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CASE REPORT

Corynebacterium striatum INFECTING A MALIGNANT CUTANEOUS LESION: THE EMERGENCE OF AN OPPORTUNISTIC PATHOGEN

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SUMMARY

We described a case of a 27-year old male patient with skin and soft tissue infection of a neoplastic lesion caused by *Corynebacterium striatum*, an organism which has been rarely described as a human pathogen. Identification was confirmed by DNA sequencing. Successful treatment with penicillin was achieved. The role of the *C. striatum* as an emerging opportunistic pathogen is discussed.

KEYWORDS: *Corynebacterium striatum*; Immunocompromised patients; Oportunistic infections.

INTRODUCTION

Corynebacterium species are widely disseminated in the environment and constitute part of the normal skin and mucous membrane flora[3]. The pathogenicity potential of coryneform bacteria has for a long time been underestimated[3]. However, owing to the increasing number of immunocompromised patients, some corynebacteria species have turned clinically relevant[9]. Notably, *C. amycolatum*, *C. jeikeium* and *C. urealyticum* are currently recognized as important pathogens[3,5,6,8-11].

Although some reports previously described *C. striatum* as a causative agent of infections specially in immunocompromised patients, its role as a human pathogen is poorly understood[5,9,11]. We described a case of *C. striatum* skin and soft tissue infection of a malignant cutaneous lesion and emphasized its role as an emerging opportunistic human pathogen.

CASE REPORT

A 27-year-old male patient with a progressive ulcerative lesion which started two months before his hospitalization for investigation. The lesion had approximately 20 cm in its larger diameter at the left cervical region and shoulder and presented elevated erythematous irregular borders, with a clean base. Local edema surrounding the lesion was present. A non-fetid purulent secretion was present in the latter 15 days, when pain at the lesion was also referred. Cervical and submandibular painful lymph nodes were noted. Fever was sporadic (up to 38.5 ºC) during the course of the disease. There were no other complains. Complete blood count was within the normal range. The patient was submitted to lymph node and skin lesion biopsy. Multiple fragments from distinct sites of the skin lesion were removed. Ziehl-Neelsen and Grocott stains were negative. Gram staining of the lesion fragments revealed multiple gram-positive coryneform bacteria, some of them within polymorphonuclear neutrophils. The fragments were cultured aerobically on sheep blood agar (bioMérieux, Brazil) for 48 hours at 36 ºC. The organism grew in pure culture on sheep agar plate, consisting of gram-positive, catalase-positive, non-spore-forming, rod shaped organism. Preliminary identification was performed following standard procedures for *Corynebacterium* spp[3]. Further biochemical identification was achieved using the API Coryne system (bioMérieux Marcy-l'Etoile, France), according to the manufacturer's instructions. The code number achieved was 2111125, being the isolate identified as a *C. striatum/amycolatum.* Genomic DNA was extracted from a bacterial suspension using QIAamp DNA minikit (QIAGEN, Germany) according to the manufacturer's instructions, and then the 16S rRNA gene was amplified by PCR with the following primers: 8FLP (AGT.TTG.ATC.CTG.GCT.CAG) and 16S-3 (TGT.AAA.ACG.ACG.GCC.AGT). Reactions were submitted to 35 amplification cycles (95 °C for 30 seg; 55 °C for 30 seg; 72 for one min) and checked using agarose gel electrophoresis and UV exposure. PCR products were submitted to direct sequencing using the BigDye terminator chemistry (Applied Biosystems) and the following primers: 16S-2 (TAT.TAC.CGC.RGC.TGC.TGG) and 1096-R (GTT.GCG.CTC.GTT.GCG.GG). The determined sequences consisted of about 1200 nucleotides, which were compared with other available sequences in the DDBJ (DNA Data Bank of Japan) using the Blast program. The strain showed 98% of homology with the *C. striatum* sequences available in the DDBJ database and was clearly distinct from *C. amycolatum*.

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Minimum inhibitory concentrations (MICs) were determined by Etest (AB Biodisk Solna, Sweden) and were as follow: penicillin = 0.06 µg/mL; cefepime = 0.5 µg/mL; erythromycin = 0.12 µg/mL; tetracycline = 1 µg/mL; vancomycin = 0.25 µg/mL; clindamycin = 0.25 µg/mL and trimethoprim/sulfamethoxazole = 4/76 µg/mL.

The patient was treated with IV penicillin G crystalline three million IU each four hours during 14 days, when a significant decrease in purulent secretion as well as in the erythema of the borders of the lesion was noted. There was no more fever after 3-day therapy.

The lesion proved to be a T-cell lymphoma by histopathological and immunohistochemistry findings and the patient was further submitted to chemotherapy with complete resolution of the lesion.

DISCUSSION

This report showed an indolent infection of a neoplastic tissue by a usually human skin colonizer, *C. striatum*. This pathogen has been increasingly recognized as a human pathogen, particularly in patients with severe underlying diseases[5,8].

To our knowledge, this is the first case of a *C. striatum* infection of a malignant lesion. The tissue fragments collected by surgical procedure, the Gram staining with intracellular coryneform bacteria, and the heavy growth on culture were consistent with *C. striatum* as the etiologic agent of the infection.

Although *C. striatum* has been described as a cause of severe infections such as pneumonia and meningitis, mortality rates are usually low[5]. The infection from our report was not severe; however, even mild skin and soft tissue infections should be considered important, since it may be the source of more severe infections, such as bacteremia[6].

C. striatum is usually susceptible to a wide range of antibiotics, particularly β-lactams[7]. Nevertheless, strains presenting resistance to multiple antibiotics have been described in nosocomial outbreaks[9], limiting therapeutic options for treatment of infections by this organism. Our isolate, however, presented very low MIC values to all drugs tested, except for trimethoprim-sulfamethoxazole (MIC = 4/76 µg/mL).

It has been shown that the API system is an accurate and useful method to identify coryneform bacteria[2,4], although the API Coryne is not able to make the differentiation between *C. striatum* and *C. amycolatum.* Thus, molecular analysis is required to differentiation between these species.

In summary, our report reinforce the role of the *C. striatum* as an emerging opportunistic pathogen, which should no longer be considered just as a skin colonizer in immunocompromised patients with signs and symptoms of infection.

RESUMO

Corynebacterium striatum infectando lesão cutânea maligna: a emergência de um patógeno oportunista

Descrevemos infecção de lesão neoplásica em paciente masculino de 27 anos, envolvendo pele e partes moles, causada por *Corynebacterium striatum*, um microrganismo raramente descrito como patógeno humano. A identificação foi confirmada por seqüenciamento de DNA. O paciente foi tratado com penicilina, com sucesso. O papel do *C. striatum* como patógeno oportunista é discutido.

REFERENCES

1. CANTARELLI, V.; BRODT, T.; SECCHI, C.; INAMINE, E. & PEREIRA, F. - Cutaneous infection caused by *Corynebacterium pseudodiphtheriticum*: a microbiological report. **Rev. Inst. Med. trop. S. Paulo, 50:** 51-52, 2008.

2. FRENEY, J.; DUPERRON, M.T.; COURTIER, C. *et al.* - Evaluation of API Coryne in comparison with conventional methods for identifying coryneform bacteria. **J. clin. Microbiol., 29:** 38-41, 1991.

3. FUNKE, G.; VON GRAEVENITZ, A.; CLARRIDGE III, J.E. & BERNARD, K.A. - Clinical microbiology of coryneform bacteria. **Clin. Microbiol. Rev., 10:** 125-159, 1997.

4. FUNKE, G.; RENAUD, F.N.R.; FRENEY, J. & RIEGEL, P. - Multicenter evaluation of the updated and extended API (RAPID) Coryne Database 2.0. **J. clin. Microbiol., 35:** 3122-3126, 1997.

5. LEE, P.P.; FERGUSON Jr., D.A. & SARUBBI, F.A. - *Corynebacterium striatum*: an underappreciated community and nosocomial pathogen. **J. Infect., 50:** 338-343, 2005.

6. MARTIN, M.C.; MELON, O.; CELADA, M.M. *et al*. - Septicaemia due to *Corynebacterium striatum*: molecular confirmation of entry via the skin. **J. med. Microbiol., 52:** 599-602, 2003.

7. MARTÍNEZ-MARTÍNEZ, L.; PASCUAL, A.; BERNARD, K. & SUAREZ, A.I. - Antimicrobial susceptibility pattern of *Corynebacterium striatum*. **Antimicrob. Agents Chemother., 40:** 2671-2672, 1996.

8. MARTÍNEZ-MARTÍNEZ, L.; SUÁREZ, A.I.; RODRÍGUEZ-BAÑO, J.; BERNARD, K. & MUNIÁIN M.A. - Clinical significance of *Corynebacterium striatum* isolated from human samples. **Clin. Microbiol. Infect., 3:** 634-639, 1997.

9. OTSUKA, Y.; OHKUSU, K.; KAWAMURA, Y. *et al.* - Emergence of multidrug-resistant *Corynebacterium striatum* as a nosocomial pathogen in long-term hospitalized patients with underlying diseases. **Diagn. Microbiol. infect. Dis., 54**: 109-114, 2006.

10. SCHOLLE, D.A. - Spontaneous joint infection with *Corynebacterium striatum*. **J. clin. Microbiol., 45:** 656-658, 2007.

11. SORIANO, F & TAUCH, A. - Microbiological and clinical features of *Corynebacterium urealyticum:* urinary tract stones and genomics as the Rosetta Stone. **Clin. Microbiol. Infect., 14:** 632-643, 2008.

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