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Short communication

Outpatient parenteral antimicrobial therapy for infective endocarditis: A cost-effective strategy

Traitement parentéral ambulatoire des endocardites infectieuses : une stratégie coût-efficace

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Abstract

Objectives. – We evaluated the benefit/risk ratio of outpatient parenteral antimicrobial therapy (OPAT) in infective endocarditis (IE).

Method. – We performed an observational retrospective study of definite IE (Duke criteria) treated in an infectious diseases unit in 2012. We compared patients having completed the treatment in hospital (H), and those deemed sufficiently stable, and with adequate home environment, for OPAT. The costs were estimated through hospital bills, and, for OPAT, through the costs of drugs and their administration (material, staff), transportation, and outpatient visits.

Results. – Eighteen out of 39 consecutive patients presenting with IE received OPAT, with a mean hospital stay of 23.5 days (vs 34.7 days for H group, $P = 0.014$). No severe adverse event related to OPAT was reported. The global saving was estimated at 267,307 euros, or 14,850 euros per patient.

Conclusions. – OPAT in selected patients presenting with IE seems effective, safe, and reduces costs by approximately 15,000 euros per patient.

Keywords: Infective endocarditis; Outpatient parenteral antimicrobial therapy; Cost-effectiveness

Résumé

Objectifs. – Évaluer les risques et bénéfices de l'antibiothérapie parentérale ambulatoire (APA) des endocardites infectieuses (EI).

Méthodes. – Étude observationnelle rétrospective d'EI certaines (Duke) traitées dans un service d'infectiologie en 2012. Comparaison des patients traités intégralement à l'hôpital (H) et des patients jugés suffisamment stables et bien entourés pour terminer leur traitement par APA. Estimation des coûts à partir des forfaits hospitaliers et, pour l'APA, par le coût des médicaments, de leur administration (matériel, personnel), des transports et de l'hôpital de jour.

Résultats. – Sur 39 EI consécutives, 18 ont reçu une APA, avec une durée moyenne de séjour de 23,5 jours (versus 34,7 jours dans le groupe H ; $p = 0{,}014$), sans événement indésirable grave lié à la stratégie d'APA. L'économie globale est estimée à 267 307 euros, soit 14 850 euros par patient.

Conclusion. – L'APA des EI chez des patients sélectionnés semble efficace, sans risque majeur et réduit le coût d'environ 15 000 euros par patient.

Mots clés : Endocardite infectieuse ; Antibiothérapie parentérale ambulatoire ; Coût-efficacité

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1. Introduction

Outpatient parenteral antimicrobial therapy (OPAT) has been proposed for more than 40 years with increasingly documented cost-effectiveness ratio and impact on the patient's quality of life [1]. Infective endocarditis (IE) requires a prolonged parenteral treatment [2]. An increasing number of teams have been using OPAT in this indication, for the patients having responded to the initial antibiotic therapy, when the risk of complications becomes weak. The main criteria for the selection of IE that can be treated with OPAT are a low embolic risk, no decompensated heart failure or threatening conduction disorders, a well controlled sepsis, quality home environment, and compatibility of the therapeutic scheme with OPAT (according to the required interval between each injection, the stability of antimicrobials, their extra-hospital availability, and the requirements of monitoring) [3]. We wanted to better assess the use of OPAT for IE; specify the characteristics of IE treated with OPAT in our centre, the adverse events following hospitalization, and the cost/benefit ratio of this strategy insufficiently used in France.

2. Patients and methods

We conducted a retrospective observational study of all patients managed for IE, between January 1 and December 30, 2012, in an infectious diseases unit. The cases were identified in the unit's computerized database. Only patients with definite IE according to Duke criteria were included. We excluded patients who died during hospitalization, those who were followed in another hospital following their discharge, and those whose treatment was completed by an oral treatment. The data, collected on a standardized questionnaire from medical records, included the demographic characteristic, comorbidities, diagnostic criteria for IE, adverse events observed during hospitalization and during the following 3 months (considered as "severe" if requiring or prolonging hospitalization, in case of death, or sequels). The hospitalization and outpatient management was documented: antibiotic therapy, surgery, duration of hospitalization, protocol for OPAT initiation. The costs of management were estimated from the daily hospitalization fee multiplied by the number of hospital days, and, for the "OPAT", by the total cost of drugs, of their administration (material, personnel), transportation and weekly outpatient consultation at hospital according to a follow-up protocol: clinical examination, venous access monitoring, and biological check-up (hemogram, blood creatinine level, blood sodium level, C-reactive protein, and plasma concentrations of beta-lactams or glycopeptides). The patients managed in hospital were compared to the patients managed with OPAT. Student's *t*-test was used for quantitative variables, the Chi^2 test for qualitative variables (or Fischer's exact test).

3. Results

3.1. Characteristics of patients

Fifty-six patients, presenting with definite IE, were managed in our unit, in 2012; 17 were excluded because they died in the initial phase ($n = 6$), because of a switch to oral antibiotic therapy ($n = 2$), or because they were transferred to another hospital ($n = 9$). Twenty-one of the 39 included patients presenting with IE were completely managed in hospital and 18 were managed with OPAT (32.1% of all IE cases). The main characteristics of these 2 groups, without any significant difference at admission, are described in Table 1.

3.2. Complications

OPAT was administrated via a peripherally inserted central catheter (PICC, $n = 16$), an implanted port-chamber ($n = 1$), or with daily IV ceftriaxone injections ($n = 1$). During OPAT, 3 patients (16.7%) presented with severe adverse events requiring re-hospitalization, but none was attributed to the OPAT (these events would have also occurred even if the patient had stayed in hospital):

- hemorrhagic stroke with a subdural hematoma 2 months after treatment initiation for a Whipple endocarditis with a favorable outcome (no sequel);
- fever due to beta-lactams requiring re-hospitalization for a switch to vancomycin;
- cardiac failure cured by medical treatment.

After OPAT, 3 patients presented with severe adverse events:

- death due to pneumonia with severe hypoxemia;
- relapse of IE 1 month after the end of antibiotic therapy (infected bioprosthesis, with coagulase negative methicillin-resistant *staphylococcus*, with a MIC of vancomycin at 4 mg/L);
- progressive mitral regurgitation requiring mitral surgery 6 months after IE cure.

3.3. Management costs

The fees taken into account to estimate the management costs are described in Table 2. The global cost of management with OPAT for these 18 patients was estimated at 67,943 euros, including all home care, the cost of treatments and of their administration, the hospital outpatient fees, and transportation. The number of hospitalization saved for all the patients treated with OPAT was 298 days, for an estimated cost of 335,250 euros when considering the daily hospitalization fee in our unit. The global saving due to partial OPAT management was estimated at 267,307 euros, 14,850 euros per patient, when compared to antibiotic treatment administrated in hospital only.

4. Discussion

The results of this monocentric observational study suggest that parenteral treatment of IE may be given at home without any major risk, for selected patients, i.e. patient responding well to the initial management, at low risk of complications, and with adequate home environment warranting that healthcare will be given in favorable settings. Patients selected for a switch to OPAT had better prognostic factors and their IE was controlled more