

## **Case study**

PACEMAKER INFECTIVE ENDOCARDITIS : DIAGNOSTIC AND THERAPEUTIC PARTICULARITIES IN 2 CASES REPORTS INCLUDING ONE OF THE LEFT HEART :  
A case report

### **ABSTRACT**

Pacemaker infective endocarditis is a more real diagnostic problem than a therapeutic one. The precise impact is not well known. Its incidence is poorly known, and it is a serious infection with an estimated mortality of around 25%. It is with this in mind that we report 2 clinical cases with a literature review.

#### CASE 1

An 88-year-old patient with a double chamber pacemaker was admitted for febrile syndrome with a fever at 39.2 °. Transthoracic and transesophageal echocardiography (TOE) found an image of vegetation on the aortic valve measuring 9mm, located on the noncoronary cusp, and overflowing on the right coronary cusp. An inflammatory syndrome was found on blood tests. Blood culture, wound swab culture, and bacteriological study of material after removal revealed Staphylococcus Aureus Meti S. The patient was initially put on Vancomycin with a loading dose of 2g / 24h then 1g / 24h, and the pacemaker was extracted.

#### CASE 2

A 68-year-old with a double chamber pacemaker (PM) was admitted for fever at 39 ° c with suppuration of the PM pocket. Echocardiography identified an image on the tricuspid valve measuring 14x8mm evoking vegetation given the context. Two blood cultures and swabs isolated a Staphylococcus Aureus. The patient was administered Triaxon 2g / day for 4 weeks and gentamycin 180mg for 15 days. The pacemaker was removed.

Pacemaker Infective endocarditis is rare, poorly understood, very serious, and potentially fatal, accounting for up to about 7% in some case series. In half of the cases, they affect the endocavitary leads, but also the valves, and in 45% of cases the infection of the pocket. The average age is 65 years. The clinical symptoms are disparate making the diagnosis more difficult, it must be evoked in case of unexplained fever in a patient implanted with a Pacemaker. Bactericidal dual therapy should be administered after blood cultures in case of strong suspicion of infective endocarditis (IE) and adapted after identification of the germ in question. Most authors are adamant about extracting any pacemaker whenever possible.

**KEYWORDS: CASE REPORT-INFECTIOUS ENDOCARDITIS-PROBE-PACEMAKER**

### **INTRODUCTION**

Pacemaker endocarditis is a real problem both on the diagnostic and therapeutic level due to the existence of foreign material in the organism, and its occurrence mostly in patients with multiple comorbidities.

The precise incidence is poorly known because it is a definition grouping several distinct entities, namely infection of the PM generator pocket and/or infection of endocavitary stimulation lead, with or without associated valve infection.

The frequency of these infections, all combined, varies in the literature from 0.13 to 7% (1,2). A French study on the epidemiology of infective endocarditis carried out in 1999, found the incidence of endocarditis on PM estimated at about 400 cases per year and per million patients carrying PM.

It is a serious infection with an estimated mortality of around 25% (2).

We report the cases of 2 patients admitted in this context with a diagnostic and therapeutic challenge.

## **CASES PRESENTATIONS**

### **CASE 1**

An 88-year-old patient with a history of a double chamber pacemaker implanted in January 2022 for a paroxysmal high-degree atrioventricular block, was admitted to our department for a febrile syndrome with deterioration of the general condition.

On clinical examination, we found a purulent discharge on the scar of the pacemaker pocket, we considered it as a starting point of the sepsis without visible externalization of the device. There was a fever of 39.2 °C, and her blood pressure was 139/61 mmHg. There were no signs of heart failure or abnormal murmurs on auscultation. The electrocardiogram (ECG) revealed a sinus rhythm at 60bpm (beat per minute) without electrostimulation.

Transthoracic echocardiography showed a good left ventricular function at 65% with an image of vegetation on the aortic valve measuring 8mm. The transesophageal echocardiography revealed the image of vegetation measuring 9mm, located on the noncoronary cusp, and overflowing on the right coronary cusp.

On biological tests, there was an elevated CRP (C Reactive Protein) at 290 mg / l with hyperleukocytosis at 13000 elements, predominantly neutrophilic. Renal function was 188 pmol/l compared to an initial creatinine of 80 pmol/l before cloxacillin introduction, with corresponding glomerular filtration rates of 23 ml/min vs. 62 ml/min, calculated by using the modified simplified MDRD formula. Blood culture, wound swab culture, and bacteriological study of the PM leads after removal revealed Staphylococcus Aureus Meti S.

The cerebral, thoracic, and abdominal CT scans did not find any embolization image.

The patient was initially put on Vancomycin loading dose of 2g / 24h then 1g / 24h subsequently changed by Cloxacillin 200 mg/kg / 24h then Cefazoline 850mgx2 / day and Rifampicin 300mgx3 / day following renal failure and non-improvement of the inflammatory syndrome that led to the extraction of the pacemaker. Apyrexia was subsequently noted after one week of treatment with improvement in renal function and negativation of the follow-up blood cultures. The patient has a sinus rhythm with some rarely blocked P waves post-removal of the material, so we decided to monitor the patient without new implantation.

Vis-à-vis the fluctuation of the inflammatory tests and the persistence of vegetation which goes from 9mm to 11mm without any images of abscessation, the theoretical indication of aortic valve replacement was discussed but not conducted due to the general condition of the patient.

She received 2 months of several lines of antibiotics from the first negative blood cultures, from 16/08 to 13/10/2022 with improvement in the inflammatory tests, she was then discharged with biological follow-up tests and echocardiography / TEE 15 days after stopping antibiotic therapy to decide on long-term or not for antibiotics.

## **CASE 2**

A 68-year-old patient was admitted to our department for a 39°C fever with suppuration of the pacemaker pocket. The dual chamber pacemaker was implanted 1 year prior to his hospitalization for symptomatic Mobitz 2 second-degree atrioventricular block.

The examination at admission found a conscious patient with a preserved general condition, febrile at 39 ° C, blood pressure at 130/80mmHg, and heart rate at 60 beats per minute without signs of heart failure or abnormal murmurs, there was also a suppuration of the pacemaker's pocket. The electrocardiogram showed an electrostimulated rhythm at 60 beats per minute.

Transthoracic echocardiography unveiled an image on the tricuspid valve measuring 14x8mm evoking vegetation given the context. Left ventricular function was impaired, and LVEF was estimated at 40%.

The blood test revealed hyperleukocytosis at 13500 / µl predominantly lymphocytes, CRP at 66.8mg / l; good renal function with creatinine at 8mg/l estimating the glomerular filtration rate at 100 ml/min according to the simplified MDRD formula. Two blood cultures and swabs detected a staphylococcus aureus. The patient was put on Ceftriaxone 2g / day for 4 weeks and Gentamycin 180mg /day for 15 days adapted to the antibiogram with local treatment of the pacemaker's pocket.

Apyrexia was acquired after 3 days of treatment without the development of congestive signs. There was a persistence of the vegetation on the tip of the atrial lead, and suppuration of the pacemaker's pocket at the end of the 4 weeks of antibiotic therapy. The patient subsequently received 10 days of vancomycin 1800mg/24h, and we proceeded with the removal of the device, replacing it with epicardial stimulation. The postoperative evolution was favorable with the absence of new episodes of fever and suppuration at the level of the scar of the compartment of the removed device.

## **DISCUSSION**

Infective endocarditis of pacemakers is rare, poorly understood, very serious, and potentially fatal, accounting for up to approximately 7% in some case series (1,3,4). In half of the cases, they affect the intracardiac leads, but also the valves, and in 45% of cases the infection of the pocket (1).

The average age is 65 years. The clinical symptoms are disparate, making diagnosis more difficult. It should be evoked in the case of unexplained fever in a patient with a Pacemaker (2,4).

In 90% of patients in the study by X. Duval et al, fever was prolonged or intermittent; In 45% of cases signs of infection of the casing compartment are reported and in 20-40% of cases, pulmonary manifestations and vegetations are detected in 90% of cases by transesophageal ultrasound. (1).

Fever was the master of symptoms of our 2 reported cases, with an average age of 78 years, affecting on the one hand the pocket, and on the other hand the tricuspid valve. The vegetation was present in the first case on the aortic valve without touching the valves of the right heart, while the starting point was an infection of the PM pocket, which is very rare, unlike the 2nd case where the vegetation was located on the tricuspid valve.

In a study reported by Camus et al, staphylococcus was present in 50-90% of cases in pacemaker infections, early post-implantation PM infections were caused by Staphylococcus aureus infections, and later PM infections were due to Staphylococcus coagulase-negative. In 0-36% no microorganisms were found (5,6).

While in the US, staphylococcus aureus was the main germ of infective endocarditis. The diagnosis goes through a bundle of clinical arguments, ultrasound with a sensitivity of 95% and excellent specificity in case of sepsis (6) with biological confirmation by blood cultures (1).

Dual antibiotic therapy should be administered after blood cultures in case of strong suspicion of infective endocarditis, and it should be adapted after the identification of the germ in question. Most authors are adamant about extracting any pacemaker whenever possible.

Cacoub et al reported mortality between 31 and 66% when patients were treated with antibiotics alone as opposed to routine extraction where it was between 9-27% (5,7,8). The removal of the pacemaker can be done under local anesthesia by simple traction when the implantation is recent but requires general anesthesia by thoracotomy under extracorporeal circulation in case of late implantation. Hence, the importance for medical-surgical staff to decide on the extraction of the material in patients with high comorbidity, and continuation of antibiotic therapy by evaluating its effectiveness (4).

In our two patients, the device extraction was performed under local anesthesia combined with antibiotic therapy for a better prognosis.

## **CONCLUSIONS**

Infective endocarditis of pacemakers is a rare and fatal condition, suspected in the presence of fever, and requires a bundle of clinical and ultrasound arguments, with biological confirmation by blood culture to retain the diagnosis. Pacemaker extraction is the main treatment starting with antibiotic prophylaxis unless there is significant comorbidity.



**FIGURE 1** transesophagealecho image of vegetation on the aortic valve



FIGURE 2: image of vegetation on the tricuspid valve at **tranoesophageal echocardiography**

### **LIST OF ABBREVIATION**

PM= PACEMAKER

ECG= ELECTROCARDIOGRAM

BPM= BEAT PER MINUTE

CRP = C REACTIVE PROTEIN

DECLARATIONS :

#### **Ethics approval and consent to participate**

It is not applicable

#### **Consent for publication**

In accordance with international and academic standards, written consent for publication was obtained from the patient and retained by the authors.

#### **Availability of data and materials**

The datasets supporting this article are included in the article.

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