Changing modalities of outpatient parenteral antimicrobial therapy use over time in Italy: a comparison of two time periods

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This study aimed to assess the extent and nature of recent changes in the management of outpatient parenteral antimicrobial therapy (OPAT) in Italy. We reviewed our previously reported data from 1999 to 2003 and compared them with data from patients who received OPAT from 2005 to 2010. Data for 1175 patients who received OPAT were analysed. Skin and soft tissue infections (SSTIs) were the most common infection treated with OPAT in both time periods, but an increase in patients with SSTIs receiving OPAT was observed. By contrast, a decline over time of OPAT use was found for patients affected by pneumonia. Furthermore, ceftriaxone use declined, whereas teicoplanin increased over time. In conclusion, OPAT use has significantly changed over time in Italy.

Keywords: outpatient parenteral antimicrobial therapy, skin and soft tissue infections, ceftriaxone, teicoplanin.

INTRODUCTION

Outpatient parenteral antibiotic therapy (OPAT) was firstly proposed in the United States in 1974; the term “outpatient” was used to refer to all settings other than traditional hospital stay, where antibiotic therapy can be administered, including the patient’s home, the general practitioner’s office, the hospital ambulatory, and public or private infusion centers [1]. Following the US experience, other countries set up their own OPAT programs which vary considerably from country to country because of different ways in which infections are managed in different parts of the world and because of different reimbursement systems [2]. The use of OPAT has enjoyed substantial success in Italy, where patients generally believe that being treated at home is better than at the hospital. The aim of this study was to assess and describe any possible change occurred in the OPAT management over time by comparing data of two different periods of time in Italy.

Patients and methods

We reviewed our previously reported data from 1999 to 2003 (group A) and compared them with data from patients who received OPAT from 2005 to 2010 (group B) [2]. Data were taken from the database of the national OPAT registry. Details on the registry were previously published [3, 4]. A case report form was used at all sites for data collection. The following parameters were recorded: demographics, disease, delivery model, delivery route, antibiotic therapy, and outcome. Data were entered at each center, using electronic data entry systems.
software (Microsoft Access/Excel). Descriptive results are reported as frequency or percentage of events for each issue considered. Chi-square or Fisher’s exact test were used to analyze all categorical variables. Student’s t-test was used to analyze continuous variables with a normal distribution. Statistical significance was established at a two-tailed level <5%.

**RESULTS**

The earlier study group included 620 patients (group A) while the more recent study group (group B) included 555 patients. Gender distribution shows that male patients were more frequently treated (about 60% in both groups). The mean age in Group A and Group B was 52.7 years and 54.3 years, respectively \((P=0.325)\). Among the most common infections, skin and soft tissue infections (SSTIs) were the leading infections in both groups, however patients who received OPAT increased over time (19.7% in group A and 40.0% in group B, respectively; \(P<0.0001\)). No differences were observed among time periods with bone and joint infections (BJIs) treated with OPAT (19.0% in both groups; \(P=0.897\)). Among OPAT use for patients affected by pneumonia was detected (14.2% in group A and 0.0% in group B, respectively; \(P<0.0001\)). Antibiotics were usually administered intravenously during both time periods, however the percentage of participants who received an antibiotic course by intramuscular route declined from 39.4% during the early period to 11.5% in the recent period \((P<0.0001)\). The percentages of patients who received OPAT at infusion centers (hospital or clinic) in earlier group and recent group were 53.8% and 56.6%, respectively \((P=0.320)\), while 42.3% of cases in earlier group and 42.2% of cases in recent group were treated at the patient’s home (administration by self/family or by home visiting nurse/doctor) \((P=0.978)\). Among the most common antibiotics utilized for OPAT, the use of ceftriaxone decreased (31.8% in group A and 9.0% in group B, respectively; \(P<0.0001\)), whereas teicoplanin increased over time (17.6% in group A and 26.0% in group B, respectively; \(P<0.0001\)). Mean antibiotic duration significantly declined, passing from 56 days during the early period to 40 days in the recent period \((P<0.05)\). A favorable outcome, defined as clinical cure or improvement, was observed in similar high percentages in both study groups (95.1% in group A and 93.9% in group B, respectively; \(P=0.331\)).

**DISCUSSION**

The initiation of OPAT requires that a physician determines that an antibiotic therapy is needed to treat a defined infection, that hospitalization is not needed to control that infection and that alternative routes of drug delivery are not feasible or appropriate [5, 6]. In Italy, OPAT has become part of routine recommendations and practice guidelines for both acute and chronic infections [7, 8]. In the present study, we found that number of patients with SSTIs treated with OPAT increased significantly over time. Several studies found that OPAT is a feasible alternative to inpatient management of SSTIs. For example, in a randomized controlled trial on cellulitis management, Corwin et al. observed no significant differences in clinical outcome (defined as days to no advancement of disease) and intravenous antibiotics duration between patients treated with OPAT or in hospital [9]. Similarly, Martone et al. showed that successful outcomes for OPAT patients vs. inpatient parenteral antibiotic therapy were 94.6% and 86.3% respectively \((P<0.001)\) [10]. Success rates of OPAT patients compared to patients treated in hospital for both complicated and uncomplicated SSTIs were 95.5% vs. 89.4% and 98.0% vs. 94.4%, respectively.

In our study, we found a significant decline over time of patients affected by pneumonia and of OPAT courses by intramuscular route and of third-generation cephalosporins such as ceftriaxone. One explanation for this decrease could be that in earlier period the national OPAT registry was attended by general practitioners rather than infectious diseases specialists compared to the recent period. In early 2000, Italy had the highest proportion of community-acquired lower respiratory tract infections treated with injectable therapies, with about half given by the intramuscular route, far exceeding the proportions in other countries [11, 12]. Teicoplanin has become the top antimicrobial agent in the Italian OPAT registry because of sev-
eral explanations. Firstly, its pharmacokinetic and pharmacodynamic properties permit once daily dosing, allowing a reduction in patient discomfort and the risks associated with frequent manipulation of catheters. Moreover, thanks to its long elimination half-life, teicoplanin can be successfully used three-times weekly for the treatment of chronic infections [13]. Secondly, teicoplanin is a mainstay for the treatment of SSTIs and BJIs that are the infections most suitable for OPAT in several countries [2]. Finally, the wide use of teicoplanin is probably due to its spectrum of activity, including methicillin-resistant staphylococcal species, as well as to the frequent need to prescribe antimicrobial therapy on an empirical basis.

In conclusion, our data show that compared to several years ago, patients’ characteristics and modalities of OPAT in Italy have changed. Over time, the Italian OPAT model has become similar to that observed in other countries.

Conflict of interest: The authors have no conflict of interest to report.

REFERENCES