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Unveiling the First *Staphylococcus argenteus* Infection in Portugal

Descrição da Primeira Infeção por *Staphylococcus argenteus* em Portugal

Keywords: Portugal; Staphylococcal Infections; Staphylococcus argenteus
Palavras-chave: Infecções Estafilocócicas; Portugal; Staphylococcus argenteus

Dear Editor,

Staphylococcus argenteus is a novel species described in 2015, belonging to a divergent *Staphylococcus aureus* lineage.[1] Since then, the detection of *S. argenteus* infections increased worldwide, although it remains undistinguished from *S. aureus* by standard non-molecular methods.[1-4]

In December 2021, a 71-year-old man was admitted to the intensive care unit with respiratory failure associated with COVID-19 pneumonia. On day six of intubation, the tracheal aspirate was collected after the detection of purulent sputum associated with fever and increased systemic inflammatory markers.

At the microbiology laboratory, the bacteriological examination revealed a non-pigmented and greyish creamy colony with beta-haemolysis on blood agar (Fig. 1A) and a positive coagulase agglutination test. A putative *Staphylococcus aureus* was initially identified (labelled as ULSM26) through the automated identification systems VITEK®MS (bioMérieux) and susceptibility testing was performed on Vitek®2 (bioMérieux) with the AST-P648 card. Penicillin and vancomycin susceptibility were assessed by disc diffusion and the agar gradient test, respectively, according to the EUCAST breakpoints. The genetic background of ULSM26 was assessed by *spa* typing and detection of *mecA*, *pvl* and other virulence determinants were carried out by PCR.[5,6]

A methicillin-susceptible *S. aureus* (MSSA), with non-multiresistant profile, except to penicillin and tetracycline, was reported and the patient received ceftriaxone with a favourable clinical evolution.

Molecular characterization identified a *spa* type t5078, associated with clonal complex 75 and suggestive of a *Staphylococcus argenteus* species, which was confirmed by NRPS gene amplification (Fig. 1B).[1] Neither *mecA*, *pvl*, or other virulence genes were detected on USLM26, except the staphylococcal immune evasion cluster genes *sak* (staphylokinase) and *scn* (staphylococcal complement inhibitor).

Previous studies suggest that the frequency of healthcare-associated infections, morbidity and mortality are comparable to those of *S. aureus*.[2] Although resistance rates seem to be lower in *S. argenteus*, penicillin-resistant strains are common and methicillin resistance is prevalent in Europe and Australia.[3] Furthermore, a wide variety of virulence

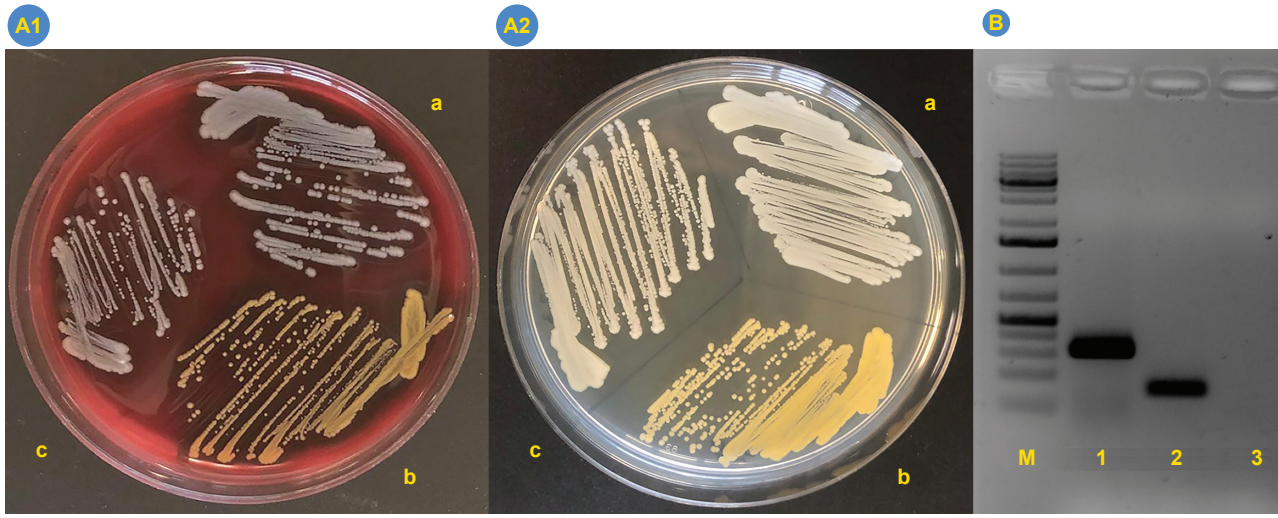

Figure 1 – Comparison between *Staphylococcus argenteus* (a) and *Staphylococcus aureus* (b and c) colonies after 24 hour incubation in non-selective media (triptic soy agar - TSA, Becton & Dickinson, Sparks, MD, USA) at 35°C with (A1) and without (A2) blood supplement. (a) *S. argenteus* ULSM26; (b) *S. aureus* ATCC6538; (c) *S. aureus* ATCC25923 (control strain). PCR amplicons of the nonribosomal peptide synthetase gene (NRPS).
1 – *S. argenteus* ULSM26 (340 bp); 2 – *S. aureus* BAA-42 (160 bp); 3 - negative control; M - 1 kb plus DNA ladder (B).

determinants have been described in *S. argenteus*, confirming its pathogenic potential.[1-3]

While *S. aureus* are endemic in Portuguese hospitals with 25% of methicillin-resistance in 2021[5], *S. argenteus* had not been previously detected. We believe that this identification rate is due to the fact that this microorganism is not present in the database routinely used in the laboratory (VITEK®MS System IVD 3.2). However, the new version of this system, which will be implemented soon, already incorporates *Staphylococcus argenteus*. In order to improve future decisions regarding surveillance, clinical relevance, and infection control, it is necessary to have updated laboratory equipment. Meanwhile, it is worth retaining the message that *S. argenteus,* an emerging pathogen with the ability to cause serious infection, is already circulating in our hospitals.

AUTHOR CONTRIBUTIONS

TC, MF: Data collection and writing of the manuscript.
VA, HL: Critical review and approval of the manuscript.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

PATIENT CONSENT

Obtained.

COMPETING INTERESTS

The authors have declared that no competing interests exist.

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Three Autochthonous Cases of Strongyloidiasis: An Endemic Tropical Disease Underdiagnosed in Portugal

Três Casos Autóctones de Estrongiloidíase: Uma Doença Tropical Subdiagnosticada Em Portugal

Keywords: Portugal; Strongyloides stercoralis; Strongyloidiasis
Palavras-chave: Estrongiloidíase; Portugal; Strongyloides stercoralis

Strongyloides stercoralis is a nematode with worldwide distribution, and a frequent cause of infection in tropical and subtropical regions.[1–5] Although sporadic imported and autochthonous cases have been described in Southern Europe,[3–5] there is no recent epidemiological data from Portugal.

Infection is more common in areas with poor sanitary conditions as it frequently occurs after skin exposure to contaminated soil with larvae. In Portugal, several autochthonous cases were described until 1985, suggesting endemic *foci*, mainly in the district of Coimbra.[1,2] After 1986 (when Portugal joined what was then known as the European Economic Community), sanitary conditions improved and the infection became underdiagnosed.[2]

The parasite can complete its lifecycle within the human host with persistent autoinfection. If not correctly eradicated, the parasitosis may persist for decades, with periods of remission and recurrence of symptoms – mainly gastrointestinal, respiratory, or cutaneous. Peripheral intermittent eosinophilia is common, but its absence does not exclude the diagnosis.[1]

In immunocompromised individuals (particularly those with impaired cellular immunity),[3] hyperinfection syndrome may occur: an accelerated autoinfection cycle with disseminated strongyloidiasis, associated with a high morbimortality. Therefore, eradication is particularly important in immunosuppressed or immunosuppression candidates.[1,3]

In 2020, Pinto *et al*[1] presented one of the first autochthonous cases of strongyloidiasis in Portugal since 1985[5]: the case of a 69-year-old farmer with abdominal pain and eosinophilia.

We present three cases of strongyloidiasis diagnosed at our institution between 2017 and 2018. These individuals were born between 1935 and 1958 in Matosinhos, Vila do Conde and Amarante, with no travel to endemic areas reported before diagnosis.

One patient was completely asymptomatic, but parasite eradication was performed as the patient was a candidate for immunosuppressive therapy. In the other two situations, symptoms or signs compatible with chronic infection were described: diarrhea after the initiation of rituximab and high-dose corticosteroids, and marked eosinophilia (49%, 5800 eosinophils/μL). In the latter, eosinophilia improved dramatically after treatment.

In all cases, parasitological stool examinations were negative, and the diagnosis was confirmed by immunoenzymatic assays.

The authors wish to draw attention to the existence of chronic carriers of *S. stercoralis*, who may have contracted the infection decades earlier. This parasitic infection is presumably forgotten and underdiagnosed due to the low clinical suspicion in patients without a history of travel to endemic regions. The consequences of hyperinfection syndrome after immunosuppression are dismal, and a high degree of suspicion is needed, particularly in patients with previous or current precarious sanitary conditions.

AUTHOR CONTRIBUTIONS

SRO: Data collection and writing of the manuscript.
CB, SMS: Data collection.
IN, SJ: Critical review of the manuscript.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

PATIENT CONSENT

Obtained.

COMPETING INTERESTS

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