Subjective Complaints - Objective Findings: A Study of Pacemaker Patients After Implantation

H. THAUFELDER
St. Anna-Klinik, Innere Abteilung, Sulzbach-Rosenberg, Germany

Summary

In a catamnestic survey of 543 pacemaker patients, 16.4% complained of new or recurrent symptoms after implantation. Through directed questioning and examination of 130 patients, this study aimed to determine the correlation between subjective complaints and objective findings. Objective explanations were found for the symptoms in 82.1% of the patients with complaints. In addition, directed questioning was able to elicit symptoms in 57.7% of the patients who initially had no complaints. Explanatory findings showing abnormalities were established objectively in 34.6% of the group with no initial complaints.

Key Words

Subjective complaints, objective findings

Introduction

With proper determination of indications, correct implantation, the appropriate pacemaker model and optimal programming, pacemaker therapy is a valuable adaptive aid for patients suffering from heart disease. The symptoms that necessitated the implantation are usually remedied by implantation. The operation itself is minor and unproblematic, the postoperative complications are minimal, and lifestyle limitations due to pacemaker therapy are practically nonexistent.

But even when patients have been optimally treated and the technical possibilities of the pacemaker have been utilized to their fullest, a number of patients still experience a similar range of symptoms shortly after the pacemaker implantation as they did before the implantation [1]. Occasionally, symptoms similar to those prior to pacemaker implantation reappear after a short period of stability. The patient attributes these symptoms directly to the implantation.

When determination of indications, attempts at further optimization of pacemaker programming, and drug therapy are not very effective, the patient must be asked whether other causes may be responsible for his or her symptoms.

At the Waldkrankenhaus St. Marien in Erlangen, a study was conducted using a catamnestic survey of 543 pacemaker patients [2]. The goal of the study was to determine for the symptomatic patients the extent to which disruptions in the pacemaker system, whether in the heart or in the cerebrovascular system or circulatory regulation, were responsible for the new or recurrent symptoms. In addition, we tested whether the pacemaker indications could possibly have been determined incorrectly, or whether other, additional conditions were present that were not sufficiently recognized and treated using the ECG-symptoms that provided grounds for the pacemaker implantation.

Methode

Out of the 543 pacemaker patients examined, 89 (16.4%) of the patients complained of continuing symptoms after pacemaker implantation. Büchner and Burkhardt reported similar results in their research [3][4]. Of the 89 patients reporting symptoms, 78 patients (Group I) with an average age of 68.9 years underwent an extensive examination program. The average time after pacemaker implantation was 3.9 years. All patients complained independently that implantation had brought about essentially no improvement in their condition.

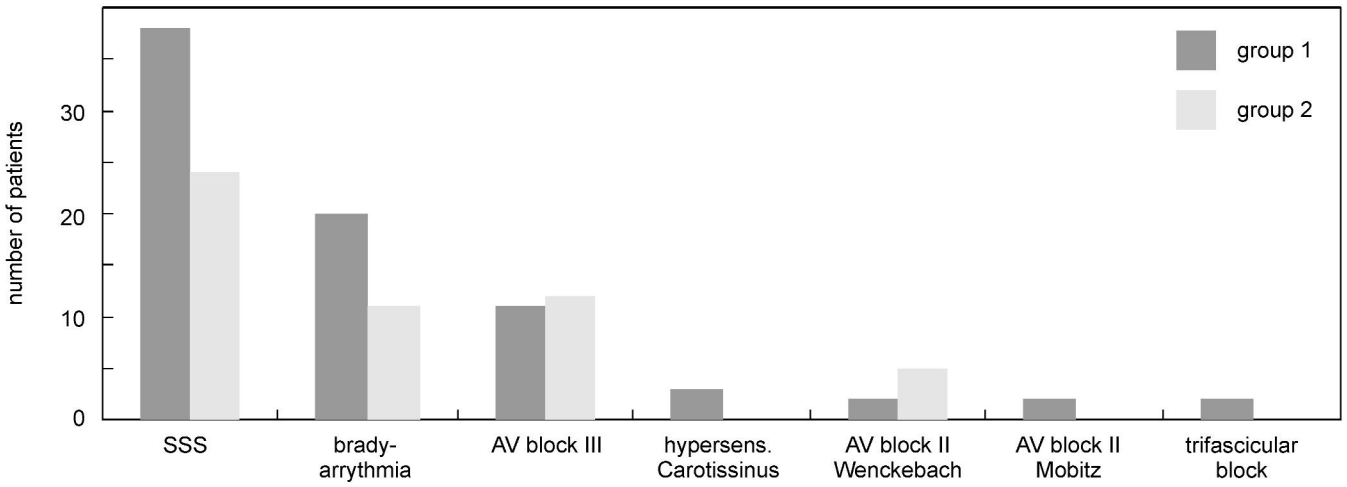

Figure 1. Pacemaker indications.

Group I was compared with a control group (Group II) of 52 patients with an average age of 68.3 years and an average of 4.3 years after pacemaker implantation. These patients all reported an improvement in their condition after the pacemaker implantation. They claimed to be almost symptom-free due to the pacemaker therapy. Subjective symptoms were found for some patients in directed follow-up questioning over the course of the examination program.

The most common indication for both groups was sick sinus syndrome with 38 patients (48.7%) in Group I and 24 (46.2%) in Group II, followed by bradyarrhythmia absoluta in Group I with 20 (25.6%) and in Group II with 11 (21.2%). In third place was 3rd grade AV-block with 11 patients (14.1%) in Group I and 12 (23.1%) in the control group (Figure 1).

Patients in both groups went through the entire examination program, which consisted of extensive anamnesis, physical examination and laboratory testing, pacemaker testing, resting- and long-term ECGs, ergometry, echocardiography, carotid pressure tests, carotid Doppler, Schellong orthostatic testing and myopotential inhibition tests using a handgrip, as well as ENT and neurological examinations in individual cases. In ever case, the tests were conducted in one day; the long-term ECG was completed and evaluated on the following day. Prerequisites for participation in the study were patient consent, the ability to walk, and an elapsed period of at least one year following pacemaker implantation.

Results

No patients in Group I had a positive response or an improvement in their condition with regard to quality of life, physical activity, or peace of mind. In Group II, all patients reported that their quality of life had improved drastically. Eighteen patients (34.6%) reported increased physical activity. In 40 patients (76.9%) in Group II, their peace of mind was significantly improved (Table 1a, 1b and 1c).

In the pacemaker examination, 10 patients (12.8%) in Group I complained of pain in the region of the pacemaker. In one patient (1.3%), a pacemaker error was discovered. Two (2.6%) showed insufficient rate increase and shortness of breath. In the control group, on the other hand, just one patient (1.9%) had pain in the pacemaker region; pacemaker function and adequate rate increase under load was observed for all patients. These results are summarized again in Tables 2 and 3, in which it is apparent that pain, impairment, and dissatisfaction are significantly higher in Group I.

The results of ergometry were not noteworthy: 21 patients (12 from Group I/15.4%, 9 from Group II/17.3%) were able to complete the exercise testing. Eighty-five patients (45/57.7% and 40/76.9%) were able to handle an exertion of 50 Watts over 2 minutes. For 24 patients, (21 from Group I/26.9%, 3 from Group II/5.8%) only 25 Watts was possible. However, due to the distribution at the further levels of exertion, a significant difference with regard to exercise ability could not be determined.

	Group I (%)	Group II (%)
Improved quality of life	0	100
Quality of life is unchanged	94.9	0
Worsened quality of life	5.1	0

1a

	Group I (%)	Group II (%)
Expanded Activities	0	34.6
Activities are unchanged	37.2	65.4
Limited Activities	62.8	0

1b

	Group I (%)	Group II (%)
Greater peace of mind	0	76.9
Peace of mind is unchanged	55.1	23.1
Less peace of mind	44.9	0

1c

Table 1a-c. a) Change in Quality of Life. b) Activities after pacemaker implantation. c) Feeling of security after pacemaker implantation.

	Group I (%)	Group II (%)
Pain in upper arm, shoulder, or area of implantation	30.8	5.8
Reduced mobility in upper arm, shoulder or area of implantation	16.7	28.9
Unsightly scar	1.3	5.7
PM-activation is felt	29.5	28.9
Diaphragmatic stimulation	3.9	0
Interference with electrical devices	5.1	0

Table 2. Results of patient questioning.

	Group I (%)	Group II (%)
Normal during exercise	85.9	94.3
Too fast during exercise	6.4	5.7
Too slow during exercise	7.7	0
Normal at rest	87.2	96.2
Too fast at rest	10.3	3.8
Too slow at rest	2.5	0

Table 3. Subjective experience of programmed PM-rate.

In the orthostasis test, 41 patients (51.3%) in Group I and 39 (48.8%) in Group II reported no symptoms. Thirty-six patients (46.2%) in Group I complained of dizziness and one patient collapsed. In the control group, only 13 patients (26.5%) complained of dizziness and none collapsed. It is also notable in these cases that the symptoms were much more common in Group I.

In the long-term electrocardiography, there were no essential differences between the two groups with regard to polymorphic ventricular rhythm disturbances, bigeminy or couplets/salvos. However, the subjective experiences of the two groups were quite different. In Group I, polymorphic ventricular rhythm disturbances, bigeminy, or couplets had already been experienced to a limited degree. In Group II, the same electrocardiographic results were not experienced as a problem (Table 4).

The carotid Doppler examination showed very clear results, with no significant difference between the two groups. In Group I, stenosis of the internal carotid with over 80% narrowing of the lumen was observed in 3 patients (3.85%); in 12 patients (15.4%) a 60-80% narrowing was registered. In the control group, only 4 patients (7.7%) showed 60-80% narrowing; higher degrees of stenosis were not observed.

In the myopotential inhibition test, pacemaker inhibition due to myopotentials in Group I was observed for up to 1.5 seconds in 15 patients (19.2%) and for over 2 seconds in 56 patients (7.7%). In Group II, a pause of up to 1.5 seconds was observed in 4 patients (7.7%).

Table 5 shows a summary of the complete examination results, subdivided into three categories: "explanatory of symptoms," "conditionally explanatory of symptoms," and "normal findings." An examination result was regarded as "explanatory of symptoms" only when

	Group I (%)	Group II (%)
No VES	14.1	19.2
Monomorphic VES < 30/h	14.1	21.2
Monomorphic VES > 30/h	11.5	9.6
Polymorphic VES	20.5	15.4
Ventricular bigemini	21.8	7.7
Couplets	11.5	19.2
Salvos	6.4	7.7
R-on-T phenomenon	0	0

Table 4. VES in the long-term ECG.

it bore a clear relationship to the symptom in question, e.g. if the patient complained of dizziness during the long-term ECG and supraventricular tachyarrhythmias were recorded. Orthostatic testing, long-term ECGs and ergometry were the examinations that most often resulted in explanations of the symptoms. Pathological findings were seen as conditionally explanatory when they were not clearly results of the symptoms complained of, e.g. middle-grade carotid stenosis.

In Group I, 64 of 78 patients (82.1%) showed findings that explained their symptoms; the symptoms in 55 (70%) of the patients were evaluated as being related to the pacemaker. The most commonly registered finding was ventricular or supraventricular rhythm disturbances (7 patients/10% and 18 patients/23%), hemodynamically effective stenosis of the internal carotid (3/3.9%), longer muscle inhibition (6/7.7%), or ischemic reactions (13/16.7%) in the stress ECG. In two patients (2.6%), the pacemaker did not function properly. These were remedied through reprogramming.

In Group II, in comparison diagnoses that explained symptoms could only be found in 18 patients (34.6%). Of these 18, 4 patients (7.7%) had supraventricular tachycardias, 2 (3.9%) suffered from ventricular rhythm disturbances, another 2 suffered ischemic reactions in the stress ECG and finally 13 patients (25%) exhibited a pathological orthostasis test.

Also in Group II, disturbances due to muscle inhibition were observed in 4 patients (7.7%). These disturbances were remedied by reducing the sensing. It is interesting to note that the largest share of patients in both groups suffered from orthostatic complaints or tachyarrhythmias; these symptoms were, however, observed much less often in the control group.

Summary

The study conducted at our clinic showed that 16.4% of the patients who were questioned reported continuing symptoms. The goal of our study was to ascertain in which respects subjective complaints and especially

	Explantory of symptoms		Conditionally expl. of symp.		Normal findings	
	GI (%)	GII (%)	GI (%)	GII (%)	GI (%)	GII (%)
PM-Testing	2.6	0	0	0	97.4	100
Laboratory	0	0	52.6	32.7	47.4	67.3
Echo	0	0	0	0	100	100
Long-term ECG	32.1	7.7	5.1	11.5	62.8	80.8
Ergometry	16.7	3.9	5.1	1.9	78.2	94.2
Orthostasis	47.4	48.1	0	0	52.6	51.9
Hypotonic	0	0	28.2	19.2	71.8	80.8
Carotid Doppler	0	0	3.9	0	96.1	100
Carotid pressure	0	0	37.5	1.9	62.5	98.1
Myopotential inhibition	20.5	7.7	14.1	13.5	65.4	78.8

Table 5. Examination results.

objective findings differ between patients who are satisfied with pacemaker therapy and those that are unsatisfied.

On the one hand, our results suggest that for patients who are unsatisfied with pacemaker therapy due to subjective symptoms, explanations could not always be found (in our concrete case, only in 82.1% of patients). On the other hand, directed questioning of "satisfied patients" was able to elicit abnormalities that had occurred since implantation (57.7%), and there were objective findings that could explain symptoms in 34.6% (18 patients).

In conclusion, it should be continually stressed that the underlying disease is not changed by the implantation of a pacemaker, and that a patient's basic psychological state has an influence on the frequency of complaints after pacemaker implantation. As always, reported symptoms should in no case be dismissed as psychological alteration. Complaints of this sort must be taken seriously and examined carefully. Here, the special relationship between the physician and patient is tested.

References

[1] Fitzpatrick AP, Travill CM, Vardas PE, et al. Recurrent symptoms after ventricular pacing in unexplained syncope. PACE. 1990; 13: 619-624.

[2] Drochner U. Sozialmedizinische und psychosoziale Auswirkungen von Herzschrittmacherimplantationen unter Berücksichtigung medizinisch-technicaler Aspekte. Dissertation: Erlangen-Nürnberg 1988.

[3] Büchner CH. Langzeitergebnisse nach Schrittmacherimplantationen. Therapiewoche. 1979; 29: 6375-6377.

[4] Burckhardt DA, Hoffmann M, Jost M. The role of Holter-monitoring in the evaluation of patients with persisting syndrome despite pacemaker implantation. In: Hombach V, Hilger HH. Holter monitoring technique: Technical aspects and clinical applications. Stuttgart - New York 1985.