Hellenic Society of Cardiology (2017) xx, 1–4

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.journals.elsevier.com/hellenic-journal-of-cardiology/

LETTER TO THE EDITOR

Leadless Pacing System: Initial experience with a novel technology in Greece

KEYWORDS
cardiac pacing;
pacemaker;
leadless pacemaker;
bradycardia

Leadless pacing systems have recently emerged as a reliable therapeutic alternative to conventional pacemakers in providing therapy for patients with bradyarrhythmias.[1,2] Initial studies demonstrate favorable efficacy and safety results compared to transvenous pacemakers.[3–8]

We report the first six cases of a leadless pacemaker system (Micra™ Transcatheter Pacing System, Medtronic, Minneapolis, MN, USA) implantation in Greece that took place in the electrophysiology laboratory of Hippokrateion General Hospital of Athens between April and November 2016. Because of the relatively high cost of leadless pacemakers compared to the conventional ones, the use of this technology is still limited in Greece, and currently such implantations are restricted mostly to patients who present with severe access problems, unlikely to be overcome by conventional transvenous implantation techniques. Data of our patients are presented in Table 1.

Procedure: Implantation was performed under fluoroscopy, after obtaining informed consent from the patients, with local anesthesia. After introducing a 24-French sheath into the right femoral vein, a deflectable delivery catheter with the pacemaker adjusted on its distal part was advanced through the inferior vena cava and the right atrium to the right ventricle (RV). Subsequently, the outer sheath was retracted, allowing the device tines to be deployed, fixing the pacemaker in the right ventricular trabeculae. Adequate fixing of the system was confirmed mechanically by the "tug-test" while the pacemaker still maintained a connection to the catheter by means of the tethering mechanism. Subsequently, pacing thresholds, sensing, and impendence were tested. After ensuring that the pacemaker parameters were adequate and the pacemaker was well fixed, the capsule was released and the delivery system was removed.

Patients: The ***first patient*** was a 78-year-old Caucasian male who was referred to us by his local hospital because of multiple syncoptic episodes, bradyarrhythmia, and pauses longer than 5 s. He had a history of ischemic cardiomyopathy treated with a coronary artery by-pass grafting (CABG) in 1991, severe peripheral vascular disease, a cerebrovascular stroke 5 years prior to referral, chronic renal failure, and right ventricular dysfunction and dilatation accompanied with severe tricuspid regurgitation. In addition, he had a history of prior left subclavian vein thrombosis, and during a previous hospital stay, the patient experienced an infection of a transvenous catheter to the right subclavian vein, resulting in septicemia.

The ***second patient*** was a 50-year-old Caucasian male with a history of chronic renal failure under hemodialysis due to diabetes mellitus and arterial hypertension. However, the patient presented with peripheral dialysis fistula dysfunction because of repeated infection and peripheral arterial vascular disease. Therefore, a permanent dialysis catheter was placed in the right subclavian vein, but unfortunately, soon after this procedure, the patient experienced catheter infection and occlusion of the vessel, followed by bacterial endocarditis, resulting in severe incompetence of the aortic valve. Subsequently, the native valve was replaced with a prosthetic metallic aortic valve,

Peer review under responsibility of Hellenic Society of Cardiology.

http://dx.doi.org/10.1016/j.hjc.2017.06.003

Please cite this article in press as: Sideris S, et al., Leadless Pacing System: Initial experience with a novel technology in Greece, Hellenic Society of Cardiology (2017), http://dx.doi.org/10.1016/j.hjc.2017.06.003

Table 1 Data of patients who received a leadless pacemaker system at Hippocrateion General Hospital of Athens between April and November 2016.

		Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6
Date		April 2016	June 2016	September 2016	November 2016	November 2016	November 2016
Age (y)		78	50	72	64	65	77
Indication for PM		Syncopy, bradyarrhythmia, pauses >5 s	CHB	Syncopy,/ Presyncopy, bradyarrhythmia, pauses of 3 s	Syncopy, CHB	AF with slow VR, deterioration of functional status	Syncopy, bradyarrhythmia, pauses of 4 s
Heart Rhythm		AF	SR	AF	SR	AF	AF
History of underlying heart disease		CHD (CABG), RV dysfunction/ dilatation, severe TR	Prior BE causing AR/ Metallic prosthetic AV	CHD (CABG), Rheumatic mitral & aortic VHD/ prosthetic biological mitral & aortic valves	No	No	Rheumatic VHD/ metallic prosthetic mitral valve, LVD, RV dysfunction/ dilatation, severe TR
Previous PM implantation		No	epicardial PM (exit block)	No	No	No	No
Additional history		CVA, PVD	PVD, AH, DM	AH, Anemia/MDS	CVA, AH, DM, PVD	CVA	None
Renal Function		Moderate CRF	CRF (on H/D through LSV)-peripheral dialysis fistula dysfunction	Mild CRF	CRF (on H/D through LSV)	Normal	Moderate CRF
Superior caval access problems		LSV thrombosis, Prior infection of a transvenous catheter to the RSV	Occlusion of RSV	SVC syndrome/ thrombosed venous stent to SVC	None	No access due to anatomical problems	LSV thrombosis, Prior infection of a transvenous catheter to the RSV
Pacing & Sensing Parameters (pre-discharge)	R-wave amplitude (mv)	5	6	5	7	6	6
	Pacing threshold (V)	1 (at a 0.4-ms pulse width)	1.2 (at a 0.4-ms pulse width)	0.7 (at a 0.4-ms pulse width)	1.3 (at a 0.4-ms pulse width)	0.7 (at a 0.4-ms pulse width)	1.1 (at a 0.4-ms pulse width)
	Impedance (Ohms)	650	500	800	550	600	700
	Low Rate Limit (bpm)	60	60	60	60	60	60
	Pacing (%)	70	100	70	100	80	75
Pacing & Sensing Parameters	R-wave amplitude (mv)	7	8	8	9	7	9

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