Introduction: An unusual case of permanent pacemaker (PPM)-associated severe tricuspid regurgitation (TR) is presented, and associated diagnostic challenges are discussed.

Methods: Consent for disclosure was obtained from the patient.

Results: A 74-year-old woman presented with findings of right heart failure, including dyspnea, peripheral edema, pulsatile liver and elevated JVP. Past medical history included coronary artery bypass grafting (CABG) six years earlier and post-operative sick sinus syndrome necessitating single lead PPM implantation. Transthoracic echocardiogram (TTE) revealed new severe TR associated with a dilated tricuspid annulus (41mm) and a mildly dilated and hypokinetic right ventricle (RV). Pulmonary artery systolic pressure (PASP) was estimated at 56mmHg, despite normal left ventricle (LV) systolic function. It was unclear whether the mechanism for her TR was due to annular dilatation or PPM wire interference. Given the patient’s symptomatic right heart failure in the context of severe TR, she was scheduled for tricuspid valve replacement. Pre-cardiopulmonary bypass (CPB) transesophageal echocardiography (TEE) confirmed severe TR centered on the pacemaker lead. The lead appeared to be adjacent to an immobile posterior leaflet. Unexpectedly, surgical exploration revealed the pacemaker actually perforating the posterior leaflet and the associated papillary muscle, causing significant fibrosis. Tricuspid valve replacement was undertaken, and the patient was successfully weaned from CPB. At 3-month follow-up, the patient had good exercise tolerance, resolution of her right heart failure, and TTE evidence of a well-functioning bioprosthetic tricuspid valve.

Discussion: PPM implantation is frequently associated with mild TR (1). Possible contributing mechanisms for PPM-associated TR include abnormalities in muscle depolarization, pacemaker-associated atrioventricular asynchrony, direct leaflet impingement by the pacing lead, and development of scar tissue and adherence to an adjacent leaflet (2). Severe PPM-lead associated TR is not well recognized, and is often the result of leaflet laceration or perforation (3). Although this case is not unique, it is an example of a rare complication that is often diagnosed only at autopsy (1). Due to acoustic shadowing from the PPM lead, routine TTE alone is often not able to accurately grade the severity of PPM-associated TR; the exact mechanism for TR is also often difficult to identify (4). TEE, on the other hand, is more effective in assessing the severity of TR in this setting, but may be insufficient in delineating the orientation of the PPM lead with respect to the valve leaflets (4). Three-dimensional echocardiography may have a role to play in more accurately delineating the mechanism of PPM-related TR by providing superior structure visualization (5); this, in turn, would allow for prompt and appropriate clinical management. Finally, given the difficulties in diagnosis, a high index of suspicion for significant PPM-associated TR is required, as symptoms of right heart failure may not develop for years following PPM implantation (3).

4. Echocardiography. 2007;24:649-52