

Right-sided endocarditis: the importance of echocardiogram in the identification of the affected structure(s)

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Abstract

Endocarditis affecting the valves of the heart right chambers is a rare entity. It usually occurs in parenteral drug addicts, pacemaker (PMD) carriers, in patients with prosthetic heart valves and with central venous catheters and, also, in congenital cardiac diseases.

Echocardiography is the gold standard to identifying the structure(s) involved enabling therapeutic orientation.

Although it is a rare disease, it should be considered when a transthoracic or trans-esophageal echocardiogram is carried out

to exclude endocarditis.

Patients should undergo antibiotic prophylaxis before any invasive procedure as recommended.

Raising public awareness is emphasized in order to prevent serious complications emerging of simple procedures, ever more common in younger populations, as piercing.

The authors report two cases of such pathology.

Key words: Endocarditis, eustachian, tricuspid.

INTRODUCTION

Right-sided endocarditis is a rare pathology.¹⁻⁴ It usually occurs in intravenous drug abusers, patients with pacemakers or central venous catheters, and patients with congenital heart disease and prosthetic valves.^{1,2,4-7} Few cases of Eustachian valve endocarditis are described in the literature.^{6,8} In the literature consulted, 16 reported cases were found.¹⁻⁴

“Body art”, in the form of body piercing and tattoos, is becoming more and more common, particularly among young people, and is practiced under various conditions, some of which constitute serious health risks. Despite the multiple known complications of these practices, body piercing has not been described as a doorway for endocarditis.

The objectives of this paper are:

1. To demonstrate the importance of the echocardiogram for the diagnosis of endocarditis through the identification of the affected structures.
2. To describe two rare cases of right-sided endocarditis.

3. To reinforce the need for health practitioners to follow the antibiotic prophylaxis guidelines when carrying out invasive procedures, and advise against individuals getting body art in places that lack adequate sterile conditions.

The first case relates to a seventy-six year old male patient, with a biological prosthetic valve in the aortic position, hospitalized for upper gastrointestinal bleeding; the patient underwent upper gastrointestinal endoscopy, requiring transfusion support that led to fever during hospitalization. Eustachian valve endocarditis was evidenced by echocardiogram, through isolation of methicillin-resistant *Staphylococcus aureus* in blood cultures. Despite target therapy, the patient died after 20 days of hospitalization.

The second case relates to an eighteen year-old female patient with a definitive pacemaker (DPM) for one year, who had recently had a tongue and facial piercing, hospitalized for febrile syndrome, to be investigated. Echocardiogram revealed a voluminous mass adhering to the leaflets of the tricuspid valve and electrocatheter. The patient underwent successful surgery to remove the mass, and replace the DPM.

CASE 1

A Caucasian male patient, 76 years, with a history of gastroesophageal reflux disease, peptic ulcer, and ischemic heart disease, who had undergone surgical coronary revascularization and implantation of biological prosthetic valve in the aortic position

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three years previously, and had been diagnosed with prostate adenocarcinoma two years previously, with staging for two months and no evidence of local or distant metastasis.

The patient was admitted to the Gastroenterology Department for upper gastrointestinal bleeding without hemodynamic involvement and baseline haemoglobin of 11.2g/dL. He underwent upper gastrointestinal endoscopy, which revealed prepyloric erosion and duodenal ulcers without active bleeding. On the day after hospitalization, a new event of upper gastrointestinal bleeding occurred with hemodynamic repercussion (fainting and HB of 4.8g/dL). Endoscopy was again performed, which revealed a bleeding duodenal ulcer. Local hemostasis was performed and blood transfusions with 5 units of erythrocyte concentrate were given.

On the fifth day of hospitalization, fever was observed, as well as an increase in the inflammatory markers (CRP 17.7 mg/dl, leukocytes - 5,900, and 90% neutrophilia) and aggravation of the renal function (creatinine 1.70 mg/dL, urea 43 mg/dL). Renal echography was performed, which did not show any significant changes. Empirical therapy with antibiotic ceftriaxone was initiated.

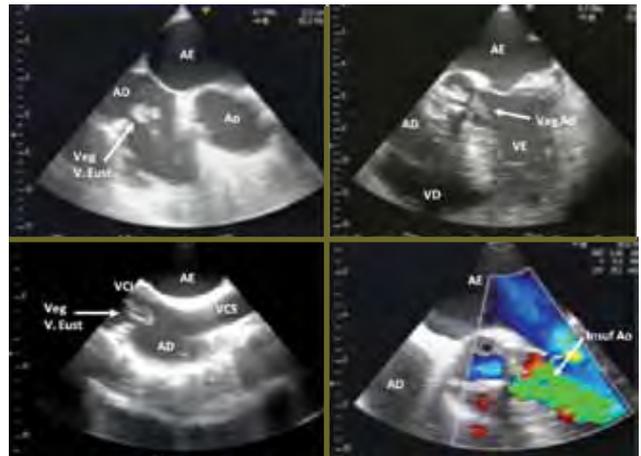
On the seventh day of hospitalization, the patient had convulsive crises; a CT of the brain was performed, which did not reveal acute ischemic or hemorrhagic lesions.

Methicillin-resistant *Staphylococcus aureus* (MRSA) was isolated in two blood cultures with sensitivity to vancomycin, gentamicin and ciprofloxacin. Therapy with vancomycin was begun.

On the ninth day of hospitalization, and the seventh day of therapy with antibiotics, and following aggravation of the clinical symptoms, hemodynamic instability and mixed acidosis, an oral tracheal tube was placed, connected to a mechanical ventilator; a central venous catheter was placed and administration of amines was begun. The patient was transferred to the Polyvalent Intensive Care Unit (UCIP).

EVOLUTION AT THE UCIP

Ventilation and administration of amines were kept, and gentamicin was added to the therapy with antibiotics due to the persistence of MRSA in the blood cultures. Transthoracic echocardiogram (TTE) was performed on day 2, which revealed vegetations adhering to the aortic valve. Transesophageal echocar-



TEE - Transeophageal echocardiogram, through which vegetation (veg) adhering to the Eustachian valve can be observed; AD - right atrium; AE - left atrium; VCI - inferior vena cava; VCS - superior vena cava.

FIG. 1

diogram (TEE) confirmed the TTE findings and also showed vegetation adhering to the Eustachian valve, which confirmed the diagnosis of aortic valve endocarditis and Eustachian valve endocarditis (Fig 1).

Due to aggravation of the renal function and anuria (creatinine - 4.50 mg/dL, urea - 162 mg/dL), continuous renal replacement therapy was begun, followed by intermittent therapy.

The MRSA bacteraemia persisted, without fever, despite the administration of combined antibiotic therapy (vancomycin and gentamicin). The follow-up echocardiogram performed on day 12 was similar to the previous one.

On the day 13 of UCIP and vancomycin, day 12 of gentamicin, and assuming a possible resistance to vancomycin, administration of linezolid at a dose of 600mg IV every 12 hours was begun.

On day 20 of hospitalization, day 8 of linezolid and day 18 gentamicin, the patient died of multiple organ failure.

CASE 2

A symptomatic Caucasian female patient, 18 years, with definitive a pacemaker (DPM) implanted by means of a Mobitz type II second degree aortic valvuloplasty block around one year previously. The patient was admitted to the Emergency Services with fever and poor general condition. On objective examination

upon admission, the patient was prostrated, with shallow breathing, tachycardia and fever (38° C – 39° C). The patient had several facial and tongue piercings, which she confirmed had been done recently.

Laboratory tests showed an increase in the inflammation parameters (CRP – 18.08mg/dL, Leuk. – 10.100/µl, neut. 89.6%), changed liver function (GOT – 47UI/L, GPT – 92UI/L, total bil. – 2.8mg/dL) and thrombocytopenia (platelet - 38,000 µl); blood gas analysis in room air upon admission revealed severe hypoxemia (pO₂ – 47mmHg and O₂ saturation – 87.3%). An X-ray of the thorax showed parenchymal infiltrates to the left.

Due to respiratory insufficiency, the patient was admitted to UCIP, where she underwent TTE, which revealed a voluminous mass adhering to the electrocatheter and the leaflets of the tricuspid valve, with mild dilatation of the right-sided cavities (Fig. 2). Empirical therapy with antibiotics was begun with piperacillin / tazobactam and vancomycin.

Methicillin-sensitive *Staphylococcus aureus* was isolated in four blood cultures, and the therapy with antibiotics was changed to flucloxacillin and gentamicin, based on the antibiotic sensitivity test.

On day 5 of hospitalization, following good response to the antibiotic therapy, the patient underwent surgery for the removal of the vegetation and replacement of the DPM.

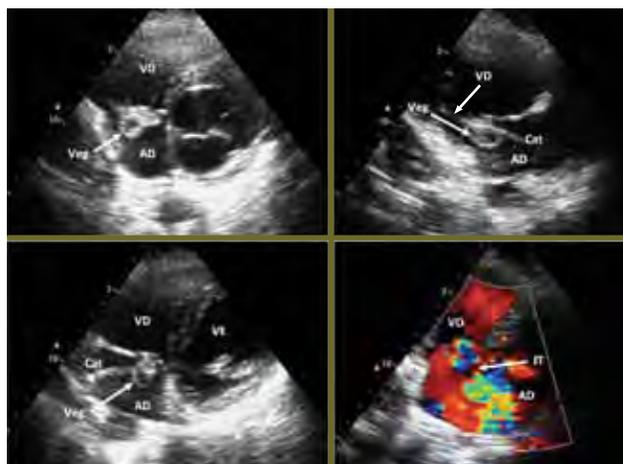
DISCUSSION

Persistent Eustachian valve endocarditis in adults is a rare condition.¹⁻⁴

Also rare is right-sided endocarditis, which usually occurs among intravenous drug abusers, patients with central venous catheters, pacemakers, and prosthetic valves.¹⁻⁵ Pellicelli's article published in 2005 reports 16 described cases of Eustachian valve endocarditis.²

Piercings are doorways for endocarditis.¹⁴⁻¹⁶ However, it is worth noting that despite the various risks of infection posed by body piercings, body art is becoming more and more common, and is not always performed under ideal sterile conditions.

Streptococcus viridians accounts for 30% to 65% of cases of endocarditis in patients without a history of drug abuse; in 27% of cases, the etiology is *Streptococcus bovis* and others.^{9,10} The main isolated microorganism in endocarditis in patients with drug abuse history and patients with hospital catheters and drains is *Staphylococcus aureus*, which is usually



Transthoracic echocardiogram, with vegetation (Veg) adhering to the electrocatheter (Cat); AD - right atrium; VD - right ventricle; AE - left atrium; VCI - inferior vena cava; VCS - superior vena cava; IT - tricuspid insufficiency.

FIG. 2

resistant to penicillins.^{1,3,6,10}

The diagnostic method of choice for the diagnosis of right-sided endocarditis is TEE^{1,2,7,8} which, besides enabling to view vegetations, enables the observation of eventual complications of endocarditis (abscesses, perforation of the valve leaflets and fistulisation), and helps practitioners decide on the most appropriate treatment (therapy, surgery or a combination of both); TEE is usually followed by TTE. Echocardiogram should always be included in the diagnostic approach to febrile syndromes, particularly if they have been occurring for long periods.

Combined vancomycin and gentamicin are the drugs of choice for infection by MRSA, and should be administered for around six weeks; in prosthetic valve endocarditis, rifampicin should be associated, to increase cure rates.¹¹⁻¹³ Nevertheless, according to the AHA and SEC guidelines, antibiotics are to be administered according to the sensitivity test of the isolated microorganism, as occurred in the second case described above. For cases refractory to the medical treatment, and those with complications associated with the endocarditis or aggravation of the vegetation (as in our second case), surgery is recommended.^{1,2,5,7}

In the first case, the doorway is likely to have been upper gastrointestinal endoscopy, since it was not preceded by antibiotic prophylaxis in a patient

at high risk of endocarditis.

The convulsive crises reported in case 1 is likely to have been caused by septic emboli or fever.⁷

When clinical symptoms persist, even though targeted antibiotic therapy is given, the antibiotic should be replaced by other long-lasting, broad-spectrum antibiotic.

We believe the death in case 1 is related to multiple organ failure in a patient with significant comorbidities, whose endocarditis did not respond favourably to vancomycin.

The lethality of right-sided endocarditis in intravenous drug abusers is 10%.¹²

CONCLUSIONS

Echocardiogram should always be performed in patients with febrile syndrome of unknown etiology. The risk of endocarditis in patients with catheters, DPM or a history of drug abuse is high, so all valves should be carefully observed in the echocardiogram.

In high risk patients, prophylaxis should always be performed before any invasive procedure, according to the recommendations.

Although vancomycin is the drug of choice for endocarditis caused by *MRSA*, bear in mind that in some cases the response to the antibiotic may not be so effective; therefore, a combination of antibiotics should be considered or the administration of other long-acting, broad-spectrum antibiotics.

Additional campaigns should be implemented to advise people on getting tattoos and piercings in places that use proper sterile techniques, to prevent complications like endocarditis. ■

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