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Efficacy of cefpodoxime in the prophylaxis of recurrent pharyngotonsillitis

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Abstract

Background: Recurrent acute pharyngotonsillitis remains a common illness in children and young adults and can lead to serious complications if not treated. Cefpodoxime proxetil is a second-generation oral cephalosporin, which shows potent antibacterial activity against both Gram- and Gram-negative bacteria and high stability in the presence of beta-lactamases. *Objective*: We aimed to evaluate the efficacy of second-generation cephalosporins in the prophylaxis of recurrent pharyngotonsillitis in children. *Methods*: A total of 180 children aged between 4 and 14 years with recurrent pharyngotonsillitis were randomized to receive either cefpodoxime proxetil (100 mg twice a day, 6 days a month for 6 months) or placebo (at the same dosage). *Results and conclusions*: Our results show that treatment with Cefpodoxime proxetil may be effective in reducing symptoms of recurrent pharyngotonsillitis and preventing recurrences without causing side effects or developing bacterial resistance.

Keywords: Oral cephalosporin; Pharyngotonsillitis; Prophylaxis

1. Introduction

Anaerobes (*Peptostreptococcus* and *Bacteroides* species) are the chief components of the normal human oropharyngeal flora and are the main cause of bacterial infections of the upper respiratory tract. They are isolated together with aerobic organisms, generally (beta-haemolytic group A Streptococci, *Streptococcus pyogenes*, *Streptococcus pneumoniae*,

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Haemophilus influenzae and *Moraxella catarrhalis*) [1–3]. Therapy should provide for adequate coverage of aerobic and anaerobic pathogens in order to minimize recurrences, enhance eradication, maximize compliance and avoid creating resistance [2,3]. The aim of this study was to evaluate the efficacy of second-generation cephalosporins in the prophylaxis of recurrent pharyngotonsillitis in children.

2. Materials and methods

We studied 180 patients (75 females and 105 males) aged between 4 and 14 years (median age 10 years), presenting with recurrent pharyngotonsillitis (at least three acute episodes of tonsillitis in the last year). The patients were randomly divided into two numerically equal groups (A and B). At the beginning of the treatment, all patients underwent thorough anamnesis, ENT examination, acoustic impedance testing, pharyngeal swabbing (with and without tonsillar squeezing), assay of serum immunoglobulins (IgA, IgM, IgG, IgE), and blood tests. They were also asked to indicate the intensity of their symptoms on a subjective evaluation scale from 0 to 4 (00 no symptoms; 10 mild symptoms; 20 moderate symptoms; 30 severe symptoms; 40 very severe symptoms). These examinations were repeated after 3, 6 and 12 months of therapy. Group A patients underwent antibiotic prophylaxis with Cefpodoxime (Cefodox): 100 mg twice daily, 6 days a month for 6 months. Group B patients received a placebo at the same dosage and for the same duration.

3. Results

Analysis of the results of the two groups considered the scores on the subjective evaluation scale, the number of acute episodes of pharyngotonsillitis before, during and after treatment, the number of days of antibiotic therapy the patients received during and after treatment, and the level of serum immunoglobulins before and after treatment. Statistical analysis was performed by means of the ANOVA test.

The mean score (of each patient) on the subjective evaluation scale decreased from 2.61 before treatment to 0.88 after treatment in group A, and from 2.53 to 2.20 in group B.

In group A, an 84% reduction in the number of acute episodes of pharyngotonsillitis was observed after 3 months, while in group B the reduction was 15%. After 6 months, the number of episodes further decreased by 14% in group A and by 1% in group B. At the final examination (after 12 months), the number of acute episodes of pharyngotonsillitis decreased by another 10% in group A, while in group B there was an increase in acute episodes of pharyngotonsillitis in 86.4 patients (96% of cases). The difference between groups A and B is significant in both cases ($p < 0.05$).

In group A, a significant increase in IgA was observed in 27 patients who initially presented low serum IgA concentrations; nonsignificant modifications of serum levels of IgM, IgG and IgE were revealed. In group B, slight modifications of the serum levels of immunoglobulins were observed after 3, 6 and 12 months. These were not statistically significant ($p > 0.05$). With regard to pharyngeal swabs, incomplete eradication or

Table 1
The table shows the data concerning the subjective evaluation scale (*), the number of acute episodes of pharyngotonsillitis (**) and the number of patients with noncomplete eradication or reinfection by *S. beta-haemoliticus* on pharyngeal swabbing (***) for each group

	Before therapy	3 months	6 months	12 months
Group A (*)	2.61	1.62	0.88	0.86
Group B (*)	2.53	2.49	2.20	2.56
Group A (**)	90	14.4	12.4	11.16
Group B (**)	90	76.5	75.8	86.4
Group A (***)	90	3	17	20
Group B (***)	90	87.3	85.5	86.4

reinfection was recorded in 3%, 19% and 22% of group A patients after 3, 6 and 12 months, respectively, while in group B patients the figures were 97%, 95% and 96% after 3, 6 and 12 months, respectively (the difference between the groups is significant $p < 0.05$) (Table 1).

No side effects of the antibiotic therapy were observed.

4. Discussion

The treatment or prophylaxis of upper respiratory tract infections with penicillins can generate bacterial resistance caused by the production of beta-lactamase or changes in the penicillin-binding proteins. Therapeutic use of antimicrobial agents that preserve the normal flora but overcome penicillin-susceptible or -resistant pathogens may enhance recovery from upper respiratory tract infections [4]. There is some evidence that penicillin therapy is less satisfactory than in former years. Several explanations have been suggested, including inadequate pharmacokinetic properties, poor patient compliance, penicillin tolerance, reinfection and carrier state, and co-pathogen colonization with, for example, *Staphylococcus aureus*, *H. influenzae* or *M. catarrhalis*, which produce beta-lactamase, thereby deactivating penicillin before it can exert any effect [5,6].

Oral cephalosporins are an acceptable alternative. Several reports indicate that a 10-day course of cefpodoxime (200 mg daily) is at least as effective in eradicating group A streptococcal (GAS) infections from the pharynx as a standard 10-day treatment course of oral penicillin in both adult and paediatric patients [5,7,8,9]. In studies in paediatric patients, the rate of bacterial eradication following a 5- or 10-day course of cefpodoxime was significantly higher than that observed following treatment with penicillin V for 10 days [5,10–12].

Antimicrobial resistance is universally recognized as a major problem. Several studies have been conducted to monitor resistance patterns. Of the antibiotics tested, cefpodoxime was remarkably active against the major respiratory pathogens and its tissue penetration was greater than that of other oral cephalosporins [13,14]. Cefpodoxime was more potent than cefaclor, cefixime and ceftibuten against pneumococci, especially against strains with decreased sensitivity to penicillin, and more active than cefaclor and cefuroxime against Gram-negative respiratory pathogens. Pneumococci and staphylococci displayed a very

high level of in vitro macrolide resistance. The data obtained from our study also indicate that cefpodoxime constitutes an appropriate choice in the treatment of community-acquired respiratory tract infections because of its broad spectrum of antibacterial activity and its favourable pharmacokinetic profile, which allows twice-daily administration [13–17].

As the drug has in vitro activity against many common Gram- and Gram-negative pathogens associated with common paediatric infections, it is a useful option for empirical therapy. The clinical efficacy of 5 days of treatment with cefpodoxime proxetil is similar to that of 10 days of treatment with penicillin V [15,16].

We can confirm these data on the basis of the fact that after 6-month treatment with cefpodoxime, only 19% of our patients presented noncomplete eradication or reinfection by *Streptococcus beta-haemoliticus*. Moreover, 6 months after discontinuation of the antibiotic therapy, this percentage increased from 19% to 22%, thus proving the efficacy of cefpodoxime proxetil in the treatment of recurrent pharyngotonsillitis in children.

We can also affirm that cefpodoxime proxetil is well tolerated by paediatric patients, and that adverse events (primarily gastrointestinal tract disturbances and skin rashes) are consistent with those reported for other oral cephalosporins.

On the basis of these characteristics and of our data, we can conclude that cefpodoxime proxetil is a suitable option for the treatment of paediatric patients with recurrent pharyngotonsillitis; we have shown that a short course of treatment with cefpodoxime proxetil is effective in terms of both clinical (reduction in the number of acute episodes of pharyngotonsillitis) and bacteriological (significant percentage of eradication of *S. beta-haemoliticus* from the pharynx) efficacy. Moreover, the possibility of reducing the duration of therapy and the twice-daily administration of these cephalosporins results in better patient compliance with treatment.

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