

# Parameters associated with one-year mortality and in-hospital adverse events in patients after emergency pacemaker implantation

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## Abstract

**Background:** Permanent cardiac pacing is the treatment of choice for severe and symptomatic bradycardia. Patients undergoing emergency pacemaker implantation are stabilised earlier by the insertion of a temporary emergency pacing lead, and they experience more comorbidities than with planned admissions.

**Aim:** To identify the parameters associated with one-year mortality and in-hospital adverse events after emergency permanent pacemaker implantation.

**Methods:** This retrospective study analyses data from 131 consecutive emergency pacemaker implantations performed within a single centre.

**Results:** Cox regression analysis revealed the independent predictors of death to be: use of a temporary transvenous pacing lead (TTPL) (HR = 2.82, 95% CI 1.21–6.58,  $p = 0.02$ ), age  $\geq 78$  years (OR = 3.01, 95% CI 1.22–7.42,  $p = 0.02$ ), longer baseline QRS duration (HR = 1.02, 95% CI 1.00–1.03,  $p = 0.03$ ), and history of myocardial infarction (MI) (HR = 2.43, 95% CI 1.04–5.68,  $p = 0.04$ ). Twenty-six patients experienced in-hospital adverse events, such as: death ( $n = 6$ ), cardiac arrest ( $n = 3$ ), surgical complications (lead dislocation:  $n = 4$ , haematoma:  $n = 4$ , microperforation:  $n = 2$ ), pneumonia or respiratory tract disease ( $n = 7$ ), wound infection treated with antibiotics ( $n = 1$ ), and subsequent MI following pacemaker implantation ( $n = 2$ ). Multivariate logistic regression analysis showed that independent parameters associated with in-hospital adverse events were history of MI (OR = 5.01, 95% CI 1.88–13.3,  $p = 0.001$ ) and stroke (OR = 3.51, 95% CI 1.16–10.55,  $p = 0.03$ ).

**Conclusions:** Our results suggest that the most serious risk factors of one-year mortality related to the use of TTPL are: age  $\geq 78$  years, longer baseline QRS duration, and history of MI. The independent parameters associated with in-hospital adverse events were the presence of a history of MI and stroke.

**Key words:** one-year mortality, emergency implantation, pacemaker, adverse event, temporary transvenous pacing lead

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## INTRODUCTION

The growth of the elderly population has resulted in increasing demand for pacemaker implantation. Major indications for the implantation of a permanent pacemaker are sick sinus syndrome or a third-degree atrioventricular (AV) block [1]. Of patients with compromising bradycardia, 20% require temporary emergency pacing for initial stabilisation, while permanent pacing is needed in 50% [2]. Despite the wide-

spread implantation of pacemakers, limited data is available concerning predictors of survival after emergency implantation. Pyatt et al. [3] reported that among all patients who have undergone pacemaker implantation, independent predictors of mortality were: age at time of implantation, single chamber ventricular pacing mode, cardiomyopathy, male gender, and valvular heart disease. Similarly, Brunner et al. [4] noted that age, gender, decade of implantation, type of pacemaker,

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index arrhythmia, and initial symptoms were independent factors associated with survival. The aim of our study was to determine the parameters influencing one-year mortality and in-hospital adverse events in patients undergoing emergency pacemaker implantation.

## METHODS

This study is a retrospective chart review of all emergency pacemaker implantations in the Department of Electrophysiology, Medical University Hospital, Lodz, Poland between October 2010 and December 2011. Approximately 650 procedures were performed in the Department over the course of the year, and each operator had an annual volume of more than 50 procedures. The study population comprised symptomatic patients with Morgagni–Adams–Stokes syndrome, disturbances of cardiac automaticity, conduction with Holter or electrocardiogram-documented cardiac pause > 6 s, or escape rhythms due to the sinus arrest, sinoatrial block, second-degree AV block, or third-degree AV block. The main exclusion criteria were the presence of acute coronary syndrome, acute pulmonary embolism, stroke, dissecting aneurysm of the aorta, or cardiac tamponade, as well as other reversible causes such as drugs or electrolyte disturbances. Death statistics were collected from the families of the deceased, or population records kept by the city of Lodz. The end-point of the study was all-cause mortality. The following parameters predicting potential outcome were analysed: age, gender, clinical parameters (atrial fibrillation [AF], chronic obstructive pulmonary disease, myocardial infarction [MI], hypertension, hyperlipidaemia, diabetes, stroke, left ventricular ejection fraction [LVEF], creatinine and potassium level, and body mass index), indications for pacemaker implantation, pacing mode, baseline QRS duration, waiting period for pacemaker implantation following hospital admission, and insertion of temporary transvenous pacing lead (TTPL).

### Statistical analysis

Normality of the data set was tested using the Shapiro-Wilk test. Quantifiable variables were expressed as mean  $\pm$  standard deviation (SD) or median and inter-quartile range (IQR), depending on the results of the normality test. For categorical variables, numbers (n) and percentages (%) were calculated. For quantifiable variables, the Student-T test and Mann-Whitney U-tests were used to analyse the differences between two independent samples. For categorical variables, the  $\chi^2$  test and  $\chi^2$  test with Yates' adjustment were used. Factors significant in univariate comparisons with  $p < 0.10$  were included into a multivariate logistic regression model or a Cox regression model. The results were considered significant at  $p < 0.05$ . A Kaplan-Meier survival curve was generated for one-year mortality. The STATISTICA 10 and MedCalc software packages were used to analyse the data.

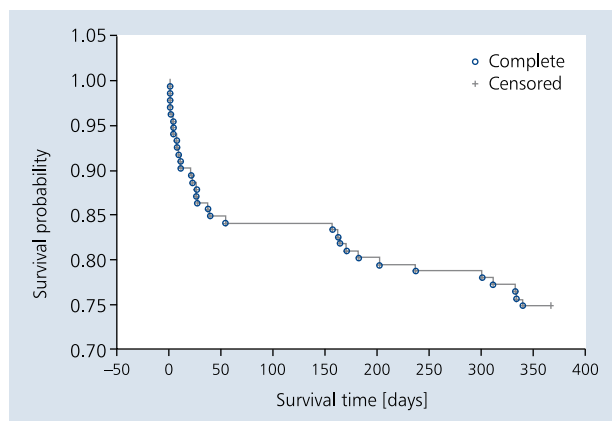


Figure 1. Kaplan-Meier curve for one-year mortality after emergency pacemaker implantation

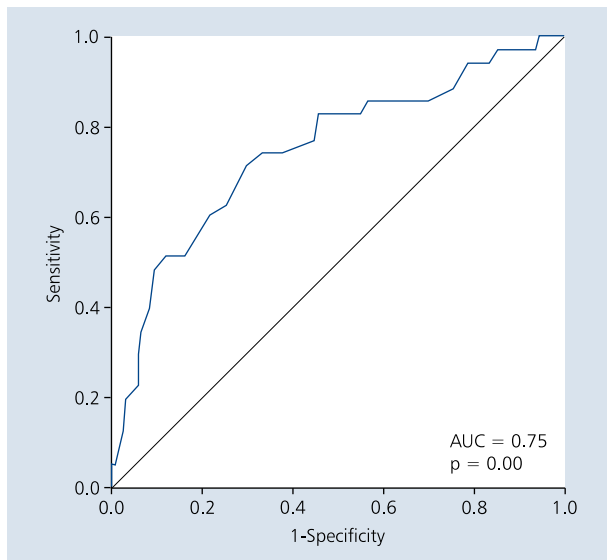
## RESULTS

One hundred and thirty-one patients with an urgently implanted pacemaker were enrolled in this study. Thirty-nine patients were implanted with a single-chamber ventricular pacemaker, and 92 patients received a dual-chamber pacemaker.

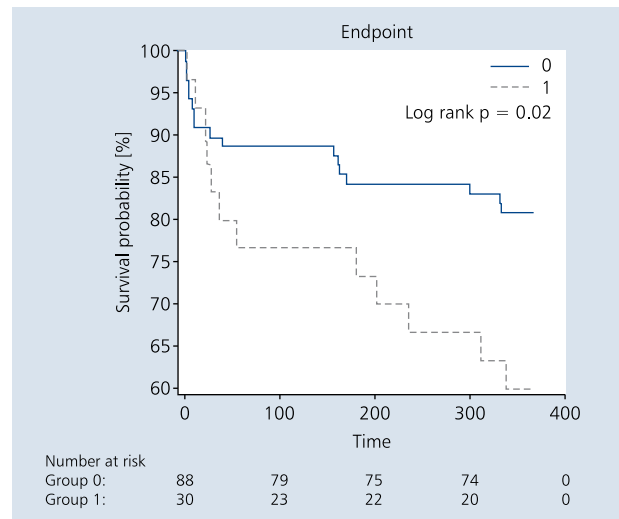
The median age of the studied population was 77 (70–83) years, and the majority of the patients were male (53%). Of the 131 pacemaker implantations, 107 (81%) were due to symptomatic AV block with escape rhythm: 91 (69%) with third degree AV block and 16 (12%) with second-degree AV block, 18 (14%) with bradycardia-tachycardia syndrome, four (3%) with sick sinus syndrome, and two (2%) with bradycardia with AF with rhythm pause > 6 s. Thirty-three (25%) patients died within 365 days after implantation (Fig. 1), of whom six died during the hospitalisation period: two patients died due to surgical complications such as right ventricular perforation, which led to cardiac tamponade, three patients died due to heart failure decompensation, and one patient died due to MI and bilateral pneumonia, which occurred after pacemaker implantation.

### Parameters associated with one-year mortality

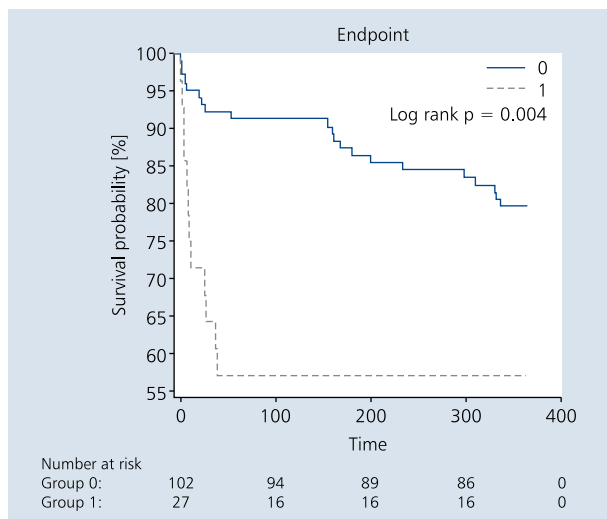
The median age of the group of patients who died within one year was significantly higher than that of the ones who survived (85 vs. 75 years,  $p < 0.001$ , respectively). Receiver operating characteristics curve analysis revealed age  $\geq 78.5$  years as an independent predictor of one-year mortality (cut off  $\geq 78.5$  years, area under the curve [AUC] = 0.75, 95% confidence interval [CI] 2.6–13.5,  $p < 0.001$ ) (Fig. 2). The following factors were noted in the group of patients who died before the one-year follow-up: more frequent insertion of TTPL by the referring hospitals before admission to our department ( $n = 12$  [36%] vs.  $n = 16$  [16%],  $p = 0.015$ ), a longer duration of baseline QRS (123 ms vs. 107 ms,  $p = 0.027$ ), more frequent history of MI ( $n = 11$  [33%] vs.  $n = 17$  [17%],



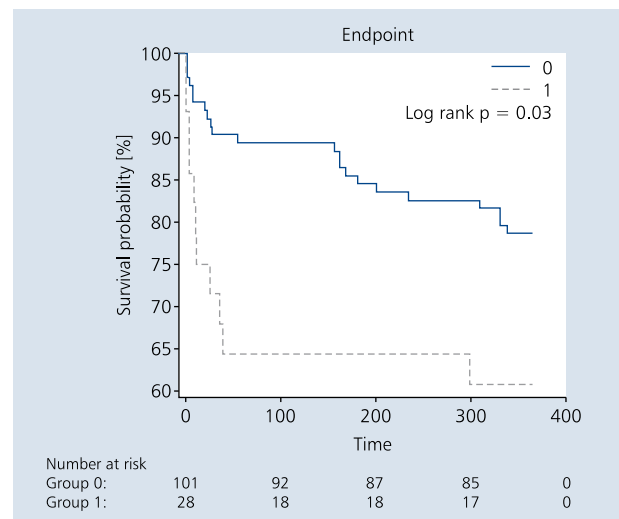
**Figure 2.** Receiver operating characteristic curve for age in predicting one-year mortality; AUC — area under the curve



**Figure 4.** Kaplan-Meier curve for one-year mortality after emergency pacemaker implantation showing a dependence on baseline QRS duration; 0 — baseline QRS < 140 ms; 1 — baseline QRS ≥ 140 ms



**Figure 3.** Kaplan-Meier curve for one-year mortality after emergency pacemaker implantation showing a dependence on an insertion of temporary transvenous pacing lead (TTPL); 0 — without TTPL; 1 — with TTPL



**Figure 5.** Kaplan-Meier curve for one-year mortality after emergency pacemaker implantation showing a dependence on a history of myocardial infarction (MI); 0 — no history of MI; 1 — history of MI

$p = 0.05$ ), and a higher number of single-chamber ventricular pacing mode implantations ( $n = 18$  [54%] vs.  $n = 21$  [21%],  $p < 0.001$ ). The Kaplan-Meier curve for one-year mortality after emergency pacemaker implantation was found to be dependent of the following: insertion of a TTPL (Fig. 3), baseline QRS duration (Fig. 4), and history of MI (Fig. 5). In all cases, a hard-tipped TTPL with passive fixation was used. Pacing leads were inserted by subclavian or jugular vein puncture. The indication for TTPL was a third-degree

AV block in 23 cases, brady/tachy syndrome in three cases, and second-degree AV block in two cases. A comparison of the group of patients who died before one-year follow-up and those who survived this period is shown in Table 1. The results of the Cox multivariate regression model showed that the only independent parameters associated with one-year mortality were as follows: TTPL (hazard ratio [HR] = 2.82, 95% CI 1.21–6.58,  $p = 0.02$ ), age ≥ 78 years (odds ratio [OR] = 3.01, 95% CI 1.22–7.42,  $p = 0.02$ ), longer baseline

**Table 1.** Patient characteristics of survivor and deceased groups

Variable	Total population (n = 131)	Survivors (n = 98)	Death (n = 33)	P
Age [years]	77 (70–83)	75 (68–80)	85 (79–89)	< 0.001
Male	69 (53%)	51 (52%)	18 (54%)	0.803
Past myocardial infarction	28 (21%)	17 (17%)	11 (33%)	0.053
Chronic obstructive pulmonary disease	15 (11%)	11 (11%)	4 (12%)	0.860
Hypertension	104 (79%)	80 (82%)	24 (73%)	0.274
Atrial fibrillation	20 (15%)	23 (13%)	7 (21%)	0.272
Hyperlipidaemia	20 (15%)	17 (17%)	3 (9%)	0.389
Diabetes	37 (28%)	29 (30%)	8 (24%)	0.551
Stroke	20 (15%)	15 (15%)	5 (15%)	0.796
Body mass index	27 ± 4	27 ± 5	28 ± 3	0.178
Left ventricular ejection fraction	58 ± 10	58 ± 9	57 ± 12	0.618
Creatinine [mg/mL]	0.95 (0.76–1.24)	0.92 (0.8–1.23)	0.99 (0.75–1.33)	0.324
Potassium [mmol/L]	4.17 (3.89–4.56)	4.15 (3.9–4.49)	4.25 (3.81–4.63)	0.448
Baseline QRS duration [ms]	111 (90–140)	107 (80–130)	123 (100–150)	0.027
Temporary transvenous pacing lead	28 (21%)	16 (16%)	12 (36%)	0.015
Implantation performed in the day of hospital admission	76 (58%)	57 (58%)	19 (59%)	0.904
Single-chamber ventricular pacing mode	39 (30%)	21 (21%)	18 (54%)	< 0.001

**Table 2.** Risk factors independently associated with one-year mortality revealed in Cox regression analysis

	Univariate			Multivariate		
	HR	95% CI	P	HR	95% CI	P
History of MI	2.22	1.07–4.58	0.03	2.43	1.04–5.68	0.04
Age ≥ 78 years	4.83	2.09–11.14	< 0.001	3.01	1.22–7.42	0.02
Baseline QRS duration	1.02	1.00–1.03	0.02	1.02	1.00–.03	0.03
Temporary transvenous pacing lead	2.50	1.12–5.55	0.02	2.82	1.21–6.58	0.02
Single-chamber ventricular pacing mode	3.45	1.73–6.86	< 0.001	2.03	0.91–4.52	0.08

CI — confidence interval; HR — hazard ratio; MI — myocardial infarction

QRS duration (HR = 1.02, 95% CI 1.00–1.03,  $p = 0.03$ ), and history of MI (HR = 2.43, 95% CI 1.04–5.68,  $p = 0.04$ ) (Table 2). The single-chamber ventricular pacing mode used in the multivariate Cox regression model was not statistically significant at  $p < 0.05$ .

#### **Parameters associated with in-hospital adverse events**

Adverse events were defined as surgical complications or nonsurgical complications that occurred during hospitalisation period. Surgical complications included haematoma (treated conservatively or requiring drainage), microperforation (lead penetrating the right atrial or ventricular pericardium requiring revision), lead dislocation requiring revision, cardiac tamponade, wound infection, and death related to surgery. Nonsurgical complications included infections such as pneumonia or

other respiratory tract disease requiring antibiotic treatment diagnosed after pacemaker implantation, MI diagnosed after pacemaker implantation, cardiac arrest with effective resuscitation, and death not related to surgery. Twenty-six patients experienced the following in-hospital adverse events: lead dislocation ( $n = 4$ ), haematoma ( $n = 4$ ), microperforation ( $n = 2$ ), pneumonia or respiratory tract disease ( $n = 7$ ), wound infection treated with antibiotic ( $n = 1$ ), death ( $n = 6$ ), cardiac arrest ( $n = 3$ ), and MI after pacemaker implantation ( $n = 2$ ) (Table 3). Multivariate analysis showed that the only independent predictors of adverse events were history of MI (OR = 5.01, 95% CI 1.88–13.3,  $p = 0.001$ ) and stroke (OR = 3.51, 95% CI 1.16–10.55,  $p = 0.03$ ). A trend towards significant differences was observed between patients experiencing adverse effects and those who did not, with regard to age (age:  $80 \pm 9$  years vs.  $75 \pm 11$  years,  $p = 0.06$ ) and

**Table 3.** In-hospital adverse events

Lead dislocation	4
Lead microperforation	2
Hematoma	4
Wound infection treated with antibiotics	1
Cardiac arrest with effective resuscitation (in the mechanism of: 1. ventricular asystole; 2. polymorphic ventricular tachycardia; 3. lead perforation induced cardiac tamponade)	3
Infections [pneumonia, respiratory tract disease])	7
Myocardial infarction diagnosed after pacemaker implantation	2
Death	6

waiting period for implantation ( $\geq 24$  h waiting vs.  $< 24$  h waiting,  $p = 0.07$ ). No such differences were observed regarding the presence of AF, chronic obstructive pulmonary disease, hypertension, hyperlipidaemia, or diabetes, as well as LVEF, creatinine and potassium level, body mass index, QRS baseline duration, insertion of TTPL, implantation on the day of hospital admission, single chamber ventricular pacing mode, and the use of antiplatelet drugs/anticoagulants.

## DISCUSSION

The primary finding of our study is that insertion of TTPL, age  $\geq 78$  years, longer baseline QRS duration, and history of MI were independent parameters associated with one-year mortality.

One prior study showed that 20% of the studied population with compromising bradycardia required temporary emergency pacing for initial stabilisation [3]. In our population, 21% of enrolled patients needed to be stabilised with TTPL. One specific study [5] showed that approximately 32% of the TTPL procedures resulted in documented complications. The risk of complications was higher when the TTPL procedures were performed by inexperienced physicians and when the pacing leads were left *in situ* for more than 48 h [6]. McLeod and Jokhi [6] showed that TTPL could directly trigger ventricular arrhythmias. In another study, Murphy [7] reported that TTPL caused complications such as ventricular tachycardia or fibrillation, pneumothorax, brachial plexus injury, septicaemia, and wound infection. Harris et al. [8] found that the insertion of a TTPL may also lead to myocardial perforation. Chauhan et al. [9] reported that patients from district hospitals were frequently referred to specialist centres with unnecessarily inserted temporary pacing leads. In our study population, most TTPL insertions were performed by referring physicians from district and general hospitals, and the degree of experience in performing such procedures was not known. The guidelines of the European Society of Cardiology from 2013 recommend the avoidance of temporary pacing as much as possible and

shortening the placement time of TTPL *in situ*. As long as sinus rhythm is present, physicians should avoid using TTPL [10]. TTPL insertion should only be performed by a qualified cardiologist, and a soft-tipped lead should be used rather than a hard-tipped lead.

Kalahasti et al. [11] found that prolonged QRS duration was a strong independent marker of long-term mortality. The duration of QRS was also a predictor of the clinical outcome of heart failure in implantable cardioverter defibrillator recipients [12]. The findings of the present study indicate longer baseline QRS duration to be a negative prognostic factor for one-year survival.

Long-term survival rates post pacemaker implantation have frequently been estimated in previous studies. In one study, the survival rate in the first year of follow-up was 85% in patients  $\geq 65$  years old and 72% in patients with isolated AV block and coexisting heart disease [13], while another found survival rates after pacemaker implantations in patients  $\geq 70$  years old to be 90% [14]. The higher level of one-year mortality (25%) identified in the present study may be accounted for by the high median age of the patients who died within one year of implantation (85 years) and the fact that all patients were admitted urgently.

Pacemaker implantation is recommended for an AV block that has persisted for more than seven days from acute MI. Mortality rates, however, are known to be significantly higher in this group of patients [15]. In our study population, a higher one-year mortality rate was predicted by a history of MI combined with advanced age, the insertion of a TTPL, and longer QRS duration.

Mazza et al. [16] reported that 7% of patients with an implanted pacemaker developed new-onset heart failure over a follow-up period of 27 months. The presence of left bundle branch block and LVEF  $< 50\%$  at baseline predicted heart failure death or hospitalisation. Our present findings reveal no statistical difference in LVEF between the group of patients who died before the one-year follow-up and the group of patients who survived this period.

Emergency procedures had a higher risk of complications after device implantation [17]. A high number of in-hospital adverse events may also be connected with emergency hospital admissions.

Furthermore, our analysis showed that history of stroke and MI were independent parameters associated with in-hospital adverse events. The risk of in-hospital adverse events was 5-fold greater for patients with a history of MI and 3-fold greater for patients with a history of stroke.

## Limitations of the study

This study has several limitations that merit discussion. Firstly, the study population was small; thus not all possible parameters associated with the one-year mortality could be detected. Secondly, the study population included high-risk patients due

to advanced age and a high number of comorbidities, resulting in a higher one-year mortality rate and more in-hospital adverse events than that observed in other populations. Thirdly, no data was available concerning the duration of the TTPL *in situ*, the cause of death, or subsequent hospitalisation. Finally, although the patients had an appointment for a follow-up examination in the outpatient department, the data from the follow-up was not included in this study.

### CONCLUSIONS

The independent parameters associated with one-year mortality were as follows: use of a TTPL, age  $\geq$  78 years, longer baseline QRS duration, and history of MI. The independent parameters associated with in-hospital adverse events were a history of MI and stroke.

**Conflict of interest:** none declared

### References

- Mond HG, Proclemer A. The 11th World Survey of Cardiac Pacing and Implantable Cardioverter-Defibrillators: Calendar Year 2009-A World Society of Arrhythmia's Project. *Pacing Clin Electrophysiol*, 2011; 34: 1013–27. doi: [10.1111/j.1540-8159.2011.03150.x](https://doi.org/10.1111/j.1540-8159.2011.03150.x).
- Sodeck GH, Domanovits H, Meron G et al. Compromising bradycardia: management in the emergency department. *Resuscitation*, 2007; 73: 96–102. doi: [10.1016/j.resuscitation.2006.08.006](https://doi.org/10.1016/j.resuscitation.2006.08.006).
- Pyatt JR, Somauroo JD, Jackson M et al. Long-term survival after permanent pacemaker implantation: analysis of predictors for increased mortality. *Europace*, 2002; 4: 113–119. doi: [10.1053/eupc.2002.0233](https://doi.org/10.1053/eupc.2002.0233).
- Brunner M, Olschewski M, Geibel A et al. Long-term survival after pacemaker implantation. *Eur Heart J*, 2004; 25: 88–95. doi: [10.1016/j.ehj.2003.10.022](https://doi.org/10.1016/j.ehj.2003.10.022).
- Betts TR. Regional survey of temporary transvenous pacing procedures and complications. *Postgraduate Med J*, 2003; 79: 463–465. doi: [10.1136/pmj.79.934.463](https://doi.org/10.1136/pmj.79.934.463).
- McLeod AA, Jokhi PP. Pacemaker induced ventricular fibrillation in coronary care units. *BMJ*, 2004; 328: 1249–1250. doi: [10.1136/bmj.328.7450.1249](https://doi.org/10.1136/bmj.328.7450.1249).
- Murphy J.J. Current practice and complications of temporary transvenous cardiac pacing. *BMJ*, 1996; 312: 1134. doi: [10.1136/bmj.312.7039.1134](https://doi.org/10.1136/bmj.312.7039.1134).
- Harris JP, Nanda NC, Moxley R, Manning JA. Myocardial perforation due to temporary transvenous pacing catheters in pediatric patients. *Catheterization Cardiovasc Diagn*, 1984; 10: 329–333. doi: [10.1002/ccd.1810100404](https://doi.org/10.1002/ccd.1810100404).
- Chauhan A, Grace AA, Newell SA et al. Early complications after dual chamber versus single chamber pacemaker implantation. *Pacing Clin Electrophysiol*, 1994; 17: 2012–2015. doi: [10.1111/j.1540-8159.1994.tb03791.x](https://doi.org/10.1111/j.1540-8159.1994.tb03791.x).
- Brignole M, Auricchio A, Baron-Esquivias G et al. 2013 ESC guidelines on cardiac pacing and cardiac resynchronization therapy: the task force on cardiac pacing and resynchronization therapy of the European Society of Cardiology (ESC). Developed in collaboration with the European Heart Rhythm Association (EHRA). *Europace*, 2013; 15: 1070–1118. doi: [10.1093/europace/eut206](https://doi.org/10.1093/europace/eut206).
- Kalahasti V, Nambi V, Martin DO et al. QRS duration and prediction of mortality in patients undergoing risk stratification for ventricular arrhythmias. *Am J Cardiol*, 2003; 92: 798–803. doi: [10.1016/s0002-9149\(03\)00886-5](https://doi.org/10.1016/s0002-9149(03)00886-5).
- Bode-Schnurbus L, Bocker D, Block M et al. QRS duration: a simple marker for predicting cardiac mortality in ICD patients with heart failure. *Heart*, 2003; 89: 1157–1162. doi: [10.1136/heart.89.10.1157](https://doi.org/10.1136/heart.89.10.1157).
- Shen WK, Hammill SC, Hayes DL et al. Long-term survival after pacemaker implantation for heart block in patients  $\geq$  65 years. *Am J Cardiol*, 1994; 74: 560–564. doi: [10.1016/0002-9149\(94\)90744-7](https://doi.org/10.1016/0002-9149(94)90744-7).
- Amikam S, Lemer J, Roguin N et al. Long-term survival of elderly patients after pacemaker implantation. *Am Heart J*, 1976; 91: 445–449. doi: [10.1016/s0002-8703\(76\)80325-0](https://doi.org/10.1016/s0002-8703(76)80325-0).
- Behar S, Zissman E, Zion M et al. Prognostic significance of second-degree atrioventricular block in inferior wall acute myocardial infarction. *Am J Cardiol*, 1993; 72: 831–834. doi: [10.1016/0002-9149\(93\)91075-s](https://doi.org/10.1016/0002-9149(93)91075-s).
- Mazza A, Bendini MG, Leggio M et al. Incidence and predictors of heart failure hospitalization and death in permanent pacemaker patients: a single-centre experience over medium-term follow-up. *Europace*, 2013; 15: 1267–1272. doi: [10.1093/europace/eut041](https://doi.org/10.1093/europace/eut041).
- Kirkfeldt RE, Johansen JB, Nohr EA et al. Complications after cardiac implantable electronic device implantations: an analysis of a complete, nationwide cohort in Denmark. *Eur Heart J*, 2014; 35: 1186–1194. doi: [10.1093/eurheartj/ehf511](https://doi.org/10.1093/eurheartj/ehf511).

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# Czynniki predykcyjne rocznej śmiertelności i wewnątrzszpitalnych zdarzeń niepożądanych u pacjentów po wszczepieniu stymulatora serca w trybie pilnym

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## Streszczenie

**Wstęp:** Stała stymulacja serca stanowi terapię z wyboru w ciężkiej i objawowej bradykardii. Pacjenci przyjęci do szpitala w celu implantacji stymulatora serca w trybie pilnym są częściej zaopatrzeni elektrodą do czasowej stymulacji serca i współlistnieje u nich więcej chorób niż u pacjentów przyjętych do szpitala planowo.

**Cel:** Celem niniejszej pracy była ocena czynników predykcyjnych związanych z roczną śmiertelnością i wewnątrzszpitalnymi zdarzeniami niepożądanymi po implantacji stymulatora serca w trybie pilnym.

**Metody:** W retrospektywnym, jednośrodkowym badaniu przeanalizowano dane z 131 kolejnych implantacji stymulatora serca w trybie pilnym.

**Wyniki:** Analiza wieloczynnikowa regresji Coxa wykazała, że niezależnymi czynnikami predykcyjnymi rocznej śmiertelności były: użycie elektrody do czasowej przezżyłnej stymulacji (TTPL) (HR = 2,82; 95% CI 1,21–6,58; p = 0,02), wiek ≥ 78 lat (OR = 3,01; 95% CI 1,22–7,42; p = 0,02), dłuższy czas trwania własnego zespołu QRS (HR = 1,02; 95% CI 1,00–1,03; p = 0,03) i przebyty zawał serca (HR = 2,43; 95% CI 1,04–5,68; p = 0,04). U 26 pacjentów stwierdzono zdarzenia niepożądane, takie jak zgon (n = 6), zatrzymanie akcji serca (n = 3), powikłanie zabiegowe (dyslokacja: n = 4, krwiak: n = 4, mikroperforacja: n = 2), zapalenie płuc lub choroba układu oddechowego (n = 7), infekcja łoża stymulatora leczona antybiotykiem (n = 1), zawał serca po implantacji stymulatora serca (n = 2). W modelu wieloczynnikowej regresji logistycznej czynnikami istotnymi statystycznie w ocenie ryzyka wystąpienia zdarzeń niepożądanych okazały się: przebyty zawał serca (OR = 5,01; 95% CI 1,88–13,3; p = 0,001) i udaru mózgu (OR = 3,51; 95% CI 1,16–10,55; p = 0,03).

**Wnioski:** Niezależnymi czynnikami predykcyjnymi rocznej śmiertelności u osób po pilnej implantacji stymulatora serca były: TTPL, wiek ≥ 78 lat, dłuższy czas trwania zespołu QRS oraz przebyty zawał serca. Z kolei niezależnymi czynnikami predykcyjnymi wewnątrzszpitalnych zdarzeń niepożądanych były przebyty zawał serca i udar mózgu.

**Słowa kluczowe:** roczna śmiertelność, pilna implantacja, stymulator serca, zdarzenie niepożądane, elektroda do czasowej przezżyłnej stymulacji

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