Ambulatory Treatment of Streptococcal Bacterial Endocarditis

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Bacterial endocarditis is a severe infectious disease, of which treatment is traditionally carried out in hospitalized patients through intravenous medication. The possibility of at-home or ambulatory treatment, for stringently selected cases, is attractive from the social as well as from the economic point of view. We report 6 patients with a diagnosis of bacterial endocarditis caused by *Streptococcus*, treated partially or completely on an outpatient basis. All of them evolved without complications and presented complete resolution of the infection.

Introduction

Endocarditis is a severe bacterial disease that involves the mural endocardium and one or more cardiac valves or septal defects and can course with important cardiac and systemic complications during the treatment[1].

Traditionally, the treatment is carried out for a long period in hospitalized patients. Several studies, however, have demonstrated the possibility of conducting part of the treatment on an outpatient basis, resulting in the decrease of hospital costs and a higher degree of comfort for patients[2-3].

The aim of the present study was to show that the ambulatory treatment of streptococcal bacterial endocarditis, in well-selected patients, is safe and effective.

Patients

Six patients with streptococcal bacterial endocarditis, diagnosed through the Modified Duke Infective Endocarditis Criteria[4], were included in the study from January 2006 to November 2008. The patients were required to present a hemodynamically stable condition, without the need for drugs. The study was approved by the Ethics Committee for Research with Human Subjects and the Free and Informed Consent Form was signed by all patients.

Key words

Endocarditis, bacterial/therapy; *Streptococcus*; outpatients.

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The demographic data of all six patients and illustrative aspects of two cases are shown in Chart 1 and Figure 1, respectively.

All of them presented fever and heart murmur before the drug therapy. The blood culture was carried out only before the patient's inclusion. Four patients presented increased CRP levels, which normalized at the end of the treatment. Regarding the complete blood count, 3 patients presented leukocytosis and anemia at the start of the treatment and one of them still presented a slight anemia at the end of the treatment. Creatinine levels were within normal range in all patients, both pre and post-treatment. The electrocardiogram showed average frequency atrial fibrillation rhythm, intercalated with pacemaker rhythm in one patient and first-degree atrioventricular block in another patient. Such alterations did not suffer any changes during treatment.

The echocardiogram was carried out at the start and at the end of the treatment in all patients. It was necessary to perform a transesophageal echocardiogram in three of them, to adequately assess the intracardiac structures. Four patients presented typical vegetation images. In one patient, the vegetation image disappeared at the end of the treatment.

As for the drug treatment, four patients received 2.0 mg of Ceftriaxone, once a day. One patient received 1.0 mg Vancomycin every 12 hours and the other received 500 mg of Levofloxacin once a day. The standardized treatment duration was 4 weeks, due to the low pathogenicity of the infectious agent. The antibiotics were administered by intravenous route in all patients, using a salinized abbocath as the venous access. Three patients received the medication at the outpatient clinic of the health insurance facility, one received the medication at home, one received it at the public basic unit health and another received it in a private clinic.

The patients were examined by a physician once a week and were interviewed daily by the nurses in charge of the antibiotic infusion. No seriated blood cultures were carried out due to the good clinical evolution presented by all patients. There were no clinical complications throughout the outpatient treatment.

Discussion

Historically, patients with bacterial endocarditis remain hospitalized throughout their treatment, receiving antibiotics by parenteral route and undergoing daily medical evaluation.

Recently, the possibility of treating endocarditis with a shorter-duration treatment, the capacity to administrate parenteral drugs at home and economic pressures have

Chart 1 - Characterization of the patients regarding sex and age, underlying disease, location of endocarditis and presence of typical vegetation at the echocardiogram, etiological agent, presence of peripheral diagnostic signs, antibiotic therapy used and duration of treatment

Sex/age	Disease	Location (typical vegetation at echo)	Agent	Peripheral signs	Antibiotic therapy (Duration)
F/37	Rheumatic valvular insufficiency	Mitral valve (present)	*Strepto viridans*	Janeway lesions	Ceftriaxone/4 weeks
M/32	Bivalvular aortic valve	Aortic valve (present)	*Strepto sp*	Janeway lesions; conjunctival hemorrhage	Ceftriaxone/3 weeks
M/43	Valvular prolapse with moderate reflux	Mitral valve (present)	*Strepto viridans*	Conjunctival hemorrhage	Vancomycin/2 weeks
M/45	Corrected transposition of the great vessels	Ventricular extension of the pacemaker electrode (present)	*Strepto sp*	Absent	Levofloxacin/4 weeks
F/65	Degenerative disease	Aortic biological prosthesis (absent)	Beta-hemolytic *strepto non-A*	Absent	Ceftriaxone/3 weeks
M/65	Valvular prolapse with moderate reflux	Mitral valve (absent)	*Strepto viridans*	Absent	Ceftriaxone/3 weeks

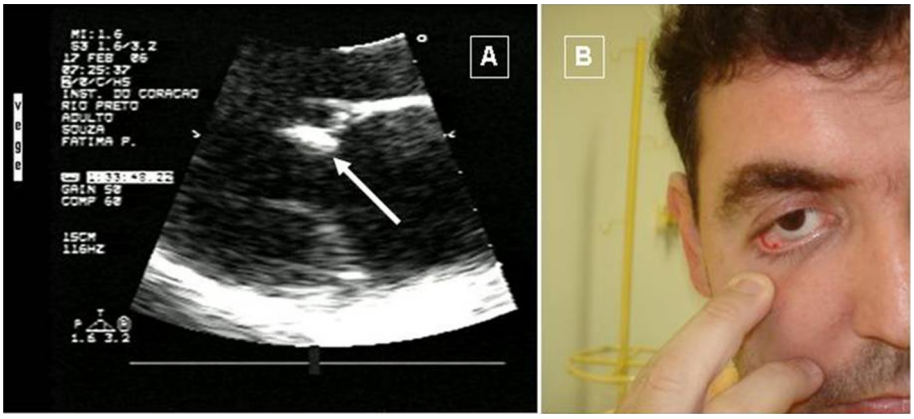

Figure 1 - *Illustrative aspects of two patients in the series. Panel A shows the echocardiographic image with consolidated vegetation in the extremity of the mitral valve anterior leaflet (arrow) and Panel B shows conjunctival hemorrhage in a patient with the acute phase of endocarditis.*

made the ambulatory treatment more frequent, even though the outcomes are still limited due to the lack of large cohort studies using this type of approach[5,6].

This study reports 6 patients with streptococcal bacterial endocarditis that were treated on an outpatient basis and presented excellent evolution.

Four patients were treated with Ceftriaxone; one was treated with Levofloxacin due to the fact that he was allergic to Ceftriaxone and another patient was treated with Vancomycin, as he still presented fever 72 hours after the introduction of Ceftriaxone.

When the *Streptococcus* was sensitive to Ceftriaxone, the latter was the antibiotic of choice, due to its simple posological scheme and low rate of complications. The complete treatment plan lasted four weeks.

Two patients were treated entirely on an outpatient basis; two remained for three weeks on an outpatient basis and two were treated for two weeks on an outpatient basis. The latter two cases were treated longer on a hospital basis due to purely administrative issues, rather than infection-related problems.

The incidence of bacterial endocarditis is 1.7 to 6.2 cases per 100,000 patients-year[7], which would represent an expected number of 7 to 24 cases per year in our city, which has approximately 400,000 inhabitants. As six patients were treated throughout a period of two years (one case every 5.5 months), that is equivalent to 12.5% and 42.8% of the incident cases, which does not seem negligible, considering the disease severity profile.

The patient that presented endocarditis at the endocardial pacemaker electrode was treated on an outpatient basis, as the good evolution of endocarditis when it affects the right side of heart is well known, even when the etiological agent is *Staphylococcus aureus*. The pacemaker electrode was removed 28 days after the antibiotic administration.

The patient with the biological aortic-valve prosthesis was included in the study, as the drug treatment started 5 days

after the fever onset and the patient presented excellent general status.

Patients with uncomplicated endocarditis, of which etiology is due to *Streptococcus viridans*, have been considered candidates to home-based treatment[8]. We agree with the literature when it states that the endocarditis caused by *Streptococcus* is the most adequate one for ambulatory treatment, due to its lower aggressiveness when diagnosed at an early stage.

The larger prospective studies for the ambulatory treatment of endocarditis caused by *Streptococcus viridans* have kept the patients hospitalized, on average, for 8 days, before releasing them to continue the treatment at home[8]. However, we think that it is even possible to prevent the hospitalization phase, when the diagnosis of the endocarditis is attained at an early stage and the patient does not present risk factors.

Costa et al[9], retrospectively assessing a noteworthy Brazilian series of 186 consecutive confirmed cases of endocarditis, detected, through multivariate analysis, 7 variables that were predictors of mortality: age ≥ 40 years; functional class IV or presence of shock; presence of arrhythmias or conduction disorders; presence of extensive valvular destruction, abscess or prosthesis; sepsis that was unresponsive to antibiotic treatment; and large (> 10 mm) and mobile vegetations.

Other important criteria that must be considered when selecting patients for this type of approach are: presence or not of cardiac prosthesis; impaired kidney function; older age; and the presence of symptoms or signs of heart failure.

Conclusion

The ambulatory treatment of streptococcal bacterial endocarditis may be employed in well-selected cases that do not present concomitant aggravating factors, with consequent benefits for the patient and for the health system.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Study Association

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