

RESEARCH ARTICLE

"STRANGE" DUAL CHAMBER STIMULATION

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..... Manuscript Info

Abstract

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..... Implantable cardiac devices (pacemaker, ICD, resynchronisation) are increasingly indicated in recent years. Complications secondary to these implants are encountered more frequently. We report the case of a 60 year old patient with a double chamber pacing device, implanted 6 months before her consultation date for a complete AVB.She was referred by her attending physician for exertional dyspnea and lipothymic discomfort following the implantation of the device.Clinical examination revealed no abnormalities. The ECG showed a spontaneous sinus rhythm at 60cpm. The interrogation of the device showed a DDDR pacing mode with the most frequent pacing mode in ASVS found at 80%. The EGMs listed were not consistent with the programmed dual chamber mode. The atrial endocavitary signals are labelled VS and the ventricular ones AP. The change of mode to VVI which should generate a ventricular drive showed us a spontaneous atrial signal coded VS. The AAI mode produces ventricular pacing with AP coded ventriculograms.A reversal of the lead connection at the box level was evoked. The patient has undergone a correct reconnection of the leads to the box with a rhythm at the end of the procedure in DDD.Follow-up telemetry 1 month after reconnection showed atrial and ventricular EGM signals appropriate to the paced and detected chamber.

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Introduction:-

Pacemakers have been implanted for over 50 years.

The indications are no longer limited to conductive disorders but have been extended to the prevention of sudden death due to ventricular arrhythmia [1]. Biventricular pacing is now one of the cornerstones of optimal management of heart failure.

Despite advances in implantation procedures, they are not without complications [2].

The aim of this case study was to highlight the existence of inattentional errors during pacemaker implantation and to call for vigilance on the part of clinical practitioners when monitoring patients with pacemakers.

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Patient And Observation:-

The patient was Mrs B, 60 years old, with no modifiable cardiovascular risk factors, who had been wearing a dualchamber pacemaker for 6 months for a complete AVB. She was referred by her GP for lipothymic discomfort associated with exertional dyspnoea.

Results:-

The clinical examination was without abnormalities. The ECG revealed a spontaneous rhythm at 60 cpm.

- Telemetric control of the device showed :
- A longevity of more than 5 years
- DDDR mode
- ASVS>80%.
- Probe parameters (in bipolar): A= 480 ohms /0.8V

V=410 ohms /0.4V

Switching to VVI mode causes trained atrial signals to appear.



Image 1:- Atrial EGM trained in VVI mode.

The AAI mode reveals ventricular EGMs trained with large ventriculograms and coded by an AP signal.



Image 2:- Ventricular EGMs trained in AAI mode.



A displacement of probes was suspected in front of this picture. This was ruled out by chest X-ray.

The lack of impedance elevation and ventricular pacing thresholds was against this diagnosis.

A reversal of the connection of the leads to the box was evoked. This diagnostic possibility was supported by obtaining an electroentrained rhythm at the ventricular stage in AAI mode (image 2).

A ventricular detection test was performed showing a spontaneous sinus rhythm at 50cpm. Programming of the unit was switched to AAI mode at 40 cpm



Image 4:- ECG in AAI mode at 40cpm.

This mode is the equivalent of a single chamber ventricular pacing in order to performing the procedure to modify the lead connection reversal.



A correction of the lead connection to the box was performed with a rhythm at the end of the procedure in DDD.

Image 5:- ECG after correction of the lead connection.

Discussion:-

The advent of cardiac pacing methods has increased the number of indications and complications of intracardiac device placement. A large part of the 2021 ESC recommendations on cardiac pacing focuses on the importance of a good learning curve to avoid or at least reduce the risks of complications related to the procedure [2].

The interest of the description of our case is to bring to the attention of interventional cardiology practitioners that a lack of attention during the connection to the device can lead to major complications.

The immediate complications of cardiac pacing are mainly related to the vascular approach [3]. Of these, the most frequent event is accidental subclavian arterial puncture, which accounts for 2.7% of complications [4]. Other complications include pneumothorax; vascular dissection and gas embolism.

The manipulation of endocavitary leads can lead to perforation of the myocardium of the right ventricle, estimated at 0.6 to 5.2% depending on the series, resulting in a haemopericardium which can be responsible for a cardiac tamponade [4].

Early post-procedural complications concern the implanted loge or device. Hematoma of the lodge may occur in the hours or days following the procedure. Factors that have been implicated are: anticoagulation during or before the procedure, AVK-Heparin relay, duration of the procedure and bleeding during device placement with imperfect haemostasis at the end of the procedure [5].

These haematomas can become superinfected and form the bed for infection of the lodge, which in time can lead to bacterial colonisation of the endocavity device [3,6].

Lead displacements can occur early or late and will be evoked by an elevated pacing threshold [3,7].

Telemetric monitoring of the device is therefore a key element in the follow-up of patients with cardiac stimulation devices [6,8].

It helps to diagnose pacemaker malfunction and to adapt the management.

In our case, the interrogation of the device at 6 months after the first implantation of the device revealed a reversal of the connection of the leads to the device.

The data in the literature concerning this type of procedural defect are non-existent or not listed. On the other hand, early or late complications involving infectious or device-related problems are widely described in studies [9,10].

The case we are reporting is quite new or under-reported.

The patient's symptoms made us suspect a pacing defect. The ECG showed a spontaneous rhythm at 60cpm. The interrogation of the box revealed during the threshold test that the atrial EGMs were concomitant with the ventriculograms on the surface ECG trace. An increase in impedance and pacing threshold was not objectified to suspect lead displacement.

The VVI mode showed atrial pacing (image 1) and the AAI caused ventricular entrainment (image 2). An error in the connection of the leads to the box was suggested on this finding.

The patient was taken back to the rhythm unit and scheduled for a correction of the lead connection to the box. Perprocedure lead testing (detection, threshold, impedance) was within norms.

Early follow-up showed no local complications or displacement of the endocavity leads.

This is the only case of connection errors recorded in our unit since its creation. As this patient's device was first implanted in another facility, she was sent to her cardiologist with a letter explaining the findings when the device was interrogated.

The importance of good procedural practice was also shared.

Conclusion:-

The frequent indication for pacemaker placement makes it a procedure fraught with complications.

Particular attention should be paid to errors during the procedure which could lead to more serious complications.

The interrogation of the pacemaker is very helpfull for those patients to assess and diagnose as soon as possible these kind of stimulation problems.

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