

THE FIRST SEVEN YEARS OF IMPLANTATION OF PERMANENT CARDIAC PACEMAKERS IN A SMALL URBAN COMMUNITY IN CENTRAL CROATIA

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SUMMARY – The aim of the study was to assess the situation with implantation of cardiac pacemakers and to critically evaluate the possibility of this method of treatment. The study was conducted from 2001 to 2007. Data on a total of 211 operations were included in the study. There were 121 (57.3%) male patients, mean age 69.7 years, and 90 (42.7%) female patients, mean age 74.5 years. Total number of operations increased from 18 in 2001 to 24 in 2002, 28 in 2003, 38 in 2004, 38 in 2005, 30 in 2006 and 35 in 2007. Primo implantation was carried out in 196 (92.9%) cases. The following types of pacemakers were used: VVI in 79 (40.3%), VVIR in 73 (37.2%), DDD in 7 (3.6%), DDDR in 18 (9.2%), VDD in 17 (8.7%) and AAIR in 2 (1.0%) cases. ECG indication was second degree heart block in 40, third degree heart block in 86, chronic atrial fibrillation with bradyarrhythmia in 57, sick sinus syndrome in 27 cases and trifascicular block in one case. The symptoms included dizziness in 126, syncope in 52, dyspnea in 45, bradycardia in 12, chest pain in 3 and cerebral dysfunction in 2 cases. In conclusion, our patients now receive appropriate treatment within a shorter time, thus reducing pressure upon large cardiac surgery centers. However, efforts should be continuously invested in approaching European standards of artificial pacemaker implantation.

Key words: *Cardiac pacing, artificial – methods; Pacemaker artificial – adverse effects; Pacemaker artificial – complications; Electrocardiography; Croatia*

Introduction

Extensive clinical experience has demonstrated that implantable cardiac pacemakers are safe and effective mechanisms for controlling symptoms and preventing the hazards of third degree heart block with Stokes-Adams syncope^{1,2}. The number of implanted cardiac pacemakers in Croatia has considerably increased in recent years. However, we have not yet reached the level of industrialized countries. This particularly applies to the number of implanted sophisticated cardiac pacemakers³.

The aim of this study was to assess the situation in the course of seven years of implantation of permanent cardiac pacemakers in Karlovac (southern part of cen-

tral Croatia with about 140,000 inhabitants as catchment population of our hospital) and to critically evaluate the possibility of implementing this therapeutic option at a smaller regional hospital.

Patients and Methods

This study was carried out at Division of Cardiology, Department of Medicine, Karlovac General Hospital in Karlovac from 2001 to 2007. The study included all patients undergoing implantation of permanent cardiac pacemakers with a total of 211 operations. There were 121 (57.3%) male patients aged 34-87 (mean age 69.7) years and 90 (42.7%) female patients aged 55-88 (mean age 74.5) years. The following parameters were assessed: number of primo implantations, types of implanted pacemakers, number of replacement of generators and electrodes, preoperative symptoms and ECG result, correc-

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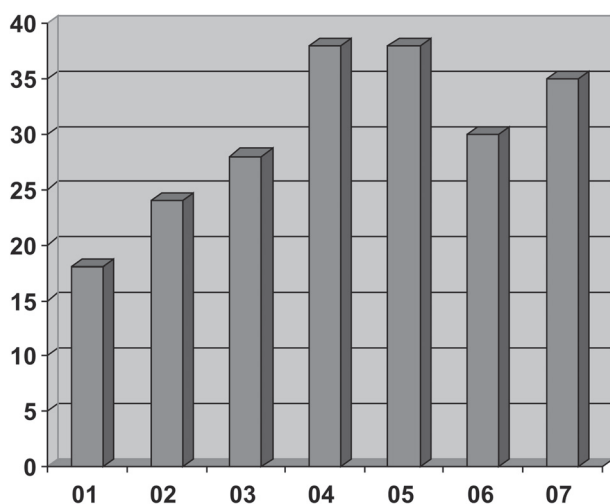


Fig. 1. Number of operations per year (2001-2007).

tion of dislocated electrodes and complications such as infections, hematomas, decubital ulcers, and impossible electrode implantation *via* cephalic vein.

Results

During the 7-year period, total number of operations increased from 18 in 2001 to 24 in 2002, 28 in 2003, 38 in 2004, 38 in 2005, 30 in 2006 and 35 in 2007 (Fig. 1). There were 211 operations in total, i.e. primo implantation in 196 (92.9%), replacement of an exhausted generator in 3 cases, electrode replacement due to fracture in one case, and correction of a dislocated electrode in

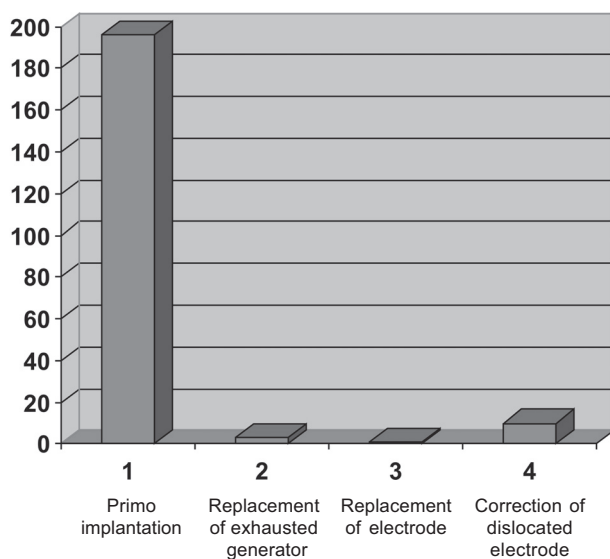


Fig. 2. Types of operations.

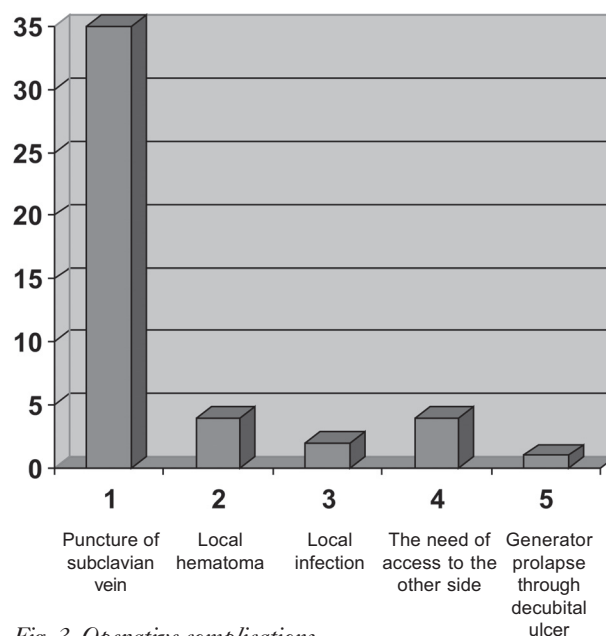


Fig. 3. Operative complications.

10 cases (Fig. 2).

Puncture of subclavian vein was performed in 35 (17.9%) cases of primo implantation, treatment of local hematoma in 4 cases and treatment of local infection in 2 cases. Access at another site was required in 4 cases and management of generator prolapse through decubital ulcer in one case (Fig. 3).

The following types of artificial pacemakers were used on primo implantation: VVI in 79 (40.3%), VVIR in 73 (37.2%), DDD in 7 (3.6%), DDDR in 18 (9.2%) cases (including one atrio-biventricular pacemaker),

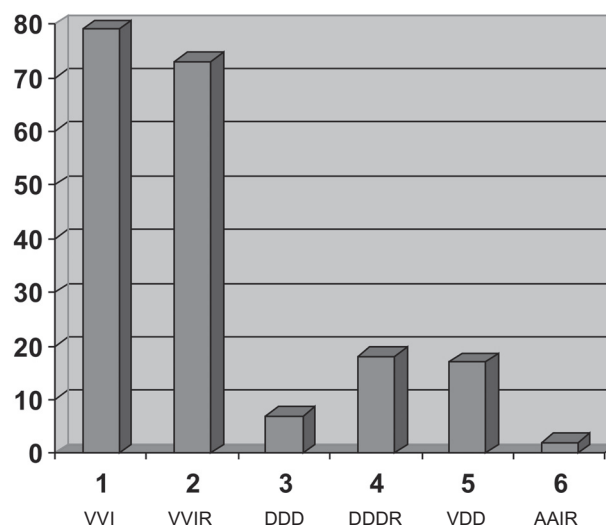


Fig. 4. Types of cardiac pacemakers.

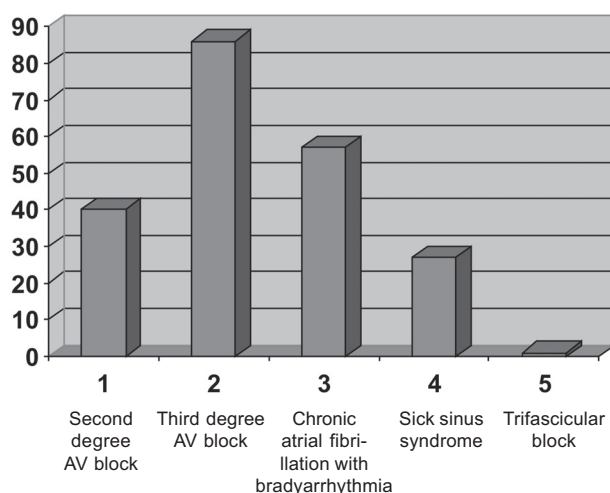


Fig. 5. ECG indications.

VDD in 17 (8.7%) and AAIR in 2 (1.0%) cases (Fig. 4).

ECG indications for primo implantation included second degree heart block in 40, third degree heart block in 86, chronic atrial fibrillation with bradyarrhythmia in 57, sick sinus syndrome in 27 cases and trifascicular block in one case (Fig. 5).

The following clinical symptoms were present in our patients: dizziness in 126, syncope in 52, dyspnea in 45, bradycardia in 12, chest pain in 3 and cerebral dysfunction in 2 cases. In addition, nonspecific disorders were present in 8 cases (Fig. 6).

Discussion

In the 7-year period, a satisfactory and progressive increase in the number of pacemaker primo implanta-

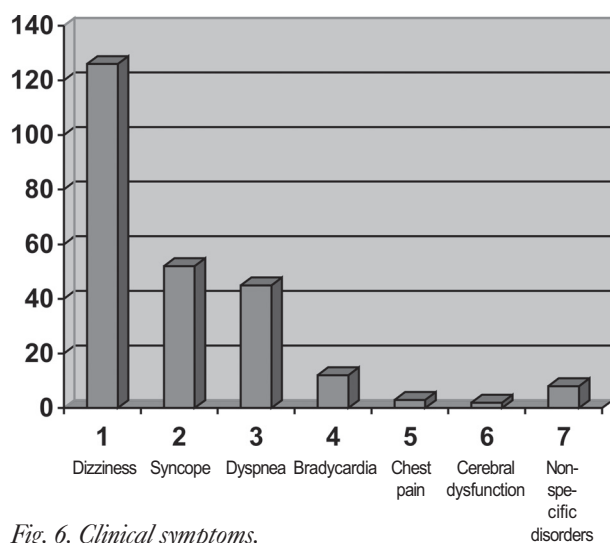


Fig. 6. Clinical symptoms.

tions was recorded (Figs. 1 and 2), which could be explained by the proportional improvement in the cardiologic team competencies. However, the choice of the types of implantation of permanent cardiac pacemakers (Fig. 4) according to ECG indications (Fig. 5) is still inappropriate, with even 3/4 of ventricular pacemakers and only 1/4 of atrioventricular pacemakers implanted^{4,5}. This ratio has been leveled in Europe and in large Croatian centers⁶. The reasons for this are of financial nature, older age of patients and time needed for the team to acquire due experience.

The leading symptoms for implantation of cardiac pacemakers were dizziness, syncope and dyspnea (Fig. 6), which means that implantation is still carried out mostly therapeutically and less frequently as a prophylactic measure, in contrast to industrialized countries^{7,8}. It should be noted that the rates of electrode dislocation, subclavian vein puncture, changing the side of implantation, and management of local operative complications such as infection, hematoma and decubitus ulcer (Fig. 3) did not exceed the rates reported from large centers⁹⁻¹¹.

Briefly, our results recorded during the first 7 years of implantation of permanent cardiac pacemakers were fully satisfactory. Our patients now receive appropriate treatment within a shorter time, thus reducing pressure upon large cardiac surgery centers. However, apart from what has been done so far, efforts should be continuously invested to approach European standards of artificial pacemaker implantation. To achieve this goal, the ratio of the types of cardiac pacemakers implanted should be upgraded by increasing the number of atrioventricular pacemaker implantations. This can be achieved by better individual and group education of physicians in terms of technical skills of implantation, extending the indications among older patients, and finally by providing adequate financial support to supervising bodies for supply of appropriate devices.

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Sažetak

PRVIH SEDAM GODINA UGRADNJE TRAJNIH ELEKTROSTIMULATORA U MANJEM GRADU SREDIŠNJE HRVATSKE

D. Horvat

Cilj studije bio je utvrditi stanje s ugradnjom srčanih elektrostimulatora i kritički procijeniti mogućnosti ove metode liječenja naših bolesnika. Studija je provedena od 2001. do 2007. godine, a obuhvatila je 211 operacija. U studiju je bio uključen 121 (57,3%) bolesnik srednje dobi od 69,7 godina i 90 (42,7%) bolesnica srednje dobi od 74,5 godina. Zabilježen je porast ukupnog broja ovih operacijskih zahvata na godinu s 18 u 2001. na 24 u 2002., 28 u 2003., 38 u 2004., 38 u 2005., 30 u 2006. i 35 u 2007. godini. Primoimplantacija je izvedena u 196 (92,9%) slučajeva. Prema vrsti elektrostimulatora, VVI je upotrebljen u 79 (40,3%), VVIR u 73 (37,2%), DDD u 7 (3,6%), DDDR u 18 (9,2%), VDD u 17 (8,7%) slučajeva i AAIR u 2 (1,0%) slučaja. EKG indikacija za zahvat bio je srčani blok drugog stupnja u 40, srčani blok trećeg stupnja u 86, kronična atrijska fibrilacija s bradiaritmijom u 57, sindrom bolesnog sinusa u 27 slučajeva i trifascikularni blok u jednom slučaju. Simptomi su bili omaglica u 126, sinkopa u 52, dispneja u 45, bradikardija u 12 slučajeva, bol u prsištu u 3 slučaja i cerebralna disfunkcija u 2 slučaja. Rezultati su pokazali kako se naši bolesnici danas brže i primjerenije mogu liječiti u našoj bolnici, čime se smanjuje opterećenost većih kardioloških centara u državi. Međutim, i dalje valja težiti približavanju europskim standardima u ugradnji srčanih elektrostimulatora.

Ključne riječi: *Srčana stopa, umjetna – metode; Elektrosimulator umjetni – štetni učinci; Elektrosimulator umjetni – komplikacije; Elektrokardiografija; Hrvatska*