Introduction: Atrial standstill (AS) is characterized by the absence of atrial electrical and mechanical activity. Most patients with AS are implanted with a VVI pacemaker due to difficulty in identification of a suitable implantation site for the atrial pacing lead owing to electrical silence, regardless of the atrioventricular conduction status. However, ventricular lead-induced tricuspid regurgitation (TR) is reportedly associated with a poor prognosis in patients who already have greater than mild TR before pacemaker implantation. Here, we present the case of a 75-year-old female with “pseudo” AS, severe TR, and heart failure.

Methods: We performed electrophysiological study for searching the suitable site for atrial pacing, because ventricular lead may exacerbate TR and right heart failure.

Result: We successfully implanted a single-chamber atrial pacing (AAI) mode pacemaker and achieved precise atrial pacing to compensate for interatrial synchrony, resulting in left atrial contraction recovery, improved left ventricular function and atrial volume reduction. Furthermore, we could prove amelioration of effective left atrial contraction after implantation of AAI pacemaker in patients with AS using the pulsed-wave Tissue Doppler imaging.

Conclusion: The pulsed-wave Tissue Doppler imaging and electrophysiological study are effective for diagnosis of AS even in patients diagnosed of it using ECG and help achieve physiological atrial pacing without aggravation of tricuspid regurgitation.