

## A Picture of Bacterial Endocarditis

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### Keypoints

#### What is known:

- Infective endocarditis is uncommon in children and is strongly associated with underlying heart disease.
- The infectious process, in addition to the inflammatory and immune responses, contributes to clinical findings.
- Physical examination may reveal typical signs, such as Osler nodes and Janeway lesions.

#### What is added:

- Skin manifestations are unusual in children and are associated with an increased risk of complications.
- When infective endocarditis is caused by *Staphylococcus aureus*, survival rates are poor.
- Clinical suspicion and early diagnosis are essential to make possible the correct treatment and reduce complications, as well as mortality rates.

### Introduction

A 15-year-old boy with autism, aortic stenosis, and a mechanical aortic valve prosthesis placed two years ago (medicated with warfarin and bisoprolol) without a history of recent manipulation was admitted to the emergency department. The symptoms included fever for 48 hours, altered mental status, diarrhea, vomiting, and anorexia. Additionally, he was confused (Glasgow coma scale 13) and febrile presenting tachycardic with systolic murmur III/VI, as well as petechiae and Splinter hemorrhages (Figs. 1 and 2). Blood tests revealed that the inflammatory parameters and cardiac enzymes were elevated. Furthermore, they showed thrombocytopenia, acute kidney injury (glomerulonephritis), and hepatic cytolysis. A cranial computed tomography was performed due to his altered mental status and showed ischemic / hemorrhagic lesions of embolic-septic nature. Fundoscopy revealed retinal hemorrhages (Fig. 3), and contrast-enhanced abdominal computed tomography unraveled renal and splenic embolization. Moreover, transthoracic and transesophageal echocardiography showed multiple vegetations in the mechanical aortic valve prosthesis. They also uncovered severe impairment of systolic function (Fig. 4). The patient underwent empirical therapy for infective endocarditis with ampicillin, flucloxacillin, and gentamicin, according to the European Society of Cardiology guidelines.<sup>1</sup> Instead of warfarin, he received low molecular weight heparin medicine. The cardiothoracic surgeon considered that despite enough criteria, he was not clinically stable for emergency cardiac surgery.



Figure 1. Splinter hemorrhages.



Figure 2. Osler nodes and Janeway lesions.

Methicillin-sensitive *Staphylococcus aureus* was isolated in a blood culture. According to the modified Duke criteria,<sup>1</sup> the patient had major and minor criteria for infective endocarditis. Therefore, he received antibiotics, including rifampicin, flucloxacillin, and gentamicin.<sup>1</sup> However, he developed an ischemic stroke with

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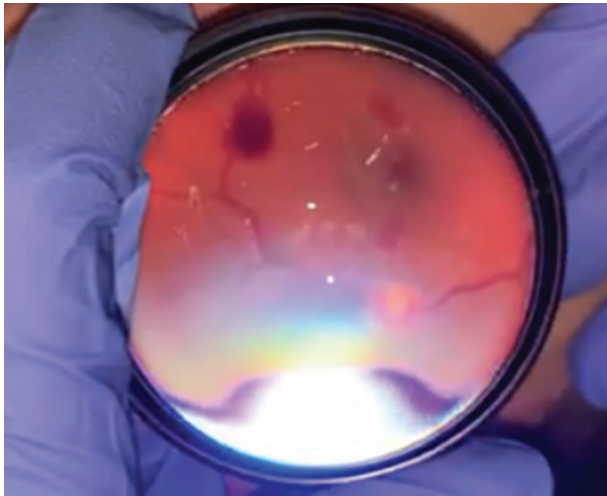
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hemorrhagic transformation and acute hydrocephalus. An external ventricular shunt was placed, but there was clinical deterioration, heart failure, and death. Infective endocarditis is uncommon in children and is strongly associated with underlying heart disease.<sup>2</sup> With prosthetic valves, the risk of infective endocarditis is high, with both immediate and late postoperative complications and poor survival rates when caused by *Staphylococcus aureus*.<sup>2,3</sup>



**Figure 3.** Retinal hemorrhages and Roth spots.



**Figure 4.** Echocardiogram showing aortic valve with vegetations.

The infectious process, as well as the inflammatory and immune responses, contribute to the clinical findings. Skin manifestations are unusual in children<sup>4</sup> and are associated with an increased risk of complications.<sup>5</sup>

**Keywords:** Adolescent; Endocarditis/diagnosis; Heart Valve Prosthesis/adverse effects; Prosthesis-Related Infections; Skin Diseases/diagnosis; *Staphylococcus aureus*; Staphylococcal Infections

#### Author Contributions

SGD and IFM participated in the study conception or design. SGD and IFM participated in acquisition of data. SGD, IFM, LB and MM participated in the analysis or interpretation of data. SGD and IFM participated in the drafting of the manuscript. SGD, IFM LB, and MM participated in the critical revision of the manuscript. All authors approved the final manuscript and are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

#### Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this work.

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#### Protection of human and animal subjects

The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki 2013).

#### Provenance and peer review

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#### Confidentiality of data

The authors declare that they have followed the protocols of their work centre on the publication of patient data

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