

## Watchful Waiting in an Unusual Cause of Hypoxemia after Implantable Cardioverter-Defibrillator Lead Extraction

The Editor,

Lead extraction is a procedure, that is, not devoid of complications. Risk factors for complications include younger age, implantation site, female gender, and physician experience.<sup>[1]</sup> Since fibrous attachments to the surrounding structures may involve the tricuspid valve, valvular damage may be provoked by lead removal, with consequent severe tricuspid regurgitation (TR).<sup>[2,3]</sup>

We present a case of 54-year-old female with a history of pacemaker implant for atrioventricular block at 16 years of age, affected by lead infection, with vegetations on the atrial and ventricular lead and positive blood cultures, unresponsive to antibiotic therapy. Indications to lead extraction were confirmed, and the procedure was performed by involving the entire extraction team (electrophysiologist, cardiac surgeon, and anesthesiologist) in right-sided thoracotomy for surgical access and double-lumen endotracheal tube. The patient informed consent was obtained.

Severe hypoxemia (ratio PaO<sub>2</sub>/FiO<sub>2</sub> below 100 mmHg) was observed in the immediate postprocedural time. A transthoracic echocardiogram performed immediately in the intensive care unit was not conclusive because of the poor window. Computed tomography pulmonary angiography was urgently performed. Similarly, to the case presented by Raju *et al.*, a small peripheral right pulmonary embolism was identified but did not justify the severe hypoxemia. The heparin infusion was started. Transesophageal echocardiography (TEE) identified severe TR, with severe eccentric jet, probably majorly due to tearing of the cusps during extraction, and further on due to the dilation of the right heart sections. In fact, there was dilatation of the right atrium (RA) and right ventricle (RV) with mild dysfunction and preserved the left ventricular function. The new TR caused increase in the right-sided pressure (pulmonary artery pressures 50 mmHg) that exceeded the left-sided pressure, and in the next TEE performed the day after, a large patent foramen ovale (PFO) (5–6 mm) with right-to-left intracardiac shunt was identified, with in association severe untreatable hypoxemia; the patient was assisted with 100% of inspired oxygen, with 91% of peripheral blood saturation detected. Although she remained hypoxemic, the hemodynamics and metabolic parameters were normal. The patient was extubated. The therapy was discussed in heart team with cardiologist, cardiac surgeon, anesthesiologist, and infectivologist. Given the recent septic condition and the pulmonary embolization identified, in association to the hemodynamic stability, urgent

indications to surgery were not given. It was decided to clinically and echocardiographically follow-up the patient. The echocardiography at 2 and 3 months of follow-up postlead extraction showed the absence of PFO and shunts associated. The TR was moderate to severe with normal RV function and mild dilation. The reduction of the entity of the TR is justified with the concomitant reduction of the dilation of the right heart sections, removing one of the two components of the cause of postlead extraction TR. The patient presented stable normal hemodynamic and oxygenation parameters. Indications to surgical treatment of the TR were not given, and the decision was to further echocardiographically follow-up the patient.

Raju *et al.* reported a case of severe hypoxemia after cardioverter-defibrillator lead extraction, in a 62-year-old patient.<sup>[1]</sup> TEE demonstrated a flail tricuspid valve with severe eccentric regurgitation and a large PFO with a bidirectional shunt. Similarly, to our patients, the authors described dilatation of RA and RV with mild RV dysfunction and preserved left ventricular function. After multidisciplinary discussion, surgical closure of PFO and tricuspid valve replacement was performed.<sup>[1]</sup>

The occurrence of a large PFO with a bidirectional shunt is not uncommon in adult patients<sup>[1,4]</sup> and necessitates closure due to the severe hypoxemia. Accentuation of the shunt across PFO results when RA pressure exceeds more than left atrial pressure or when the anatomic relationship of the interatrial septum to the inferior vena cava is altered.<sup>[5]</sup> In the case presented, the hypoxemia and the shunt were not associated with symptoms, and to our opinion, the risk of septicemia did not justify an immediate intervention, nor in surgical access neither with percutaneous procedures. The watchful waiting demonstrated to be a maneuver of benefit for our patient.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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