Isorythmic Dissociation by Alternating Interference with Double Nodal Response after Cardiac Surgery

Sana Fennira*, Sofien Kamoun, Yassmine Kammoun, Boutayna Besbes, Naziha Turki and Sondes Kraiem

Department of Cardiology, Habib Thameur Hospital, Tunisia

Abstract

Isorythmic atrioventricular dissociation by interference is a rhythmic entity that is rare in current practice and often unrecognized. Its association with a nodal duality generating a double ventricular response is exceptional. We report the observation of such association in a postoperative context of a surgical correction of interauricular communication following an attempt to close this defect by an amplatzor complicating by a migration of the prosthesis.

Introduction

Isorythmic atrioventricular dissociation by interference is a clinical situation that appears to be rare, the exact prevalence of which is not known [1-3].

It is characterized by the presence of an often sinus rhythm competing with a junctional or ventricular rhythm. The frequencies of the two rates are close which creates a hidden conduction in the conduction pathways causing a functional blocking often at the nodal level.

Nodal duality, observed in about 25% of the general population, only exceptionally generates a double ventricular response, described for the first time in 1979 and reported in about 20 publications [4,5].

We report the case of an association between an atrioventricular dissociation by interference and a double nodal response in a postoperative context.

Case

We report the case of a 19-year-old patient, hospitalized for percutaneous closure of a septal ostium secundum interauricular communication. The implantation of a 28mm Amplatz prosthesis proceeded without incident. Forty-eight hours later, following a systematic ultrasound examination, we discovered the migration of the prosthesis in the right atrium. The patient was urgently operated, it was noticed that the prosthesis migrated into the tricuspid annulus and caused a tear in the septal valve. The surgical procedure
consisted of a right atrial approach under extracorporeal circulation, right atriotomy, removal of the amplatzer, suture of the tricuspid leaflet and closure of the interatrial communication using a pericardial patch.

Postoperatively, the patient developed a fast junctional rhythm at 92bpm associated with an isorhythmic atrio-ventricular dissociation by interference (lane 1).

The analysis of the ventricular rate (lane 2) (black color) and auricular (red color) intervals shows a probable atrioventricular capture attested by a shortening of the ventricular cycle of 20 ms (marked by an asterisk*).

The massage of the carotid sinus had no effect on this anomaly. On the other hand, the injection of 0.25 mg of Atropine made it possible to restore atrioventricular conduction with a Luciani-Wenckebach sequence.

48 hours later, the patient experienced an irregular but periodic heartbeats (lane 3).

The fine analysis of this arrhythmia has identified a period of recurrence that can be explained by:
- Double nodal response
- Progressive lengthening on the fast track realizing a sequence of Wenckbach 4/3
- Alternating with progressive lengthening on the slow path with a Wenckbach 4/3 sequence.

Confirmation by electrophysiological exploration was not performed because of the presence of sepsis. The evolution was marked by the installation of a complete Atrioventricular Block (AVB) with a junctional escapement without hemodynamic repercussion as well at rest as during exertion. The equipment by a pacemaker was not held in front of the good tolerance of the BAV.

Discussion

Atrioventricular dissociation by interference is a rare rhythmic entity [1,2]. This entity has been described in ischemic events, myocarditis, hydro-electrolytic abnormalities, digitalis intoxication, after using anesthetic drugs and after cardiac surgery. The prognosis is often good except in case of poor hemodynamic tolerance explained by atrioventricular asynchrony [1,3].

Garcia [4] has reported its association with a double response. However, this entity does not seem to be described in the literature after cardiac surgery.

Nodal duality is present in about 25% of the general population but often without consequences [6,7]. In our presentation, postoperative inflammatory phenomena were in the origin of:
hyperautomatism generating the isorythmic dissociation by interference

- Longitudinal nodal dissociation generating the double nodal response associated with an obvious decremental conduction aggravated by these inflammatory phenomena

Subsequently, inflammatory sequelae would have been the cause of the installation of a complete atrioventricular block possibly aggravated by surgical trauma of the conduction pathways. The electrophysiological exploration is necessary to understand this situation but it has not been practiced. In the absence of literature data, the prognosis is difficult to formulate.

Conclusion

Isorythmic atrioventricular dissociation by interference remains a rhythmic curiosity. This case illustrates that this rhythmic entity could evolve towards the installation of an atrioventricular block but the exact mechanisms behind this issue should be clarified.