**Mycobacterium fortuitum** spontaneous breast abscess: is there a laterality effect?

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**Introduction:** Non-tuberculous mycobacteria are ubiquitous micro-organisms that rarely cause disease in humans, unless they are immunocompromised or have undergone trauma.

**Case presentation:** We describe a case of spontaneous breast abscess due to *Mycobacterium fortuitum* in an immunocompetent patient, identified using DNA-STRIP technology. This is the third report that, apart from being caused by the same agent, has the localization on the left breast in common, raising the question of a laterality effect.

**Conclusion:** Careful inspection of cultures and accurate agent identification are procedures to be emphasized in clinical microbiology laboratories. In fact, they may reveal unusual growth due to uncommon micro-organisms.

**Keywords:** DNA-STRIP technology; laterality effect; *Mycobacterium fortuitum*; spontaneous breast abscess.

**Introduction**
Non-tuberculous mycobacteria (NTM) are ubiquitous micro-organisms in soil and waters, where some may localize to specific niches, such as *Mycobacterium fortuitum* in pedicure baths (Winthrop et al., 2002); they rarely cause disease in humans, unless they have suffered trauma or their defence mechanisms are impaired. Human-to-human transmission is unknown. Although reliable data on the incidence and prevalence of NTM infections are lacking due to infrequent reporting to health agencies, there is a general perception that they are increasing (Griffith et al., 2007; Cassidy et al., 2009; Thomson et al., 2010).

*M. fortuitum*, one of 150 different NTM strains identified, has an incidence estimated between four and six cases per million people (Cassidy et al., 2009). It is a rapidly growing mycobacterium that causes skin and soft tissue infections after surgery or trauma, and may extend to the lungs, lymph nodes, bones, joints and meninges, often with fatal outcome in immunocompromised individuals. More commonly, it evolves as a severe infection of soft tissues following breast surgeries for prostheses implantation or breast resizing and after placement of skin piercings (Juang et al., 1989; Vinh et al., 2006; Coney & Thrush 2007; Bengualid et al., 2008; Lizaso et al., 2011; Abbass et al., 2014).

Here, we report the third case (Cooke & Friedland, 1998; Betal & Macneill, 2011) of a spontaneous breast abscess due to *M. fortuitum*, diagnosed in a healthy woman, without any previous history of breast surgery.

**Case report**
A 42-year-old Caucasian woman presented at our emergency department on 28 April 2013 complaining of a left breast painful mass that persisted for 1 month. One week before admission, she had a mammogram and a breast ultrasound, and was medicated with amoxicillin/clavulanic acid 875/125 mg every 12 h and ibuprofen 400 mg every 8 h, although unsuccessfully. On clinical examination, her temperature was 36°C, but the diagnosis of mastitis was established following the examination of the upper quadrants and central region of the breast.

She continued medication but, in the meantime, the breast symptoms worsened and, although without fever, the breast upper quadrants evidenced erythema and tenderness (Fig. 1a). A new ultrasound exam indicated the presence of a 5.5 × 2.3 cm collection of pus (Fig. 1b). Its aspiration resulted in about 20 cm³ of purulent fluid, which was sent to the laboratory for bacteriological examination. She maintained treatment with the previously prescribed medication and was referred to the Breast Centre of Centro Hospitalar S. João, Porto, Portugal. In the following month, whilst under clinical and ultrasound surveil-
lance, she was submitted to two additional punctures (10 and 20 May) and the collected material was sent for microbiological examination. A *M. fortuitum* strain was isolated in all three samples. At the next observation (25 June), fluid discharge was absent and thus no sample was collected for microbiological examination.

The patient was then medicated with levofloxacin 500 mg once a day and trimethoprim/sulfamethoxazole every 12 h, to continue for 4 months. During the following monthly observations, improvement was verified so that by July the patient felt well and the physical examination was normal. In May 2014, she was symptom-free, with a normal breast exam (Fig. 2), and was discharged from follow-up in November 2014.

The patient worked at a pet shop as an animal caregiver (doing baths and haircuts). She had no past relevant medical history, including lung, breast or skin disorders, and had been a non-smoker. Her menarche was at age 13 years; she took the pill for 20 years, was pregnant four times, had two deliveries and breast-fed for 1 year. There was no previous breast surgery and the patient denied any trauma or injury of any sort. No familiar history of breast pathology was ever recorded.

In the laboratory, the first sample was cultured on blood agar and a smear made for Gram staining was negative. On the second day of culture, very small, numerous, clear and irregularly limited colonies were observed; over the following days, they became larger, light-yellow and had an elevated centre (Fig. 3).

**Fig. 1.** (a) The breast on inspection. (b) Ultrasound image of a *M. fortuitum* spontaneous breast abscess.

**Fig. 2.** The same breast as in Fig. 1(a), 1 year after the diagnosis of a *M. fortuitum* spontaneous breast abscess.

**Fig. 3.** Colonies of *M. fortuitum* from the patient on blood agar.
A smear prepared with the modified Kinyoun stain revealed acid-fast bacilli; they were later identified as *M. fortuitum* using a GenoType Mycobacterium CM kit, a DNA-STRIP technology (Hain Lifescience), following the manufacturer’s instructions. Briefly, DNA was extracted by sonication and denatured at 95 °C for 20 min, followed by a multiplex amplification with biotinylated primers and reverse hybridization. The same mycobacteria were identified from the other two samples.

**Discussion**

*M. fortuitum* is a rapidly growing NTM. In an immunocompetent patient, it was associated with breast surgery for prostheses implantation for reconstructive or cosmetic purposes (Juang et al., 1989; Vinh et al., 2006; Coney & Thrush 2007; Bengualid et al., 2008; Lizaso et al., 2011; Abbass et al., 2014). The spontaneous disease is, however, extremely rare and, to the best of our knowledge, the current case is only the third hitherto described. It indicates that the condition may have a varied presentation because the patient reported in the first case (Cooke & Friedland, 1998) had marked general symptoms together with proximal and distal polyarthropathy, thus contrasting with the paucity of complaints in the second (Betal & Macneill, 2011) and the current case. Interestingly, all three cases share the same abscess localization on the upper outer quadrant of the left breast. This observation is intriguing because the upper outer quadrant was reported as the most frequent site for breast carcinoma and benign pathologies, such as fibroadenoma, cysts and phyllodes tumour (Aljarrah & Miller, 2014). It was argued that the greater proportion of breast tissue of the upper outer quadrant, the enhanced pressure exerted by lateral parts of bras and the effect of anti-perspiration products all contribute to this localization (Aljarrah & Miller, 2014). The reason why the left breast is preferred remains unclear – eventually, the lesser left side mobilization of right-handed individuals will disfavour lymphatic drainage at the left axillary region, and will predispose for the appearance and persistence of local neoplastic or infectious conditions.

The current case may help to explain why these infections are rare. In fact, if the mastitis is recognized early in its course, when pus collection is lacking and aspiration unnecessary, the final diagnosis may not be established. In addition, antibiotics may be successful enough to preclude the need for additional appointments. Indeed, in this case, only the second visit evidenced an abscess that could be drained and analysed by microbiological examination.

The growth properties of the micro-organism may also contribute to the rarity of the condition. In fact, although it is considered a fast-growing mycobacterium, colonies were still small sized on the second day, which may be overlooked during routine bacteriological culture observation.

*M. fortuitum* treatment is not supported by well-defined guidelines, such as those for *Mycobacterium tuberculosis*. Still, in contrast to amoxicillin/clavulanic acid, aminoglycosides, macrolides, sulfonamides, fluoroquinolones, imipenem and linezolid have been recommended (Brown-Elliott et al., 2012), and ≥ 6 months of treatment may be required. In this case, the successful levofloxacin and trimethoprim/sulfamethoxazole schedule, for 4 months, was based on the identification of the micro-organism.

This report highlights the likelihood of mycobacteria infection when common antimicrobials are not effective, and also the need to refer to the microbiological laboratory for adequate processing of the biological samples and final diagnosis.

**References**


