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Duration of effusion after antibiotic treatment for acute otitis media: comparison of cefaclor and amoxicillin

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A double-blind randomized clinical trial was conducted at two sites comparing cefaclor and amoxicillin for the treatment of acute otitis media with effusion in 214 children (293 ears). Each child underwent unilateral or bilateral tympanocentesis and then was randomly assigned to receive a 14-day course of either amoxicillin or cefaclor. The symptomatic clinical response was the same for the two antibiotics, with four children considered "treatment failures" in each antibiotic treatment group. By 14 days after entry into the study 59 of 106 children (55.7%) in the cefaclor group had ears that were effusion-free as compared to 40 of 97 children (41.2%) in the amoxicillin group ($P = 0.05$). When considering all children with effusion-free ears as well as those "improved" from their original status (those with bilateral middle ear effusions at entry but only unilateral after treatment), 68 of 106 children (64.2%) receiving cefaclor were effusion-free or "improved," compared to 43 of 97 children (44.3%) receiving amoxicillin ($P = 0.01$). However, by 42 days after entry the percentage of children whose ears were without effusion or "improved" was equal in both treatment groups (68.9% in the cefaclor group and 67.5% in the amoxicillin group). The reasons for the differences observed at 14 days after entry are not readily apparent.

Otitis media with effusion (OME) is being looked at in a new light these days. Not only is acute OME an immediate concern to the parent and physician because of the symptoms that it produces (fever, otalgia, irritability, at times accompanied by vomiting, diarrhea and upper respiratory tract symptoms) but also its long-term sequelae are now being probed. In the past the suppurative complications and the chronic symptomatic conditions received much attention. Recently the impact of middle ear effusion and its concomitant hearing impairment on learning and development is receiving increasing attention.[1-6] Conceivably rapid clearance of middle ear effusion following infection is a desirable end.

A study comparing cefaclor and amoxicillin for the treatment of acute symptomatic OME in 110 children has been reported previously.[7] Although intended to compare the symptomatic relief, and by inference "cure of the infection" between the two antimicrobial agents, a somewhat unexpected finding was the difference in clearance of the middle ear effusion in the two treatment groups after a 14-day course of treatment. In this study there were significantly fewer ears of children treated with cefaclor that had a middle ear effusion at the end of a 14-day course of treatment as compared with those ears of children who were treated with amoxicillin. There was no statistical significance between the two groups when children and not "ears" were analyzed for the presence or absence of effusion at the completion of the antibiotic course. However, there was a trend favoring those treated with cefaclor. Because of the relatively small sample size in the initial study conducted at the Children's Hospital of Pittsburgh, Ambulatory Care Center (CHP-ACC), the same study was repeated in a private suburban pediatric practice. Since drug compliance was not measured in the original group of patients, this was recorded for the children entered by the private practice in an attempt to clarify and possibly confirm the results of the original study. Both the initial and second studies are included in this report.

METHODS

Children who were between 2 months and 16 years of age and who were suspected of having acute OME by the house staff in the CHP-ACC (first study) or

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subsequently in the second study by the members of the private pediatric practice (M. B., K. R., F. W.) were evaluated by pneumatic otoscopy and tympanometry. Otoscopic criteria for the diagnosis of acute OME were the presence of erythema or white opacification (other than scarring), or both, of the tympanic membrane, accompanied by fullness or bulging and impaired mobility of the membrane. At least one of the associated symptoms of acute OME, such as otalgia or irritability or fever, was also present.

Subjects were excluded from the study for any of the following reasons: (1) underlying serious disease; (2) concomitant infection that might interfere with evaluation of drug efficacy; (3) vomiting which might preclude the use of oral medications; (4) need for concurrent use of a second systemic antimicrobial agent; (5) known allergy to the cephalosporins or penicillins; (6) prior tonsillectomy or adenoidectomy or both; (7) medical conditions with a predisposition for OME (e.g. cleft palate, Down syndrome). Previously unsuccessful antimicrobial therapy (other than with amoxicillin or cefaclor) did not exclude the patient from the study. If the clinical history and results of the otoscopic examination qualified the child for the study, the details of the study were described to the child's parents and informed written consent for the child to participate in the study was obtained.

Method of tympanocentesis. All children with unilateral acute OME underwent a diagnostic tympanocentesis. Those subjects with bilateral acute OME were assigned to have either a unilateral or a bilateral middle ear aspiration at the physician's discretion.

Tympanocentesis was performed in most children without general anesthesia or sedation. With the aid of an otomicroscope or an otoscope with an operating head, a culture of the external canal was obtained with a Calgiswab® (Inolex Biomedical, Glenwood, IL) which had been moistened with trypticase soy broth. The canal was then filled with a 70% alcohol solution for 1 minute,[8] after which the alcohol was removed by aspiration. By means of an Alden-Senturia trap (Storz Instrument Co., St. Louis, MO) with a No. 18 needle attached, a tympanocentesis was performed in the inferior portion of the tympanic membrane. Care was taken not to close the suction hole in the trap before entering the middle ear. No attempt was made to aspirate any more effusion than was necessary for microbiological assessment. If no effusion was aspirated the child was excluded from the trial.

Following tympanocentesis the middle ear aspirate in the collection trap was removed with a sterile cotton swab and placed in the trypticase soy broth.

Bacteriologic methods. Each of the external and middle ear swabs was inoculated onto chocolate agar and 5% sheep blood agar, and also onto trypticase soy broth and thioglycolate broth. The plates were incubated in a CO_2 incubator for 18 to 48 hours. If there was no growth on agar after 48 hours the plates were discarded, but the two broth cultures were kept for a period of 10 days. Sensitivities of the organisms isolated were tested by the standard Kirby-Bauer disc method. If the organism was found to be resistant to penicillin or ampicillin, it was then tested for beta-lactamase.[9]

Antibiotics. Subjects who qualified for the study were randomly assigned to receive either cefaclor or amoxicillin, 40 mg/kg/day in three divided doses, for 14 days. No other medication was administered. The drug was to be discontinued if (1) significant adverse effects occurred, (2) the original pathogen(s) was not susceptible to the drug as shown by the results of microbiologic testing, in association with an unsatisfactory clinical response, or (3) an unsatisfactory clinical response necessitated a second tympanocentesis which revealed the presence of a pathogen.

Subsequent management. Children were reexamined 14 and 42 days after entering the study. However, the children were reexamined at any time during the 6-week study if symptoms of ear disease recurred. Each examination included an interval history, physical examination with pneumatic otoscopy and a tympanogram. Positive response to therapy was separated into two types: (1) satisfactory symptomatic or clinical response; and (2) resolution of the OME. A satisfactory clinical response was defined as relief of otalgia and defervescence. If the child had persistent or recurrent otalgia, fever or both after 3 days of treatment, a repeat tympanocentesis was performed, when possible, in the manner described previously. The middle ear effusion was then reexamined for organisms.

Resolution of the OME was defined as the absence of effusion at follow-up visits as determined by otoscopy and, when possible, tympanometry.

Otoscopy. Pneumatic otoscopy was used for all examinations. In the first study (CHP-ACC) not all observations were made by validated examiners. However, all observers in the second study (private practice) were validated, and interobserver reliability was substantiated.[10]

Tympanometry. Tympanograms were obtained using an electroacoustic impedance bridge (Model Z073; Madsen Electronics, Oakville, Ontario, Canada) and were plotted with an X-Y plotter (Model 7010A; Hewlett-Packard Medical Instruments, Waltham, MA). Tympanogram patterns were classified according to the system suggested by Cantekin and Bluestone.[11] The tympanometric variants were based on the degree of tympanic membrane compliance, the air pressure at peak tympanic membrane compliance and the gradient of the tympanogram curve. The otoscopic diagnosis and tympanometric variants were then combined from which the probability of OME being present could be determined.

Antibiotic compliance. An attempt was made to

evaluate patient compliance with the prescribed medication dosage in the patients who were in the private pediatric practice study (second study). The parents were instructed to return the unused medication and a medication diary (checklist of medication doses given). The amount of medication removed from the bottles was then compared with the amount of medication reportedly administered as calculated from the diary, the lesser amount being the dose assumed given.

Statistical methods. Proportions were compared using the usual chi square statistic unless the sample size was too small, in which case Fisher's exact test was used. All reported P values are two-sided. In cases where proportions were compared while adjusting for selected confounding variables, the Mantel-Haenszel chi square test[12] with one degree of freedom was used. This test is applied to adjust for an imbalance in the two treatment groups for those variables that appear to be related to OME status. Since the results from both studies were nearly identical, the data have been combined.

The hypothesis of a treatment effect at 14 days was also tested using a log-linear model. This multivariate procedure can be used to adjust for treatment effects due to the various demographic variables as well as their interactions.[13]

RESULTS

Two hundred twenty-nine patients with acute OME entered the study and underwent tympanocentesis. From 1977 to 1980, 129 children were entered by the CHP-ACC; and in 1981, 100 children were entered by the private pediatric practice. Of these only 214 children (the 110 children in the original report[7] plus 5 additional children from CHP-ACC and 99 from the private practice) returned for the 14-day follow-up visit, and it is this population upon which the following data are based.

As shown in Table 1 both treatment groups are comparable with regard to age, sex, race and laterality. In addition the two groups were comparable in socioeconomic status, the frequency of episodes of acute OME in the past year as well as the presence or absence of upper respiratory tract infection symptoms at the time of entry and at the 14-day visit.

Table 2 shows the symptomatic response to treatment was the same for both antibiotic groups. Of 112 children treated with cefaclor, only four children (5 ears) were considered "treatment failures," having remained symptomatic or had a recurrence of symptoms after the first 3 days of treatment. No pathogens were recovered from the middle ear effusions of two of these children at initial tympanocentesis; one child was retapped and again no pathogen was recovered; the other was not retapped. The other two "treatment failures" in the cefaclor-treated group both grew *Streptococcus pneumoniae* at the time of initial tympanocentesis. *S. pneumoniae* was isolated from the previously normal ear of one of these children 12 days after the medication had been initiated. The middle ear effusion from the other child grew *S. pneumoniae* 10 days after starting the drug.

TABLE 1

Distribution of selected patient characteristics according to antibiotic received

	Cefaclor	Amoxicillin	Total
Study site			
Children's Hospital	60 (53.6)[a]	55 (53.9)	115 (53.7)
Private practice	52 (46.4)	47 (46.1)	99 (46.3)
Age			
2–23 months	33 (29.5)	30 (29.4)	63 (29.4)
2–5 years	56 (50.0)	46 (45.1)	102 (47.7)
6–12 years	22 (19.6)	25 (24.5)	47 (22.0)
13–16 years	1 (0.9)	1 (1.0)	2 (0.9)
Sex			
Male	59 (52.7)	54 (52.9)	113 (52.8)
Female	53 (47.3)	48 (47.1)	101 (47.2)
Race			
White	84 (75.0)	85 (83.3)	169 (79.0)
Black	28 (25.0)	17 (16.7)	45 (21.0)
Laterality of disease			
Unilateral	66 (58.9)	69 (67.6)	135 (63.1)
Bilateral	46 (41.1)	33 (32.4)	79 (36.9)
Total with acute OME	112	102	214

[a] Numbers in parentheses, percentage.

TABLE 2

Clinical (symptomatic) response of 214 children (293 ears) during 14-day antibiotic treatment for acute OME

	Cefaclor	Amoxicillin
Success	108 (153)[a]	98 (130)
Failure	4 (5)	4 (5)
Total	112 (158)	102 (135)

[a] Numbers in parentheses, number of ears.

Only four children (five ears) in the amoxicillin-treated group were also considered treatment failures. Three children had *S. pneumoniae* isolated from purulent middle ear effusions at entry. No organisms were recovered when two of the children were retapped for persistent symptoms. The third child did well until the tenth day of treatment when her previously normal tympanic membrane perforated spontaneously; *Haemophilus influenzae* (ampicillin resistant) was isolated from the exudate. The middle ear aspirate from the fourth child grew *H. influenzae* (ampicillin sensitive) initially; on repeat tympanocentesis on Day 10 no organism was isolated from the middle ear effusion. In all these cases compliance with the prescribed medication regimen was thought to be good.

Response to the antimicrobial agents was also measured in terms of the presence or absence of middle ear effusion at the end of a 14-day course of therapy. Seventy-nine percent of the children in the cefaclor-

treated group and 75% of the children in the amoxicillin-treated group returned for their follow-up visit between Days 12 and 16; 92% in the cefaclor group and 92% in the amoxicillin group were reexamined between Days 11 and 18. The number of days between entry and the follow-up visit had no effect on the outcome. Compliance with the prescribed treatment regimen, measured only in the children enrolled by the private pediatric practice, was very good in both treatment groups. Ninety-six percent of children in the cefaclor-treated group and 91% of those in the amoxicillin group received ≥93% of the prescribed medication appropriate for the time of their first follow-up visit. Seventy percent of the patients in the cefaclor group and 68% in the amoxicillin group received ≥93% of the total 14-day dose of medication; 90% in the cefaclor group and 94% in the amoxicillin group received ≥79% of the total 14-day dose.

Table 3 shows the relation of middle ear status following treatment to the bacteriology of the initial middle ear aspirate. The distribution of organisms is similar between the two treatment groups except for the ampicillin-resistant organisms, of which six were isolated in the cefaclor-treated group, and only one in the amoxicillin-treated group. No cefaclor-resistant organisms were found. More than one pathogen was isolated from nine ears. Forty-seven children underwent bilateral tympanocentesis. Thirty children (63.8%) had the same culture result in both ears; 17 (36.2%) had different culture results in each ear, with 11 of these having a pathogen in one ear and no pathogen in the other. Thirty-two children with bilateral acute OME had only a unilateral tympanocentesis.

When the ears receiving tympanocentesis are compared with regard to treatment, a higher percentage of ears of children in the cefaclor-treated group were effusion-free at the 14-day end point (56.9%) as compared to the amoxicillin group (44.4%). Likewise the ears with acute OME in the cefaclor group not undergoing tympanocentesis had a higher percentage of effusion-free ears (75%) than did those in the amoxicillin-treated group (36.4%). Overall, 59.3% of the evaluable ears (ears with perforations at the 14-day visit were excluded from analysis as to the presence or absence of OME, as were ears that received a tympanocentesis or a change in antibiotic treatment before the 14-day visit due to persistent or recurring symptoms) of children in the cefaclor-treated group were effusion-free, as compared to 43.8% of those in the amoxicillin-treated group.

Since the individual child was randomized as the experimental unit, it is appropriate to base tests of significance on the proportion of *children* with effusion-free ears rather than the proportion of *ears* that were effusion-free. Statistical analysis based on the ear status might be justified if the lack of effusion in each ear was independent, but analysis of the patients in both treatment groups in this study indicates a high degree of dependence in the probability of two ears of a child with initial bilateral disease might be effusion-free after treatment.

For a child with bilateral disease the estimated probability that a specific ear was effusion-free at 14 days is 0.53. The estimated probability that this ear was effusion-free if it is known that the other ear had no OME at 14 days is 0.86. Under the assumption of independence the two probabilities should be the same.

Table 4 shows the middle ear status at 14 days in

TABLE 3

Presence or absence of OME after 14 days of treatment related to initial middle ear isolate and antibiotic received

Isolate	Cefaclor				Amoxicillin				Total Ears	
	No OME	OME	P/E[a]	Total	No OME	OME	P/E	Total		
Streptococcus pneumoniae	21	20	3	44 (32.1)[b]	19	28	3	50 (40.3)	94	(36.0)
Haemophilus influenzae (S)	9	5		14 (10.2)	8	11	2	21 (16.9)	35	(13.4)
H. influenzae (R)	2	1		3 (2.2)	0	0		0	3	(1.1)
Streptococcus pyogenes	3	2		5 (3.6)	3	2	1	6 (4.8)	11	(4.2)
Staphylococcus aureus (R)	2	0		2 (1.5)	0	0		0	2	(0.8)
Branhamella catarrhalis (S or ?)	9	1		10 (7.3)	6	3		9 (7.3)	19	(7.3)
B. catarrhalis (R)	0	1		1 (0.7)	0	1		1 (0.8)	2	(0.8)
Mixed pathogens	3	4		7 (5.1)	0	1	1	2 (1.6)	9	(3.4)
Sterile or nonpathogen	25	22	4	51 (37.2)	16	19		35 (28.2)	86	(33.0)
All ears receiving tympanocentesis	74 (56.9)	56	7	137 (100.0)	52 (44.4)	65	7	124 (100.0)	261	(100.0)
Ears with acute OME not receiving tympanocentesis	15	5	1	21	4	7	0	11	32	
Total	89 (59.3)	61	8	158	56 (43.8	72	7	135	293	

[a] P/E, perforation or excluded; S, ampicillin sensitive; R, ampicillin resistant; ?, sensitivity not tested.

[b] Numbers in parentheses, percentage.

TABLE 4

Presence or absence of OME at 14 days related to laterality of disease and antibiotic received (N = 203 children)

Entry OME Status	14-day OME Status					
	Cefaclor ($N = 106$)			Amoxicillin ($N = 97$)		
	No OME	Unilateral OME	Bilateral OME	No OME	Unilateral OME	Bilateral OME
Unilateral OME[a]	38	24		27	39	
Bilateral OME	21	9	14	13	3	15
Effusion-free[b]	59 (55.7%)[c]			40 (41.2%)		
Effusion-free plus improvement[d]		68 (64.2%)[e]			43 (44.3%)	

[a] 14-day status is based on entered ears only.
[b] Bilateral no OME irrespective of entry status.
[c] $P = 0.05$ (adjusted for laterality).
[d] Improvement refers to those children with bilateral OME at entry but only unilateral OME at 14 days.
[e] $P = 0.01$ (adjusted for laterality).

203 evaluable children (those without repeat tympanocentesis, treatment change or tympanic membrane perforations). Thirty-eight of 62 patients (61.3%) with *unilateral* acute OME at entry in the cefaclor-treated group were effusion-free at 14 days, compared to 27 of 66 patients (40.9%) in the amoxicillin group ($P = 0.03$). For children with *bilateral* OME at entry 21 of 44 children (47.7%) in the cefaclor-treated group had no OME at 14 days in either ear compared to 13 of 31 children (41.9%) in the amoxicillin-treated group ($P > 0.5$). However, some children with bilateral disease at entry had only unilateral disease at 14 days, an "improvement" from their original condition. Of the 44 children with bilateral OME at entry in the cefaclor-treated group, 30 (68.2%) had no OME in at least one ear compared to only 16 of 31 (51.6%) children in the amoxicillin-treated group ($P = 0.23$). Overall, 59 of 106 children (55.7%) treated with cefaclor were effusion-free compared to 40 of 97 children (41.2%) treated with amoxicillin; 68 of the 106 children (64.2%) receiving cefaclor were effusion-free or "improved" (i.e. had no OME in at least one ear that had effusion at entry) from their status at entry, compared to 43 of the 97 children (44.3%) receiving amoxicillin. Adjusting for the slightly different distribution of laterality at entry in the cefaclor and amoxicillin groups results in P values of 0.05 and 0.01, respectively.

The only demographic variable related to OME status in children with unilateral disease at entry and in children with bilateral disease at entry was age (Table 5). For children with unilateral disease there was a significant relationship of age with the presence of OME at 14 days (cefaclor, $P = 0.001$; amoxicillin, $P = 0.05$). In both cases children less than 2 years old had more OME at 14 days. For children with bilateral disease at entry the lower percentage of both ears being effusion-free in the younger age group occurred only in the amoxicillin-treated group ($P = 0.002$).

The middle ear status of the children was also

TABLE 5

Presence or absence of OME at 14 days related to age, laterality of disease, and antibiotic received (N = 203 children)

Entry OME Status	14-Day OME Status					
	Cefaclor ($N = 106$)			Amoxicillin ($N = 97$)		
	No OME	Unilateral OME	Bilateral OME	No OME	Unilateral OME	Bilateral OME
Unilateral OME[a]						
<2 years	3	9		2	10	
2–5 years	24	7		14	22	
≥6 years	11	8		11	7	
Bilateral OME						
<2 years	8	2	8	2	2	11
2–5 years	10	6	6	5	1	3
≥6 years	3	1	0	6	0	1

[a] 14-day status is based on entered ears only.

examined 42 days after initiation of treatment, as shown in Table 6. Of 54 children available for examination with unilateral acute OME at entry and treated with cefaclor, 34 (63.0%) had no middle ear effusion compared to 36 of 55 children (65.5%) in the amoxicillin group. In the group of children with bilateral OME at entry, 23 of 39 children (59.0%) treated with cefaclor were effusion-free in both ears as compared to 13 of 25 children (52.0%) treated with amoxicillin. Overall 57 of 93 children (61.3%) in the cefaclor-treated group were effusion-free by 42 days, as were 49 of 80 children (61.3%) in the amoxicillin-treated group. Recurrence of effusion by 42 days in children who had been effusion-free at 14 days was the same for both antibiotic treatment groups: 10 of 50 children (20%) in the cefaclor-treated group, compared to 8 of 32 children (25%) in the amoxicillin-treated group. In children who still had effusion at 14 days, 17 of 43 (39.5%) in the cefaclor group and 25 of 48 (52.1%) in the amoxicillin group were effusion-free at 42 days ($P = 0.33$).

A log-linear model was used to test treatment effect at 14 days. The model selected to fit the data was one

TABLE 6

Presence or absence of OME at 42 days in children related to OME status at entry and at 14 days

Entry OME Status[a]	14-day OME Status	OME Status at 42 Days					
		Cefaclor ($N = 93$)			Amoxicillin ($N = 80$)		
		No OME	Unilateral OME	Bilateral OME	No OME	Unilateral OME	Bilateral OME
Unilateral OME	No OME	26	6		17	6	
Unilateral OME	Unilateral OME	8	14		19	13	
Bilateral OME	No OME	14	3	1	7	1	1
Bilateral OME	Unilateral OME	4	3	0	1	0	1
Bilateral OME	Bilateral OME	5	1	8	5	4	5
Effusion-free[b]		57 (61.3%)			49 (61.3%)		
Effusion-free plus improvement[c]			64 (68.8%)			54 (67.5%)	

[a] Subsequent classification is based only on the status of the entered ear for ears with unilateral OME at entry.
[b] No OME in entered ear(s).
[c] Improvement refers to those children with bilateral OME at entry but only unilateral OME at 42 days.

that included laterality, age and sex and their significant higher order interactions. With this model there was a significant treatment effect ($P = 0.03$) indicating a higher rate of effusion-free children in the cefaclor-treated group.

No serious side effects such as serum sickness were noted with either antibiotic.

DISCUSSION

The second study to compare the efficacy of cefaclor and amoxicillin was prompted by several factors, the most important of which was the finding that after 14 days of antibiotic therapy OME was present in fewer ears of children treated with cefaclor than of those treated with amoxicillin. In the initial study conducted at the CHP-ACC, this difference was statistically significant, but because of the small sample size when children were used as the experimental unit the difference was not significant, even though there was a trend in the same direction. Not only did the results of the second study, conducted in a private suburban pediatric practice, confirm the finding of fewer ears with effusion in the cefaclor-treated group but also, when the results of both studies are combined, the differences between *children* treated with cefaclor and those treated with amoxicillin achieve statistical significance. The percentage of ears with persistent effusion after treatment with cefaclor was lower than recently reported by other investigators using antimicrobial agents other than cefaclor.[14-17] All reported that 50% or greater had effusion at the end of 10 to 14 days of antimicrobial therapy with these other agents. This lower percentage of ears with persistent effusion at the end of treatment with cefaclor is also consistent with the experience of other investigators using cefaclor for acute OME.[18]

It was thought that drug compliance could have been a major factor in the results obtained from our first study which was conducted at an inner city children's hospital, since compliance was not monitored. However, in the second study in the suburban practice in which antimicrobial compliance was monitored, there was essentially no difference in compliance between the two antibiotic groups. In addition, differences in the initial pathogen isolated from the middle ear effusion was thought to have been a factor in the outcome of the original study, but if any bias was present it favored the children in the amoxicillin group since, by chance, there were more ampicillin-resistant organisms in the cefaclor group than in the amoxicillin-treated children. When other variables such as age, race, sex and past history of recurrent otitis were analyzed, no clear-cut explanation is evident. The examiners in the first study (CHP-ACC) were not all validated observers, and the question of whether the observations were reliable was answered in the second study (private practice) in which the same results were produced by "validated" physicians. The symptomatic clinical response, i.e. persistent or recurrent otalgia or fever, or both, was the same for both antibiotics in the first study, and again no superiority of one antibiotic over the other was shown in the second study.

The explanation for this difference in absence of effusion at 14 days is not clear at present but may be related to differences in the effect of cefaclor as compared to amoxicillin on the inflammatory response of the middle ear, or it could be related to its effect on bacteria that are not considered pathogens. However, by 42 days after starting the study effusion was present in the same number of children (and ears) in both antibiotic groups. Therefore, whatever differences were present at 14 days were not present 4 weeks later. Since scheduled interval visits were not made between the 14- and 42-day visits, there is no way of telling from either study how long this difference lasted. The recurrence rate of OME was approximately the same in both treatment groups during the month following the completion of antimicrobial therapy, but a greater

percentage of children in the amoxicillin-treated group with effusion at 14 days were effusion-free by 42 days as compared to those in the cefaclor-treated group.

Significance of duration of effusion. Even though there has been a great deal of interest in the conductive hearing loss that is associated with middle ear effusion in children, there is no proof that a modest loss of hearing is detrimental to a child.[4] However, there is a growing concern that there may be a critical age at which a mild-to-moderate hearing loss may be detrimental to a child's cognition, language and speech development as well as learning. In addition we do not know the degree of hearing loss or duration which could impair development. For the child, and especially the infant who is at highest risk for recurrent or chronic OME, who has frequent episodes of acute OME during the early years of life, it would seem to be advantageous to have a shorter duration of middle ear effusion and therefore hearing loss. For the child with infrequent attacks there is probably no need for considering changing from the standard antibiotic now in use, amoxicillin, but for the child who has frequent episodes treatment with cefaclor would seem to be a reasonable option.[19] It should be stressed that not only were more children who had unilateral acute OME free of middle ear effusion in the cefaclor group but also more children with bilateral disease were free of effusion in at least one ear, which has implications for the child's hearing.

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