Case report

An uncommon cause for a breast abscess: *Actinomyces turicensis* with *Peptoniphilus harei*

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SUMMARY

Our case report describes a patient with a common presenting complaint yet an uncommon infection. Our patient presented with a fluctuant breast mass diagnosed as a breast abscess. An aspirate sample was sent for culture and sensitivities, which revealed the presence of *Actinomyces turicensis* and the anaerobe *Peptoniphilus harei*. She was therefore prescribed several weeks of amoxicillin and metronidazole, and made a full recovery. There are only three case reports describing *A. turicensis* as a causative organism for breast abscess, one of which had also occurred in our department. One case also showed the additional presence of *P. harei*. Our findings reveal a growing need for increasing clinician awareness of *A. turicensis* and the importance of aspirate sample culture and sensitivity.

BACKGROUND

Breast abscesses are a common diagnosis often seen in both puerperal and non-puerperal women.[1] *Staphylococcus aureus* is the most common causative organism, followed by mixed anaerobes and anaerobic cocci. This publication presents the case of a non-puerperal female patient who developed a breast abscess secondary to *Actinomyces turicensis* and *Peptoniphilus harei*. This is the fourth published case report that describes a breast infection secondary to this bacterium, and the second where the anaerobe *P. harei* has been isolated as a second pathogen, therefore drawing the attention to the growing need for increasing awareness of *A. turicensis* and its many facets.

CASE PRESENTATION

Our patient first presented to her general practitioner with 5-day history of a swollen, erythematous right breast. Interestingly, she had persistent lactation from her right breast since a pregnancy around 20 years previously, but this had never been investigated. She denied any skin or nipple changes, and had had no fevers. She was 43 years of age, usually fit and well and a mother of three. She was not peripartum. She was not taking any regular medication and was a smoker. Her family history was strongly positive for breast cancer, with two first-degree relatives developing the condition under the age of 50 years.

On examination, her general practitioner identified an erythematous, warm, firm, tender 3 cm lump in the right breast, but also two large irregular masses in the inner upper quadrants of her right and left breasts. She was prescribed a 7-day course of oral flucloxacillin and referred under the 2-week-wait protocol to her local breast unit.

She was reviewed by a consultant breast surgeon 2 days thereafter, who identified a single 2×2 cm periareolar breast abscess in the right breast. A sample of thick pus was aspirated and the fluid sent for culture, as per the local breast abscess pathway. No other lumps or lymphadenopathy were identified on palpation. On the same day, an ultrasound of the right breast and axilla identified periareolar skin oedema with no fluid collection and no lymphadenopathy. The left breast revealed an occasional small cyst that was identified with no associated lymphadenopathy. A further 14 days of oral flucloxacillin was prescribed.

INVESTIGATIONS

Four days after the pus sample was taken, culture reports from the aspirate core revealed a heavy growth of *A. turicensis* sensitive to penicillin, co-amoxiclav, clindamycin and meropenem, and a heavy growth of *P. harei* sensitive to metronidazole. Both organisms had been identified using matrix-assisted laser desorption ionisation–time of flight mass spectrometry. The antimicrobial susceptibility profile of the *Actinomyces* sp was determined according to the European Committee on Antimicrobial Susceptibility Testing guidelines, and the *P. harei* metronidazole susceptibility result was determined using British Society for Antimicrobial Chemotherapy guidelines. Blood results were all within the normal range with a concentration of white blood cells at 8.1×10^9/L.

DIFFERENTIAL DIAGNOSIS

Although the majority of breast lumps are benign, a new palpable mass is also a common initial presenting complaint for breast cancer. Given the symptoms of a warm, tender breast mass with overlying erythema, it was felt breast cancer was unlikely in this patient. Instead, these symptoms were consistent with a mastitis with an underlying breast abscess. Therefore, a fluid aspirate was performed under ultrasound guidance and the sample sent for cultures and sensitivities.

A common cause of breast abscesses is lactational mastitis, especially in the puerperium period when women are most likely to be breast feeding. In our case, it was felt unlikely that the abscess was secondary to lactational mastitis, as the patient had had persistent lactation from her right breast for

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~20 years with no previous complications identified. However, this unusual feature was likely a contributing factor for the patient's risk of a breast infection.

TREATMENT

The patient was subsequently reviewed in clinic 2 weeks later. The periareolar erythema had improved and the lump measured 2×3 cm. As per advice from the microbiology team, the patient was prescribed a further 4 weeks of oral amoxicillin and 7 days of oral metronidazole. The course of amoxicillin was subsequently extended to a total of 8 weeks as per advice from the microbiology consultant.

OUTCOME AND FOLLOW-UP

Two months after she was first clinically assessed, we were pleased to see that the patient had made a full recovery from her infection and had normal clinical features on examination. We have therefore discharged her from our clinics and have referred her to the breast cancer family history pathway for further assessment of her cancer risk.

DISCUSSION

Actinomyces is a Gram-positive, rod-shaped genus of the *Actinobacteria* class that are endogenous to human mucosal surfaces, namely the oropharynx, and gastrointestinal and female genitourinary tract.[2] *Actinomycosis* is an invasive, progressive and sometimes relapsing granulomatous infection caused by this genus.[3] Due to recent developments in laboratory technologies, growing numbers of *Actinomyces* species have been discovered in the last three decades, with increasing evidence of symptomatic infections in multiple organs. Of the 30 *Actinomyces* species, 9 have been identified as causing active pathology in humans. The most prevalent species is *Actinomyces israelii*, which commonly affects the cervicofacial, thoracic and abdominopelvic areas with deep invasive abscesses, tissue fibrosis and draining sinus tracts.

A. turicensis was first described in 1995, when it was identified through 16S rRNA gene sequencing of mixed cultures from various infectious processes.[4] The species has been identified as a commensal organism of the tongue and female urogenital tract. Case reports mainly reveal *A. turicensis* infection in symptomatic genital, dermatological and urinary tract infections.[5] They are commonly isolated alongside other organisms, usually aerobic, in female urogenital infections and anaerobic in perianal and primary abscesses.

There are only three published reports documenting the identification of *A. turicensis* in breast abscess aspirates.[6–8] Only one of these reports reveals a monomicrobial infection in a non-puerperal woman, and only one laboratory study has identified *A. turicensis* in an isolated, pure culture.[9] This suggests the presence of *A. turicensis* on its own might be enough to trigger a symptomatic inflammatory response in the breast, although further research is warranted. It has been suggested *A. turicensis* infection may be caused by trauma to the breast, as two cases have been published in which there had been nipple piercings prior to the infection. All three published cases report a positive outcome with no recurrence or long-term complications.

Diagnosis is usually based on a culture from an aspirate sample from the site of infection. However, there is published evidence that a characteristic appearance of sulphur granules can be used to identify the organism through histopathological examination of a biopsy specimen.[10] This is particularly important to note given that the main differential diagnosis for breast actinomycosis is breast cancer. We note that several published cases describe patients having undergone unnecessary mastectomies for *Actinomyces* infection.[11 12]

Fortunately, antimicrobial susceptibility testing has shown that the majority of *A. turicensis* bacteria are sensitive to β-lactam antimicrobials (with and without β-lactamase inhibitors), carbapenems, tetracyclines and vancomycin.[13] In contrast, 95% of the samples tested were resistant to metronidazole. Limited published evidence recommends long-term antibiotic therapy for these patients, based on clinical experience and justified by the risk of recurrence.[14]

Our case report describes a patient with a common presenting complaint yet an uncommon infection. Had she not been so quickly referred to the breast clinic by her general practitioner, the patient may have developed complications such as a draining sinus or suffered recurrent abscesses. It was subsequently invaluable that our local microbiology team was able to promptly identify the bacteria and guide the team throughout this patient's care. Had a sample not been sent for cultures and sensitivities, it is uncertain whether the concurrent infection with *P. harei* would have resolved.

Learning points

- Clinicians should be aware of *Actinomyces turicensis* as a possible causative organism for breast abscesses.
- Input from the microbiology team is critical when treating patients with unusual presentations of pathological infections.
- Patients with a breast abscess secondary to *A. turicensis* should receive a prolonged course of antibiotics to ensure adequate treatment of the infection.

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