Unusual Form of Tricuspid Stenosis!

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Abstract

Tricuspid stenosis, in rare cases, can be induced by pacemaker electrodes. We report the case of a 72-year-old patient who, in 1982, underwent surgical ablation procedure for Wolf-Parkinson-White syndrome. The procedure was complicated by complete atrioventricular block, evolving into permanent pacemaker implantation. In 1992, due to pacemaker pocket infection, the generator was removed and extraction of the electrodes was attempted without success. The patient follow-up was lost until November 2014, when he was admitted for several episodes of syncope and right heart failure. Tricuspid stenosis was diagnosed and surgery was chosen as treatment.

Keywords: Tricuspid valve stenosis; Pacemaker, artificial; Heart failure

Introduction

Tricuspid stenosis (TS), most of which is of rheumatic origin, is rarely seen in developed countries, although it is still found in developing countries.1 Other causes of obstruction to right atrial emptying are unusual and include congenital tricuspid atresia, right atrial tumors, which can produce a clinical picture suggesting rapidly progressive TS and carcinoid syndrome.2

Obstruction to right ventricular inflow is rarely caused by endomyocardial fibrosis, tricuspid valve vegetations, cardiac tumors or pacemaker electrodes. Interestingly, there have been tricuspid stenosis reports without associated valve insufficiency, most of which are pacemaker lead-induced.3

We report a case of severe functional TS by intense fibrosis and calcification of the pacemaker electrodes. The patient was admitted to the hospital for right heart failure and atrioventricular block with indication of permanent pacemaker.

Case report

We report the case of a 72-year-old man who, in 1982, in Switzerland, underwent surgical ablation for Wolf-Parkinson-White syndrome. The procedure was complicated by complete atrioventricular block. Permanent pacemaker was implanted. In 1992, in Portugal, the patient was hospitalized due to an infection and necrosis of the pacemaker pocket and its leads. While in hospital, the generator was removed and there was an unsuccessful attempt to extract the leads of the permanent pacemaker, which remained inside the right ventricle. Patient follow-up was lost after hospital discharge.

In November 2014, the patient was admitted to the emergency room due to several episodes of syncope, edema of the lower limbs, decreased urine output and ascites. Physical examination showed distension of the jugular veins, systolic and diastolic low frequency murmurs grade II/VI, hepatomegaly, ascites and lower limb edema extending to the upper thigh.
Electrocardiogram showed trifascicular block with some periods of complete atrioventricular block.

Chest radiography showed cardiomegaly and two calcified pacemaker leads inside the right ventricle (Figure 1). Transthoracic echocardiography showed right atrial dilation, calcified pacemaker leads adhering to the tricuspid valve (TV), producing severe functional stenosis (functional area 0.9 cm² and average 6 mmHg gradient) and mild impairment without other significant abnormalities (Figure 2). Transesophageal echocardiography was performed to further characterize the TV morphology. This revealed two pacemaker leads in the right heart chambers, one of which extremely calcified and adhering to the tricuspid valve, causing severe stenosis. Coronary angiography revealed no coronary artery disease.

The patient was transferred to the cardiothoracic surgery department, where the tricuspid valve was replaced by a biological prosthesis and an epicardial pacemaker system was implanted. During the surgery, a very dysmorphic TS was observed, with extremely small opening and pronounced fibrosis and calcification over the electrocatheter course. The remaining length of stay was uneventful and five months after the surgery the patient was asymptomatic, and the bioprosthesis had normal function.

**Discussion**

The most common form of TS is rheumatic and is usually associated with other valvular diseases.1,2 This case illustrates a very rare form of TS, with only a few cases reported in the literature. The mechanisms described are right ventricular inflow obstruction by several pacemakers (in this case, by two electrodes) and fibrosis secondary to mechanical trauma associated with endocardial systems, perforation or laceration of the tricuspid leaflets, or adhesion between the redundant loops and valve tissue. The resulting endothelial damage triggers many local events, including chronic inflammation, fibrosis, calcification and, in some cases, valve stenosis, the latter being rarer. In most cases, TS was associated with more than one lead to cross the valve.3,4 The time between pacemaker implantation and early development of symptoms ranged from 7 to 33 years.5 In this case, the onset of symptoms occurred 22 years later.

There are some treatments described in the literature: some cases refer to medical treatment3, other cases refer

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**ABBREVIATIONS AND ACRONYMS**

- **TS** — tricuspid stenosis
- **TV** — tricuspid valve

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**Figure 1**
Chest radiograph showing cardiomegaly and two pacemaker leads inside the calcified right ventricle.

**Figure 2**
Transthoracic echocardiography showing right atrial dilation, calcified pacemaker leads adhering to the tricuspid valve, producing a severe functional stenosis.
to surgical replacement or surgical valve repair and, in fewer cases, balloon angioplasty. Percutaneous tricuspid valvuloplasty may be a therapeutic alternative to surgery in cases of TS alone without any concomitant valvulopathy. In the case reported in this study, the tricuspid valve was very calcified and dysmorphic and surgical treatment was chosen for the patient.

The TS induced by pacemaker leads is a chronic complication of pacemaker implantation that may occur more often than it is clinically suspected and may become even more common due to the growing number of cardiac devices currently implanted. The diagnosis should always be considered in patients with right heart failure and electrodes present in the right heart chambers. The therapeutic approach should be individualized, include a multidisciplinary team and the patient’s desires must be considered.

Potential Conflicts of Interest
This study has no relevant conflicts of interest.

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References