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Ambulatory electrical cardioversion of atrial fibrillation

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Abstract

Elective electrical cardioversion of atrial fibrillation is an effective and safe cardiac procedure in selected patients. It is most often performed during a short hospital stay or in an outpatient setting of a hospital. In a retrospective analysis, we report our experience on electrical cardioversions in private practice without a hospital stand-by performed by a cardiologist and an anesthesiologist in concert. Sixty patients with a mean age of 66±8 years and a typical spectrum of cardiac diseases in stable condition were chosen for the ambulatory procedure. The immediate success rate of electrical cardioversion was 83%. Within the next 3 months, a relapse of atrial fibrillation occurred in 46%. Following 87 procedures in 60 patients, 3 complications requiring a hospital admission occurred. One of these three patients had suffered from a short syncope without other deficits potentially due to cerebral embolism. Apart from these complications, no patient suffered a thromboembolic complication or a cerebral problem following electrical cardioversion. We conclude that elective electrical cardioversion of atrial fibrillation can be performed safely, effectively and comfortable for patient and physician following a preceding evaluation and counseling by a cardiac specialist.

Keywords: Electrical cardioversion; Atrial fibrillation; Cardioversion; Ambulatory

1. Introduction

Atrial fibrillation is a very common cardiac rhythm disturbance accounting for thromboembolic complications in high-risk patients. Restoration of normal sinus rhythm can be achieved by drugs or by electrical cardioversion [1]. In Germany and many other European countries, electrical cardioversion is performed during a short hospital stay. In the following, we report about ambulatory electrical cardioversion in a private practice setting.

2. Methods

From January 2001 to June 2004, electrical cardioversions of atrial fibrillation performed in a specialized private practice setting were assessed with respect to feasibility, efficacy and complications. In addition to the information upon the underlying cardiac disorder, the following data were retrieved from the patient charts: actual international ratio value (INR), size of cardiac chambers, NYHA-classification, antiarrhythmic medication, energy settings and number of attempts of the cardioversions, immediate success and success rate 3 months after electrical cardioversion.

Electrical cardioversion was proposed to all patients with new onset and to those with persistent atrial fibrillation [2]. Only patients who presented with new onset atrial fibrillation within 48 h were treated with drugs in the first instance to achieve sinus rhythm. No attempt to restore sinus rhythm was undertaken in patients with permanent atrial fibrillation (duration more than 1 year). Unstable patients or those presenting with an acute coronary syndrome were primarily admitted to a coronary care unit at a nearby university hospital.

Cardioversion was attempted following an anticoagulant regimen of phenprocoumon (Marcumar®)–a vitamin K

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antagonist used in Germany with a longer half-life than warfarin–for a minimum of 21 days. Only in the very few patients who refused this phenoprocoumon regimen, a therapy with unfractionated heparin related to body weight was initiated. The anticoagulant regimen of phenprocoumon aimed at an INR of 2–3 [2–4]. Depending on the individual stability, INR values were checked at least once a week. If at the day before or at the day of cardioversion the actual INR was below 2.0 but the preceeding INR values within the given range, additionally, 20 mg enoxaparin were given subcutaneously at the end of the procedure. If there was more than one INR value out of the target range, cardioversion was postponed. The phenoprocoumon regimen was stopped 3–4 weeks following a successful cardioversion and a sustained sinus rhythm.

In addition to the above-mentioned anticoagulant regimen, all patients underwent a careful cardiac examination including a patient history, a physical examination, a 12-lead electrocardiogram, exercise testing if possible, a two-dimensional color-coded echocardiogram, a spirometry, a chest X-ray and a determination of serum electrolytes and thyroid hormones. In the few patients taking digitalis, this drug was withheld for at least 2 days prior cardioversion. A transesophageal echocardiogram was performed in selected high-risk patients (e.g., mitral valve disease) and in those treated with unfractionated heparin alone.

The cardiologist obtained informed consent in respect to general anesthesia and to the electrical cardioversion several days before the procedure. Cardioversion was not performed in patients who did not sign the consent form, in patients with thyreotoxicosis, in those with a slow ventricular rate (below 55 beats/min), a bifascicular block or those with contraindications to a general anesthesia (FEV 1<1 l, ejection fraction <20%, impediments to intubation).

In fasting patients, general anesthesia was performed in an isolated room of the cardiology office by an anesthesiologist. Depending on the age and weight of the patient 0.2–0.5 alfentanilhydrochloride (Rapifen®) and 100–200 propofol (Disoprivan® 1%) were administered through an intravenous line [5]. Oxygen supplementation was given to all patients. When patients became unconscious and oxygen saturation was stable, synchronized cardioversion up to three times with a monophasic pulse of 3.2 ms width and an energy setting of 300 or 360 J using an anterior–posterior paddle position was applied by the cardiologist. In eight patients with recent onset of atrial fibrillation, an initial energy setting of 200 J was chosen. Following the cardioversion procedure, the anesthesiologist took care of the patient until his or her complete awakening. Subsequently, patients spent unmonitored another hour sitting in the regular waiting room. The cardiologist dismissed the patient following a short clinical check and a heart rate control. Again, patients were advised not the drive the car home and to report any subsequent complication immediately. The total stay from arrival to departure averaged about 2 h for the patient and 30–45 min for the anesthesiologist. All patients were contacted on the same evening by the anesthesiologist. Depending on clinical presentation, an electrocardiogram (ECG) or a holter ECG were scheduled after 3 weeks following cardioversion and in all instances when the patient complained about ongoing palpitations. The cardiologist saw all patients after 3 months for a complete cardiac reevaluation.

Success of cardioversion was defined as sustained restoration of sinus rhythmus following the cardioversion procedure. Short periods of sinus rhythm followed by recurrence of atrial fibrillation during the procedure were termed unsuccessful. Recurrences anytime after dismissal were defined as relapse of atrial fibrillation.

2.1. Statistical analysis

Continuous variables are presented as means (S.D.), discrete variables as percentages (%). Unpaired *t*-testing was used for comparisons of continuous data. A p-value <0.05 was considered a statistically significant difference.

3. Results

Between 2001 and 2004, a total of 60 patients underwent 87 electrical cardioversions. Most patients were male and slightly younger than the female population (Table 1). They suffered from hypertension (40%), coronary heart disease (25%), a mitral or aortic valve disease (17%), dilated cardiomyopathy (13%), diabetes (13%) or cor pulmonale (7%). Most patients had no clinical symptoms of heart failure (NYHA stages I and II), 4 patients were graded to NYHA stage III, and no patient had overt heart failure (NYHA stage IV). Basing on M-mode recordings of the parasternal long-axis view at end-systole, the size of the left atrium averaged 47±7 mm and of the left ventricle 54±8

Table 1
Summary of patient data

	Patient (n)	Proc. (n)	Mean age (years)	Left atrium (mm)	Left ventricle (mm)	EF (%)	INR value	Success rate (%)	Relapse (%)
All	60	87	66±8	47±7	54±8	60±13	3.0±1.0	83	46
Male	42	61	64±9	48±7	55±8	62±13	3.0±1.0	82	43
Female	18	26	69±8	46±5	52±8	55±13*	3.2±1.2	85	52*

*p <0.05. Proc.=procedures; n=number. Success and relapse rates refer to the number of procedures.