A PILOT STUDY OF CEFOTIAM (CERADOLAN) IN THE TREATMENT OF LOWER RESPIRATORY TRACT INFECTIONS

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SYNOPSIS

Eighteen patients with a mean age of 59 years (range 15-75 years) with signs and symptoms of lower respiratory tract infections were treated with 1 Gm Cefotiam given parenterally every 12 hours for mean period of 9.7 days (range 7-12 days). The overall clinical response was excellent in 11, good in 5 and fair in 2 patients, the rate of satisfactory (excellent and good) response being 89%. Nine patients were bacteriologically assessable, eight of them (89%) responded to treatment. There were no significant side effects.

INTRODUCTION

Cefotiam is a semi-synthetic injectable cephalosporin which has been shown to have marked clinical effect in the treatment of various bacterial infections like septicaemia, infections of surgical wounds or burns, respiratory tract both upper and lower infections, biliary tract infections, peritonitis and urinary tract infections (1, 2, 3, 4). It has remarkable antibacterial activities against both gram-positive and gram-negative bacteria including Streptococcus pneumoniae, Staphylococcus aureus, Haemophilus influenza and Proteus spp. The MICs of Cefotiam for most strain of clinically isolated E coli, S aureus, Klebsiella pneumoniae, H influenzae and Proteus mirabilis are within a range of 0.2 to 0.78 μg/ml (5). It yields satisfactory plasma concentrations by both intravenous and intramuscular administration (6) and compared with other parenteral cephalosporin (7, 8, 9, 10, 11), the volume of distribution (0.5 litres/Kg) is two or three times greater. This relatively high value suggests favourable distribution of the drug in tissues and body fluids and might explain the high levels of Cefotiam in skin (12), bile (13), kidneys (14), bones (15), the otorhinolaryngological fields (16) and sputum (17).

In this present pilot study, the clinical efficacy, safety and tolerance of Cefotiam has been studied in the treatment of lower respiratory tract infection.

MATERIALS AND METHOD

Eighteen patients with lower respiratory tract infection were selected for treatment with Cefotiam 1 gm given by bolus injections (mostly by intravenous route) every 12 hours for seven to twelve days (mean 9.7 days). Sixteen of them had acute symptomatology suggesting of lower respiratory tract infections serious enough to warrant admission into hospital. Two patients had hospital-acquired respiratory tract infection. There were thirteen males and five females with a mean age of 59 years (range 15-75 years). All but three of the patients had at least one other underlying medical condition.

Two sputum cultures were taken before treatment and were cultured bacteriologically at the laboratory in the Singapore General Hospital. Two further sputum specimens were taken at the end of the treatment period. A chest radiograph was taken before treatment and also after the treatment period. These patients were evaluated as to the improvement in their clinical symptoms and signs (cough, expectoration, temperature, etc) and by evaluation of the chest radiographs. The clinical response was assessed on a four-scale order as excellent, good, fair or no effect (2). The clinical response was evaluated as "excellent" when subjective symptoms and objective signs improved within 3 days of treatment and as "good" when such improvement occurred within 4-7 says. Improvement of either subjective symptoms or objective signs was evaluated as a "fair" response, and complete lack of improvement was considered as "no effect."

The bacteriological response was assessed according to the results of cultures (eradications, persistence of organism or replacement by other organism).

Safety and tolerance were monitored with routine blood counts and biochemistry before treatment and at the end of treatment. Daily clinical assessment of the patients were done in all patients and any adverse reactions, local pain and thrombophlebitis were noted.

RESULTS

Eighteen patients (16 pneumonia and 2 bronchitis) were treated with Cefotiam — Table 1. Overall clinical response was excellent in 11, good in 5 and fair in 2 patients, the rate of satisfactory (excellent and good) response being 89%. This high rate is probably due to its excellent activity against gram-positive bacteria and Haemophilus spp (5) which are the main pathogens in lower respiratory tract infections and to its excellent penetration in bronchial secretions (17). Nine patients had positive bacteriological cultures pretreatment with two cultures each having two different organisms isolated, Cefotiam was effective in eight patients (89%). The drug was effective in all five patients with Klebsiella organisms isolated.

Safety and Tolerance

There was no significant change in clinical chemistry (liver function tests, urea, creatinine) and blood counts.

DISCUSSION

The results of this pilot study demonstrate that Cefotiam was effective in the treatment of lower respiratory tract infection. The overall success rate was 89%. This is consistent with results from other workers (18, 19, 20, 21). The drug was effective in both infections caused by gram-positive and gram-negative organisms and make it a potentially valuable antibiotic in the initial therapy of severe community or hospital-acquried lower respiratory tract infection.

Matsumoto et al (22) demonstrated that four out of fifty-three patients had transient elevation of transaminases during treatment and Saito et al (23) obtained similar findings. There was no elevation of transaminases in our patients.

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TABLE 1 SUMMARY OF 18 PATIENTS TREATED WITH CEFOTIAM

No.	Sex/Age	Diagnosis	Underlying Diseases	Organisms isolated	Duration treatment (days)	Clinical response	Bacteriological response
1	F/24	Pneumonia Septicaemia	SLE	Acinetobacter	11 days	Fair	persist
2	M/65	Bronchitis	CVA with (L) hemiplegia	Not identified	7 days	Good	—
3	F/74	Pneumonia	Chronic Schizophrenia	Not identified	10 days	Good	—
4	M/58	Pneumonia	Liver cirrhosis	Ps. Aeruginosa Serratia Species	10 days	Excellent	eradicated
5*	M/65	Pneumonia	CVA	Acinetobacter valcaoceticus	10 days	Excellent	eradicated
6	M/60	Pneumonia	Bronchial Asthma	Not identified	10 days	Excellent	—
7	F/67	Penumonia	Ca lung	Not identified	12 days	Fair	—
8	M/36	Pneumonia	Bronchiectasis	Not identified	12 days	Excellent	—
9	M/15	Pneumonia	Bronchial Asthma	Not identified	8 days	Excellent	—
10	M/70	Pneumonia	COLD, pneumothorax	Klebsiella sp	12 days	Excellent	eradicated
11	M/58	Pneumonia	—	Streptococcus pneumoniae	12 days	Excellent	eradicated
12	M/71	Penumonia	—	Klebsiella sp	7 days	Excellent	eradicated
13	M/52	Bronchitis	Bronchiectasis	Not identified	12 days	Good	—
14	M/67	Pneumonia	Old PTB	Klebsiella sp	10 days	Good	eradicated
15	F/73	Pneumonia	—	Klebsiella sp P. mirabilis	10 days	Excellent	eradicated
16	M/75	Pneumonia	PTB	Not identified	7 days	Good	—
17	F/75	Pneumonia	Diabetes Mellitus	Not identified	7 days	Excellent	—
18*	M/55	Pneumonia	Parkinsonism	Klebsiella sp	7 days	Excellent	eradicated
Total:	F 5 M 13 Mean age: 59			11 organisms isolated in 9 patients	Mean: 9.7 days	Excellent 11 Good 5 Fair 2 Clinical efficacy 16/18 = 89%	Eradicated in 8 patients Bacteriological response 8/9 = 89%

*Hospital-acquired infections

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