compartment was primary infected with *P. aeruginosa* and the infection has spread secondary the ribs and sternum by direct continuity.

In this case, round breast implants in silicon with macro-textured surface were inserted in the retro-muscular space at the level of the periosteum in the mammary groove at the same time of mastopexy. Three previous cases, round breast implants in silicon with macro-textured surface were inserted in the retro-muscular space at the level of the periosteum through inframammary fold. Breast implants were manufactured by different brands but all were in silicon. Patient was positioned supine with both arms outstretched on arm boards and breast implants were inserted under general anesthesia. Povidone–iodine was used as antiseptic for preoperative skin preparation. Surgical wounds were disinfected every 2 days by povidone–iodine and covered with fatty gauze dressings (Jelonet[®], Smith and Nephew Ltd.). Pre-surgical preparation and overall skin care was in conformity as recommendation of the French Society of Hospital Hygiene

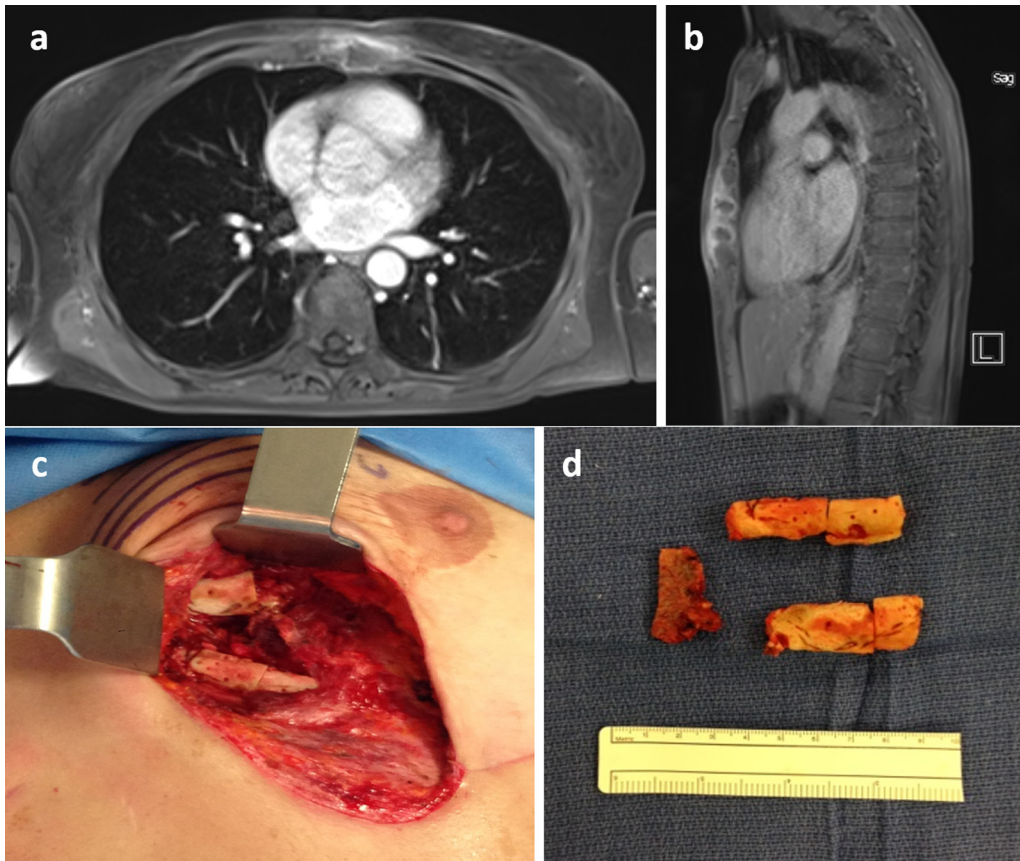


Fig. 1. Magnetic resonance imaging (MRI) has shown an inflammation of anterior chest wall in the left side with sterna osteitis (a and b), image of necrotic periosteum/perichondrium tissues and hypovascularized ribs (c), and the 3rd and 4th left ribs have been removed (d).

guideline (http://nosobase.chu-lyon.fr/recommandations/sfhh/2013_gestion_preoperatoire_SF2H.pdf).

To date, two cases of osteomyelitis of rib after breast prosthesis implantation caused by *S. aureus*, 1 case of osteomyelitis of sternum and rib after breast prosthesis implantation caused by *P. aeruginosa* (this case), and one cases of osteomyelitis of rib after breast prosthesis implantation caused by both bacteria have been reported [7]. In general, *S. aureus* and *M. tuberculosis* were frequently involved in osteomyelitis of rib [1,2]. Breast implant infection was usually caused by *S. aureus* and coagulase negative staphylococci. Gram negative bacteria were rarely involved [8]. However, 8 of 37 cases (22%) of breast implant infection managed in our centers over 4.5 years of experience were caused by *P. aeruginosa* (data not shown). We think that the trend of breast implant infection in our region has changed.

Sternum and rib osteomyelitis after breast prosthesis implantation should be considered and investigated by early imaging study which is necessary to adjust the management strategy. In this case, the infection was successfully managed with surgical removal of the 3rd and 4th left ribs and a partial sternal resection was followed by prolong antibiotic treatment. No apparent relapse was observed at the three-month post-antibiotic follow-up.

Ethics

This study was approved by the Institutional Research Ethics Board, and a written informed consent form was signed by the patient.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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