Diagnosis of pacemaker syndrome by suprahepatic vein pulsed Doppler echocardiography

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A case report where the diagnosis of pacemaker syndrome was made using simply suprahepatic vein, pulsed Doppler echocardiography. To the knowledge of the authors, this method is currently unpublished.

Keywords
- Echocardiography
- Doppler echocardiography
- Pulsed Doppler
- Electrical stimulation
- Heart failure
- Pacemakers
- Pacing
- Pacemaker syndrome

An 81-year-old man with lung infection and clinical signs of heart failure was referred for evaluation and treatment. Past medical history included a calcified aortic stenosis and paroxysmal atrial fibrillation. The patient had also a VVI pacemaker implanted several years earlier for atrioventricular block. The admission electrocardiogram showed an adequately paced ventricular rhythm, with clearly identified P-waves. Echocardiography was performed through the subcostal window only as the parasternal and apical images were of poor quality. Left ventricular systolic function was normal. Systolic pulmonary artery pressure derived from the peak velocity of the tricuspid regurgitant jet was 48 mmHg. The inferior vena cava was enlarged, with a reduced inspiratory collapse. Suprahepatic vein pulsed Doppler sampling showed a major, intermittent, systolic backward flow, with peak velocities up to 1 m/s (Figure 1). This unusual pattern was considered as highly suggestive of pacemaker syndrome, a condition where intermittent atrial contractions are observed simultaneously with paced ventricular contractions, i.e. against closed atrioventricular valves, is. After replacement of the VVI pacemaker by a dual-sensing (DDD) device, clinical signs of heart failures rapidly disappeared, and a complete normalization of pulmonary artery pressure and suprahepatic vein flow pattern was observed on further control echocardiograms.

In conclusion, pacemaker syndrome may easily be diagnosed by pulsed Doppler, suprahepatic vein sampling, which provides clear visual evidence of the haemodynamic conflict caused by right atrial contraction against a closed tricuspid valve. This original diagnostic approach may be useful not only in patients with VVI devices, but also in the presence of DDD equipments with inadequately programmed atrioventricular delay.

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