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Research Article

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Panton-Valentine Leukocidin (PVL) Skin Abscesses in Children and Adolescents Diagnostic and Treatment - A Case Report

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Summary

Panton–Valentine leukocidin is a cytotoxin, which is associated with an increased virulence of isolates of Staphylococcus aurous. It can cause necrotic dermal lesions or recurrent skin abscesses and in rare cases necrotic haemorrhagic pneumonia.

In our case a 15-year-old immunocompetent male was seen in the emergency department complaining of a painful tibial swelling. He had been travelling to South East Asia a year ago and had been suffering from multiple skin abscesses since then. Clinically, a tibial abscess was diagnosed and operatively excised the same day. The postoperative course of the patients was uneventful. In the microbiological analysis a methicillin-susceptible Staphylococcus aurous was isolated and the presence of lukF-lukS genes for Panton–Valentine leukocidin was determined. In order to avoid further spread of the cytotoxin the patient underwent an ambulant antibiotic eradication therapy with Cotrimoxazole 960mg twice daily for 5 days along with a decolonisation.

An infection with Panton–Valentine leukocidin should be suspected diagnosed and treated in young immunocompetent patients with recurrent cutaneous abscesses or affected contacts.

Keywords: Panton–Valentine Leukocidin (PVL) - Complication–Skin Abscesses - Staphylococcus Aureus – Methicillin Resistant Staphylococcus Aureus (MRSA) – Methicillin Susceptible Staphylococcus Aureus (MSSA)

Abbreviations

PVL: Panton–Valentine Leukocidin
HA-MRSA: Healthcare-Associated MRSA
CA-MRSA: Community-Acquired MRSA
MSSA: Methicillin-Susceptible Staphylococcus Aureus

Introduction

Panton–Valentine leukocidin (PVL) is a cytotoxin, which is associated with increased virulence of Staphylococcus aureus resulting in necrotic dermal lesions, cutaneous abscesses, and furunculosis and in rare case necrotic haemorrhagic pneumonia [1]. It is present in the majority of community-aquired Methicillin-resistant Staphylococcus aureus (CA-MRSA) isolates and is associated with with an increased virulence of methicillin-susceptible Staphylococcus aureus (MSSA) [2].

Material and Methods

A 15-year-old immunocompetent male was seen in the emergency department complaining of a painful tibial swelling. He had been travelling to South East Asia a year ago and had been suffering from multiple skin abscesses since then. Clinically, a tibial abscess was diagnosed and excised the same day. The postoperative course of the patients was uneventful. The microbiological analysis showed a MSSA and the presence of lukF-lukS genes for PVL association. In order to avoid further spread the patient underwent an ambulant antibiotic eradication therapy with Cotrimoxazole 960mg twice daily for 5 days along with a decolonisation.

Discussion

MRSA infections are classified as healthcare-associated (HA-MRSA) or community-aquired (CA-MRSA) [3, 4]. CA-MRSA infections are increasingly seen in healthy individuals without any exposure to healthcare facilities and in immunocompetent populations like children and adolescents [5]. CA-MRSA show different antimicrobial profiles than HA-MRSA and are associated with a higher virulence and soft tissue and skin [6-8].

PVL is a cytotoxin made of F and S sub-units which contain lukF-lukS genes [7]. It forms pores exclusively in leukocytes and induces high inflammatory mediators such as leukotriene B4, IL-8 and histamine [9]. When lukF-lukS genes are positively tested, the diagnosis of PVL infection can be made.

PVL is known to induce furunculosis, cutaneous abscesses, invasive soft tissue infections and necrotising pneumonia [10-12].

Our case highlights the clinical impact and the virulence of PVL

showing the need of an accurate microbiological diagnosis and appropriate drug treatment. This is not only to avoid subsequent recurrences of cutaneous infections but also to prevent further spread and the manifestation of even more serious infections such as necrotising pneumonia.

Increasing awareness among community-based healthcare providers of PVL-producing Staphylococcus aureus infections is important to facilitate rapid and adequate response in similar clinical events in the future.

Conclusion

An infection with PVL should be suspected and ruled out in young immunocompetent patients such as young children and adolescents with recurrent cutaneous abscesses or affected contacts. PVL-positive MRSA and MSSA infections are potential threats to public health due to the fast dissemination with high virulence and an antimicrobial resistance.

Known or expected cases (Table 1) should to undergo a protocolised decolonisation to avoid further spread (Table 2). An antibiotic treatment is recommended in patients with severe skin abscesses or complications (Table 3). PVL-positive patients in hospitals should be isolated in single rooms or in cohorts.

Table 1: Indications for decolonisation

Indications for decolonisation
PVL positive (symptomatic or asymptomatic)
Symptomatic without confirmation of PVL, if PVL positive environment
Asymptomatic without confirmation of PVL, if >2 affected members in the household

Table 2: Protocol of decolonisation

Protocol for decolonisation on five consecutive days
1. Decolonisation of the nose (three times daily)
2. Mouth-Throat-wash (twice daily)
3. Full body wash (once daily)
4. Daily exchange/washing (60 degrees) of clothing/hygienic articles/ bed sheets
5. Controls post decolonisation (three days post decolonisation, 3-6 months post decolonisation
6. Antibiotic treatment of severe skin abscesses or complications

Table 3: Antibiotic regime for patients with severe abscesses

Antibiotic regime for patients with severe/recurrent abscesses
Calculated monotherapy for 5 (up to 14) days
Cotrimoxazole 960mg 1-0-1 p.o.
Clindamycin 600mg 1-1-1 p.o.
Doxycycline 200mg 1-0-0 p.o.
Severe Infections or MRSA+/PVL+ addition with Rifampicin 600mg 1-0-0 p.o. for 3 (up to 14) days

The information received from typing Staphylococcus aureus isolates may help within the investigation of nosocomial and community-aquired infections and for the introduction of effective preventive and infection control measures.

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