

LONG-TERM OUTCOME AND COMPLICATIONS OF TRANSVENOUS PACEMAKER IMPLANTATION IN INFANTS



University Medical Center
Utrecht

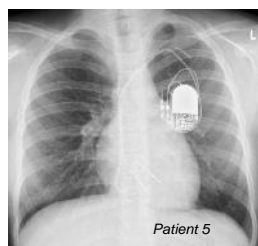
Vos LM, Blank AC, Kammeraad JA, Freund MW, Breur JMPJ.

Division Pediatric Cardiology, Wilhelmina Children's Hospital, University Medical Center Utrecht, The Netherlands

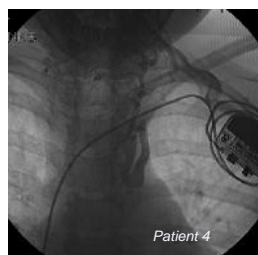
INTRODUCTION Transvenous (TV) pacing is feasible even in very small infants^{1,2,3}. Compared to epicardial (EC) pacing, TV systems have more reliable leads, require a less invasive procedure, but have a higher risk for perforation, venous stenosis/occlusion, endocarditis and lead associated complications. Objectives of this study are to determine long term results and complications of TV pacing in small infants.

METHODS Retrospective analysis of all TV implanted PM's between September 1997 and October 2001 in the WKZ.

RESULTS Complications occurred frequently: skin necrosis (n=2), atrial perforation (n=1), AV-valve dysfunction requiring surgical repair (n=2), lead malplacement (n=1), lead thrombosis (n=2), vascular occlusion (n=2, see fig. 1&2), DCM (n=1). See table 1&2.



Patient 5



Patient 4

Pt. no	Diagnosis/ PM-indication	Age at PM implant (days)	Weight at PM implant (kg)	Sex (M/F)	PM mode	PM type	Location battery
1	LQTS 2, AVB 2, VT	4	2,3	F	VVIR	SJM Mic II SR+ 2525T	Abd
2	CCAAB	310	7,5	M	VVIR	SJM Mic II SR+ 2525T	Thor SC left
3	CCAAB	1	2,6	M	VVIR	MD Thera SR 8960i	Thor SC left → abd
4	CCAAB	2	5	M	VVIR	SJM Mic II SR+ 2525T	Thor SC left
5	CCAAB	2	3,3	F	VVIR	SJM Mic II SR+ 2525T	Thor SC left → suspect left
6	QT prolongation, AVB 2	3	3,5	M	VVIR	SJM Mic II SR+ 2525T	Thor SC left
7	Corr. ASD, postop. SND and AVB	413	8,7	F	VVI	SJM Mic II SR+ 2525T	Subpect left

Abd, abdominal; ASD, atrial septal defect; AVB, atrioventricular block; CCAAB, congenital complete atrioventricular block; F, female; kg, kilogram; LQTS, long QT syndrome; M, male; MD, Medtronic; PM, pacemaker; pt, patient; SC, subcutaneous; SJM Mic, Sint Jude Medical Microny; SND, sinus node dysfunction; suspect, subpectoral; thor, thoracic; VT, ventricular tachycardia; VVI(R), ventricular pacing, ventricular sensing, inhibition response (and rate-adaptive).

Pt no	Follow up (yr)	Early reoperations (< 1 month)	Generator replacement	System upgrade	Lead related reoperations	Lead thrombosis	Vascular occlusion	AV-valve complications	LV function
1	16	-	New battery (5, 5, 10, 13 yr postop.)	ICD + 2 EC leads (5 yr postop.)	TV-lead advancing (tension; 1 yr postop.), TV-lead removal + EC-RA-lead replacement (13 yr postop.), EC-shock-lead replacement (14 yr postop.)	-	-	MVR (13 yr postop.)	Normal (13 yr postop.)
2	14	-	New battery (8 yr postop.)	DDD-PM (8 yr postop.)	-	-	-	-	Normal (13 yr postop.)
3	14	PM relocation abdominal (scar traction; 3 days postop.)	New battery (8 yr postop.)	CRT-PM + 3 EC-leads (8 yr postop.)	TV-lead removal (8 yr postop.)	-	-	-	DCM, normalization after CRT (12 yr postop.)
4	14	-	New battery (8, 13 yr postop.)	DDD-PM + 2 TV-leads (8 yr postop.)	TV-lead removal (leadfracture; 8 yr postop.)	9mm, RA (11 yr postop.)	Subcl left (8 yr postop.)*	-	Normal (11 yr postop.)
5	14	PM relocation subpectoral (imminent necrosis; 3 days postop.)	New battery (6 yr postop.)	No system upgrade due to small vessel size (6 yr postop.)	TV-lead advancing (tension; 2 yr postop.), TV-lead replacement + failed removal old TV-lead (6 yr postop.)	-	-	-	Normal (11 yr postop.)
6	14	-	New battery (9, 9 yr postop.)	DDD-PM (9 yr postop.), 2 EC-leads (9 yr postop.)	TV-lead replacement (4 yr postop.), removal TV-leads (atrial perforation; 9 yr postop.)	-	-	TVR (9 yr postop.)	Normal (11 yr postop.), moderate TR
7	12	-	Replacement unipolar with bipolar PM (pectoral stimulation; 6 yr postop.), new battery (12 yr postop.)	VVIR (6 yr postop.; small vessel size and occlusion), DDD-PM (12 yr postop.)	-	Small, RV (7 yr postop.)	Subcl left (6 yr postop.)**	-	Normal (12 yr postop.)

CRT, cardiac resynchronization therapy; DDD, Dual chamber pacing, Dual chamber sensing, Dual chamber response; DCM, dilated cardiomyopathy; EC, epicardial; ICD, implantable cardioverter defibrillator; MVR, mitral valve repair; PM, pacemaker; pt, patient; postop., postoperative; RA, right atrium; RV, right ventricle; subcl, subclavian vein; TR, tricuspid regurgitation; TV, transvenous; TVR, tricuspid valve repair; VVI(R), ventricular pacing, ventricular sensing, inhibition response (and rate-adaptive); yr, years. * Heterozygous prothrombin G20210A mutation, treated with fenprocoumon. ** Ehlers-Danlos syndrome with high bleeding tendency.

CONCLUSION

TV lead implantation in small infants is associated with a high incidence of severe complications and should be avoided in this patient group.