CEFACLOR *VERSUS* CEPHALEXIN: *IN VITRO* SUSCEPTIBILITY TESTING OF CLINICAL ISOLATES

D. J. FLOURNOY

Clinical Microbiology Section
Veterans Administration Hospital 113,
Oklahoma City, Oklahoma 73104, U.S.A.

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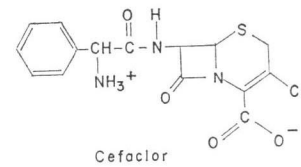
Cefaclor (Lilly 99638), 3-chloro-7-D-(2-phenylglycemamido)-3-cephem-4-carboxylic acid, is a new cephalosporin which is orally active and broad spectrum.[1] A previous study has shown it to be active against *Haemophilus influenzae*.[2] This report describes a study on the activity of cefaclor and cephalexin against local isolates.

Antibiotic powders of cefaclor and cephalexin and their corresponding disks were supplied by Lilly Research Laboratories. All other antimicrobial disks, used for agar diffusion testing, were obtained commercially. The organisms studied were 158 clinical isolates identified by conventional methods in the clinical microbiology section of the Oklahoma City Veterans Administration Hospital. Minimal inhibitory concentrations (MICs) were determined by a broth microdilution method. The inoculum consisted of 0.050 ml of a 1:100 dilution of a suspension with a turbidity equal to that of a 0.5 MACFARLAND standard. The final volume in each



Cefaclor

microtiter plate well was 0.1 ml. Microtiter plates were incubated for 16~18 hours at 35°C after inoculation. The MIC was taken as the highest dilution of antimicrobial in which no visible growth appeared. MICs of 8 μg/ml or less were considered as indicative of susceptibility for cefaclor and cephalexin. Disk agar diffusion studies were performed by the method of BAUER *et al.*[3] Zone, of inhibition, sizes of 18 mm or greater represented susceptibility, 15~17 mm was intermediate and 14 mm or less was resistant. The same criterion was used for all cephalosporins tested.

Table 1 notes the MICs performed on 158 isolates. The median MICs showed cefaclor to be more active than cephalexin against *Staphylococcus aureus, Staphylococcus epidermidis, Escherichia coli, Klebsiella pneumoniae,* and *Proteus mirabilis* strains. Neither compound was active against strains of Group D *Enterococcus, Serratia marcescens, Pseudomonas aeruginosa* or *Enterobacter* sp.

Disk agar diffusion testing on 112 isolates of *Staphylococcus aureus, Staphylococcus epidermi-*

Table 1. Comparison of *in vitro* activity of cefaclor (CF) and cephalexin (CN)

Organism	No. of strains	Drug	MIC, μg/ml	
			Range	Median
Staphylococcus aureus	21	CF	0.5~8	2
		CN	1~16	4
Staphylococcus epidermidis	12	CF	0.5~128	1
		CN	2~>128	4
Group D *Enterococcus*	14	CF	32~128	128
		CN	64~>128	128
Escherichia coli	38	CF	0.5~>128	4
		CN	2~128	8
Klebsiella pneumoniae	16	CF	0.5~32	2
		CN	4~>128	8
Enterobacter sp.	14*	CF	1~>128	64
		CN	8~>128	32
Serratia marcescens	6	CF	64~>128	128
		CN	64~>128	128
Proteus mirabilis	25	CF	0.5~16	2
		CN	4~32	16
Pseudomonas aeruginosa	12	CF	All >128	>128
		CN	All >128	>128

* Includes six *Enterobacter cloacae,* five *E. agglomerans* and three *E. aerogenes.*

dis, Escherichia coli, Klebsiella pneumoniae and *Proteus mirabilis* showed 91% were susceptible to cefaclor, 86% to cephalothin, 77% to cephalexin and 48% to ampicillin.

Regression analysis, plotting MICs against zone sizes, were prepared on 100 strains of *Escherichia coli, Proteus mirabilis, Klebsiella pneumoniae* and *Staphylococcus aureus*. The MICs in mcg/ml followed by their corresponding zone sizes (parenthesis) in mm are: 1 mcg/ml (27 mm), 2 (25), 4 (23), 8 (21), 16 (19), 32 (17), 64(15) and 128 (13).

According to published standards[4] for disk agar diffusion susceptibility testing, cephalothin is the class disk for other cephalosporins. A comparison of cephalothin to cefaclor and cephalexin was made on 150 of the isolates, not including *Pseudomonas* sp. Discrepancies were noted as major when one result was susceptible and the other resistant. There was a 4.6% major discrepancy between cefaclor and cephalothin. Among these 7 isolates, which occurred from 6 different species, 6 were susceptible to cefaclor and resistant to cephalothin. A 3.3% (5 isolates of different species) major discrepancy was found between cephalexin and cephalothin. Three were susceptible to cephalexin and resistant to cephalothin.

This investigation shows cefaclor to be a potentially useful antimicrobial against certain organisms. Also of interest is the fact that disk agar diffusion testing of cephalothin may not always be representative of other cephalosporins. Although this may not justify separate disks for different cephalosporins in general, there may be specific instances where they might provide information useful for chemotherapeutic purposes.

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