Infective endocarditis with embolic complications caused by Abiotrophia defectiva. A case report.

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Abstract

We describe the case of Abiotrophia defectiva infective endocarditis in a 13-year old boy with underlying cardiac abnormalities. Our patient presented with atypical symptoms, leading to delayed diagnosis and several complications. After antibiotical treatment, surgical intervention was indicated.

Infective endocarditis (IE) caused by nutritionally variant streptococci in pediatric population is rare. These fastidious microorganisms, growing very slowly in the laboratory, are known to be responsible for complicated IE.

This case report illustrates the atypical presentations of IE. It also reminds us that IE should rapidly be raised in patients with predisposing factors, such as structural congenital heart disease, and emphasizes the importance of blood cultures.

Introduction

Infective endocarditis (IE) is very rare, especially in children, with an estimated annual incidence of 0.43 cases per 100.000 children (1).

IE caused by Abiotrophia defectiva, a nutritionally variant streptococcus (NVS) species, is characterized by a subacute atypical clinical presentation. Only a dozen cases have been previously reported in children, of which a majority with underlying cardiac disease (2). Early diagnosis and adequate treatment are crucial.

In this case report, we describe an unusual presentation of IE due to Abiotrophia defectiva in a 13-year old boy with underlying cardiac abnormalities. By the time of diagnosis, complications had already occurred, and led to mitral valve plasty. Management by a multidisciplinary team was required.

Case report

Clinical presentation

A 13-year old boy was seen in the emergency room with a 4-month history of fatigue and intermittent inflammatory symptoms of the inferior limbs, notably swelling and warmness. His ankles were swollen and painful. In the last weeks, he presented two episodes of petechial lesions on the lateral malleolus which disappeared spontaneously (figure 1).

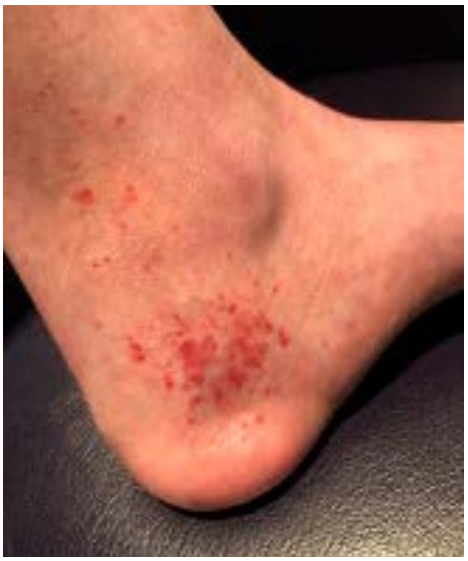
Interestingly, our patient was diagnosed with Shprintzen-Goldberg syndrome (SGS), a rare genetic disorder characterized by delayed global development, marfanoid features, a characteristic facies, skeletal abnormalities and cardiovascular anomalies (3). Cardiovascular anomalies include mitral valve prolapse, secundum atrial septal defect and aortic root dilatation. SGS results most frequently from de novo mutations of the SKI gene. Approximately sixty cases have been described in the literature.

Our young patient had all these features. He was followed up annually by the pediatric cardiologist and geneticist. His last yearly cardiac follow-up was a year ago and showed a stable atrio-ventricular valve prolapse with mild mitral valve and tricuspid valve regurgitation and a discrete aortic root dilatation.

Since the onset of symptoms, he had consulted his family doctor on several occasions for arthralgia and petechial rash, without fever. Symptomatic treatment with painkillers was initiated. He was then referred to an orthopedic surgeon who ordered a Doppler-US and an MRI of the lower limbs. They showed no abnormalities. Due to persistent complaints, he was referred to our hospital. Of note, he had undergone a dental procedure 1 year before and received adequate antibiotic prophylaxis, though he did not meet the criteria.

On initial examination he was afebrile with tachycardia (heart rate 128/minute), normal blood pressure (100/67 mmHg) and a saturation of 100% in room air. Clinical examination showed the known dysmorphia with arachnodactyly and finger clubbing, general amyotrophia and pallor. Petechial lesions were seen on his left foot. Heart auscultation revealed a

Figure 1: Initial examination : petechial lesions on exterior malleolus of the right foot.



systolic murmur grade 3/6 in the mitral area, increased compared to his last cardiologist's report. Respiratory examination was normal. No Janeway lesions, Roth's spots and Osler nodes were found. Abdominal palpation revealed splenomegaly. Orthopedic examination showed painful palpation and mobilization of his left upper and lower limbs. He suffered from severe back pain which prevented him from walking. A left hemiparesis was found on neurological examination. On the day of admission, he presented two fever spikes.

Investigations

His initial laboratory workup showed moderate microcytic anemia (hemoglobin 9.0g/dl [N 11.7-17g/d]), elevated erythrocyte sedimentation rate (28 mm/hour [N 0-11mm/h]), elevated CRP (31.78 mg/L [N < 5mg/L]) and normal leucocyte count. One blood culture was drawn on admission. His SARS-Cov2 swab was negative. Abdominal ultrasound confirmed a splenomegaly.

On admission, the differential diagnosis included rheumatic diseases, multifocal osteitis and infective endocarditis. Therefore, a bone scintigraphy was performed that showed no argument in favor of osteitis, but a mild uptake at the vertebral junction L3-4 was detected.

After 36 hours growth of gram-positive cocci, which were later identified as Abiotrophia defectiva colonies, was observed in every blood culture drawn on admission.

A transthoracic echocardiogram was performed and showed thickening of the mitral valve with two vegetations causing severe mitral valve regurgitation (grade ¾) with left atrial and ventricle enlargement (figure 2). Cardiac contractility was preserved.

According to the modified Duke criteria, the diagnosis of definite IE was made. Our patient was transferred to the university hospital (Cliniques universitaires Saint-Luc, Brussels), where additional work-up was performed. A cerebral CT-scan showed a hemorrhagic stroke in the posterior parietal region, probably due to septic aneurysms (figure 3). MRI of the lumbar region revealed spondylodiscitis of L3-4 vertebrae.

Management

Antibiotherapy consisted of gentamicin and ceftriaxone initially. After obtaining the antibiogram, he was switched on ampicillin high dose for 6 weeks after the first negative hemoculture.

According to the current recommendations, urgent surgical treatment was proposed. He underwent resection of the vegetations and mitral valve plasty with annuloplasty after 10 days of intravenous (iv) antibiotics (4). Prolonged preoperative antibiotherapy was performed because, due to his fragile aortic root, the peroperative canulation could have led to defect and necessity of reparation, which would predispose our patient to further infection if not treated appropriately. Postoperatively low molecular weight heparin (LMWH) at curative dose and enalapril were started. LMWH was continued during 6 weeks post-intervention, then replaced by acetylsalicylic acid.

A weekly follow-up echocardiogram was performed during hospitalization. Postoperatively, there was initially mild left ventricular dysfunction, which improved with time and a persistent mild mitral valve regurgitation (grade ¼). Fortunately, the mitral vegetation removed during surgery was sterile.

For the spondylodiscitis, an antalgic corset, painkillers and physiotherapy follow-up were set up. He regained his ability to walk a few weeks after cardiac intervention. The analgesics were gradually decreased.

Follow-up

Our patient evolved well and was discharged home after six weeks of iv antibiotherapy. He remained afebrile and the blood cultures remained negative after antibiotic discontinuation. Longer term cardiac follow-up will include clinical evaluation, blood cultures and echocardiography twice a year for one year, then yearly.

Figure 2: Transthoracic electrocardiogram :
Thickening of the mitral valve with two vegetations (the largest measuring 1.5x1.2cm attached to the anterior cusp, the smallest measuring 0.4x0.5cm attached to the posterior cusp) causing severe mitral regurgitation.

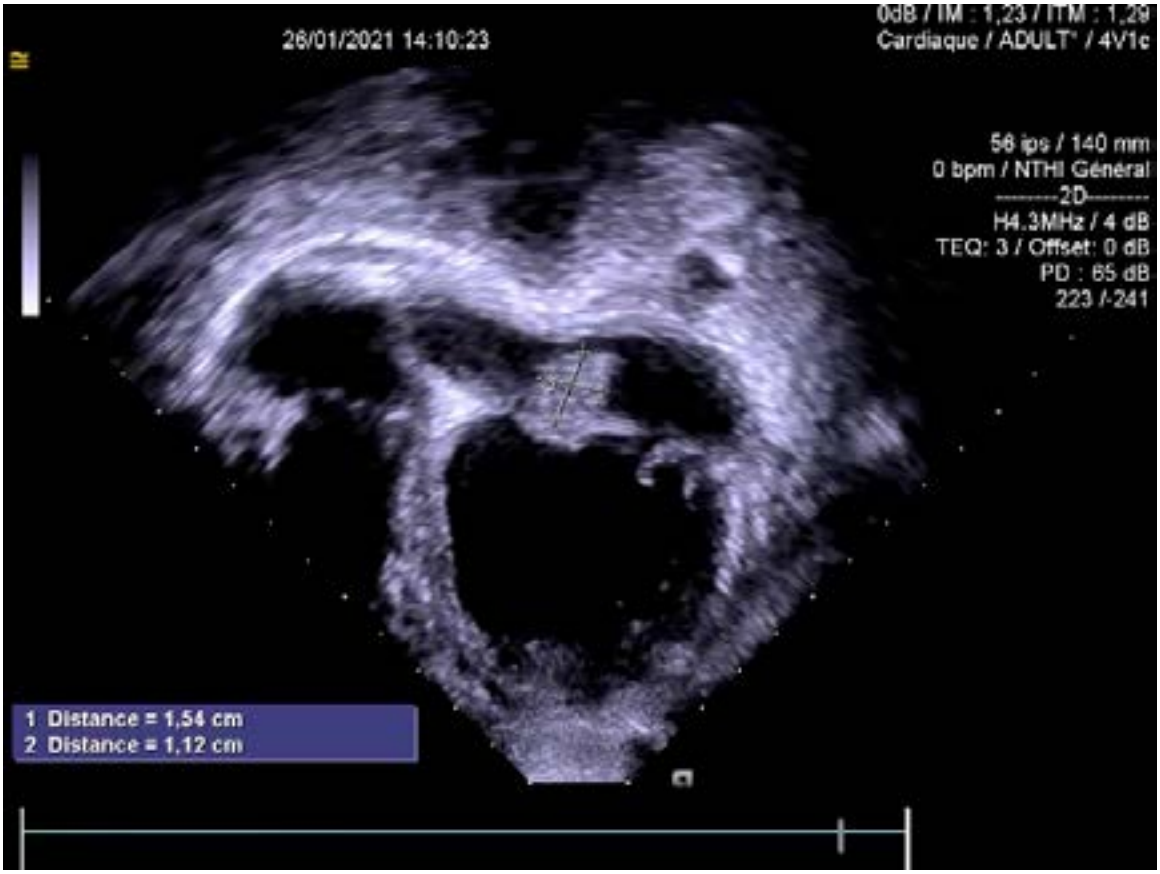
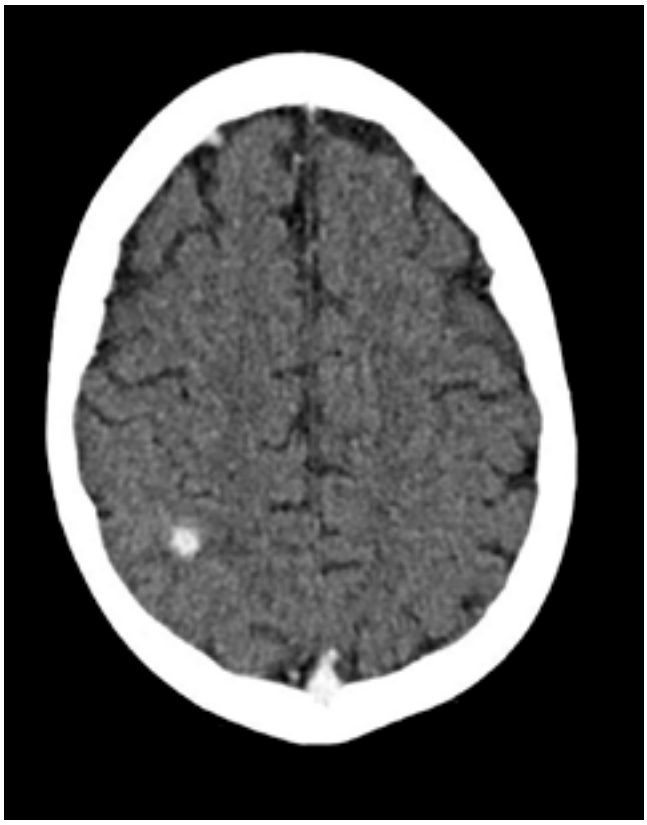


Figure 3: Cerebral CT-scan with injection :
Hemorrhagic stroke in the right posterior parietal lobe, due to septic emboli.



Neurologically, our patient evolved well. On discharge, he kept a light left asymmetry but could stand upright and walk on his own.

Of note, our patient is now eligible for antibioprophylaxis during at-risk procedures (dental procedures requiring manipulation of gingival or periapical region of the teeth or perforation of the oral mucosa) because of his first episode of IE.

Discussion

IE is a rare diagnosis in pediatric population. IE can present with an acute or subacute course, depending on the causative microorganism. Subacute endocarditis is difficult to diagnose, leading to long delay between the first symptoms and the treatment. Cases reports from worldwide literature show a time-to-diagnosis ranging from five days to one year.

Patients with the highest risk of IE are : patients with a prosthetic valve or prosthetic material, patients with a central venous catheter, patients with history of IE and patients with congenital cardiopathy.

The clinical presentation of IE in children is related to four underlying phenomena:

- bacteremia : fever (in 90% of patients), chills, weight loss
- valvulitis : heart murmurs (+- 85% of patients), heart failure
- immunologic responses : glomerulonephritis, Osler nodes, Janeway lesions, splenomegaly, petechial rash, Roth spots
- emboli : present at diagnosis in 30% of patients.

Investigation should include laboratory workup, blood cultures, and echocardiography. Echocardiography plays a key role in diagnosis and management of IE and should be performed as soon as IE is suspected.

The importance of blood cultures in the investigation process needs to be emphasized. Indeed, they are the cornerstone of diagnosis. The current recommendations advise that in case of suspicion of IE, blood cultures should be drawn daily and should not be delayed awaiting a febrile peak (4). Three pairs, taken at 30-min intervals, each containing 10ml are to be collected before any antibiotherapy. In case antibiotics have already been started, they are to be withdrawn for minimum 48 hrs. before repeating blood cultures. It is advised to notify the microbiology laboratory that IE is suspected and that fastidious organisms should be looked after. Testing for antibiotic susceptibility is critical.

After initiating the antibiotic treatment, blood cultures should be drawn after 48-72 hrs. to assess its efficiency and repeated until they become negative.

Modified Duke criteria (figure 4) are used to categorize the patient with confirmed IE, suspected IE and excluded IE.

IE is difficult to diagnose and treat, therefore an 'endocarditis team' with cardiologists, infectiologists and cardiac surgeons, is largely recommended.

In case of IE caused by NVS, prompt large antimicrobial therapy should be initiated, usually beta-lactam or vancomycin plus gentamycin, secondarily adapted to the antibiogram results (4). Antibiotherapy lasts minimum 6 weeks after the first negative blood culture. Surgical treatment is often necessary.

Given IE caused by Abiotrophia defectiva has a high risk of relapse, a clinical, biological and echographical follow-up is recommended every 6 months during the first year, then yearly. After discharge, the patient and his parents should be advised of the symptoms of IE and of the risk of relapse. Good dental hygiene is also recommended (4).

After the neonatal period, the most frequent pathogens identified in the blood cultures are, firstly, the viridans group streptococci and, secondly, Staphylococcus aureus (5).

Abiotrophia defectiva is a member of the NVS species, a subgroup of the viridans group streptococci. They are gram-positive cocci that grow as satellite colonies around other microorganisms. It is a member of the normal mouth flora, urogenital and intestinal tracts. It causes infections such as bacteriemia, brain abscess, septic arthritis and rarely infective endocarditis (6).

NVS are said to be responsible of 1-3% of all IE and are a common cause of culture-negative bacterial endocarditis (7). Blood culture-negative IE refers to IE in which no causative microorganism can be grown using the usual blood culture methods. NVS growth's is a challenge because they grow in small satellite colonies near larger colonies of "helper" bacteria. Therefore, microbiologists use agar surfaces inoculated with mixed bacterial flora. Their role in IE is likely underestimated. IE caused by NVS usually presents with large vegetations, high rates of complications and relapse.

Song et al. reported nine pediatric cases of IE caused by Abiotrophia defectiva (7). Three of them had underlying cardiac disease (33%). Eight patients out of nine presented embolic complications (89%).

The high rate of complications, especially embolic events, can be explained by two main factors. Firstly, IE caused by Abiotrophia defectiva is often belatedly diagnosed due to its subacute course. Secondly, Abiotrophia defectiva is highly infective and forms large biofilms, leading to large vegetations, more prone to embolization.

Conclusion

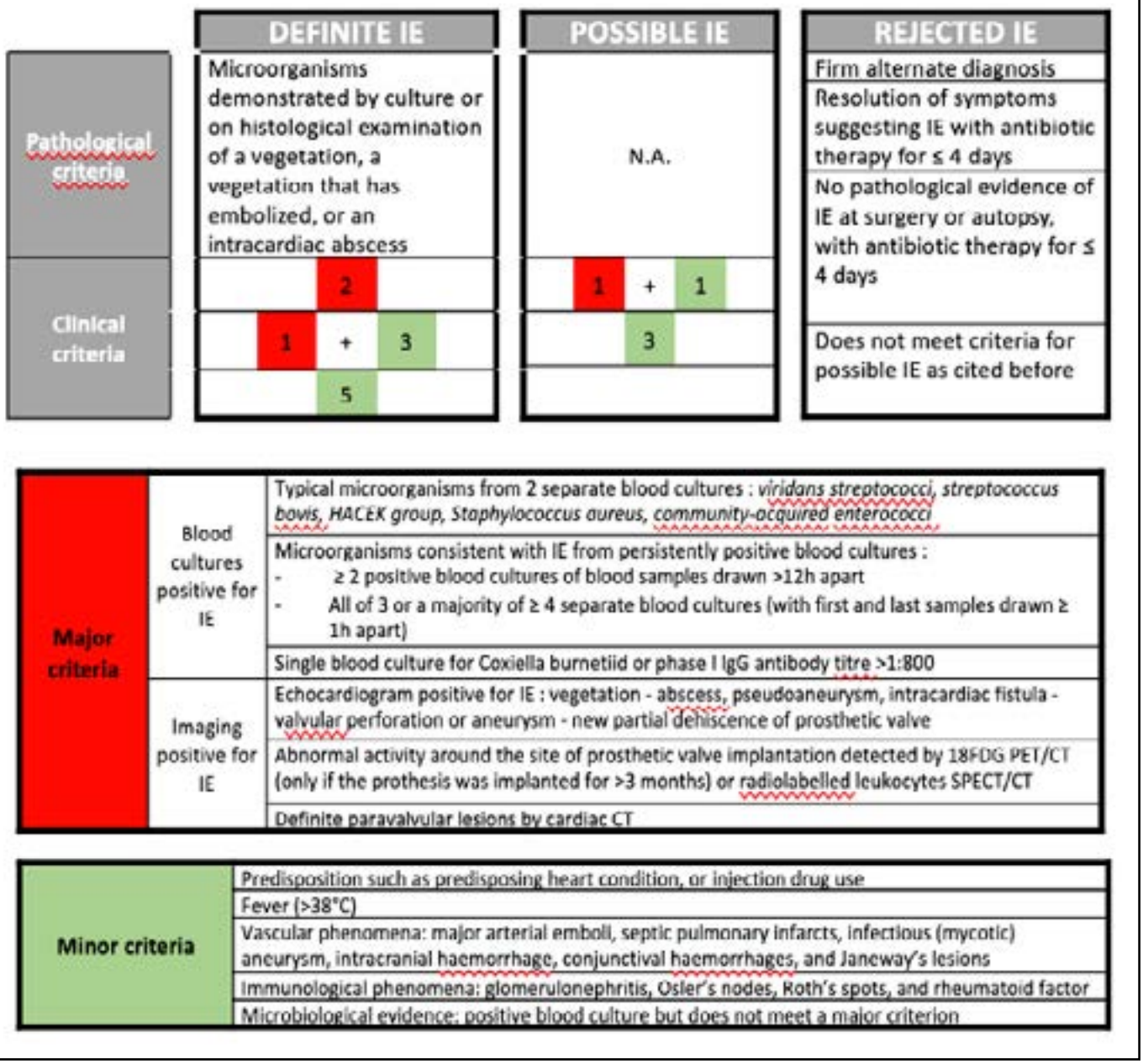
This case report discusses a subacute presentation of IE caused by Abiotrophia defectiva in a 13-year old boy with underlying cardiac abnormalities. The atypical clinical presentation led to a delayed diagnosis. At time of diagnosis, several complications were present. After combined antibiotic therapy and surgical management, the evolution was favorable.

With this case report, we hope to have emphasized the importance of clinical examination in the diagnostical approach of IE. Rheumatological and skin manifestations are rare but clearly described. Therefore, in the presence of known valvulopathy, these symptoms should raise a low threshold of IE suspicion. Blood cultures are cornerstones of the diagnostical approach.

Conflict of interest

The authors have no conflict of interest to disclose concerning this manuscript.

Figure 4: Definition of IE according to modified Duke criteria" the text is underlined as if the words were not correctly written. Do you think it would be possible the erase the underlining ?



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