

STUDY REPORT

1. Title: Evaluation of Antimicrobial Prophylaxis in Children with Upper Respiratory Infections

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OBJECTIVES

Outpatients at Children's Hospital, Bangkok, Thailand are often treated with antibiotics on the basis of clinical findings alone. Prior to this study the value of this procedure had never been determined. The objectives of this study were to evaluate the efficacy of antimicrobials then in use for prophylaxis of upper respiratory tract infections in children and to determine the effects of these antimicrobials on the bacterial flora of the upper respiratory tract.

DESCRIPTION

Patients in this study were restricted to children with upper respiratory infections (URI) and were from 6 months to 12 years of age. Criteria for selection were a fever of not less than 37 C, cough, nasal discharge and injected throat. Patients were examined by a physician on the initial visit and by the same physician at 2 day intervals for 7 days. Laboratory procedures included a complete blood examination on the first visit and cultures of nasopharyngeal swabs for bacterial isolations on all visits.

Therapy was decided on the basis of drawing one of three colored chips from a box. The control group received placebo, one therapy group received oral penicillin in a dosage 50,000 units/kg/day for 7 days and the other group received oral tetracycline in a dosage of 40 mg/kg/day for 7 days. All groups received symptomatic and supportive therapy. Treatment was prescribed as syrup A, B or C and the contents of the syrups were known only to personnel of the pharmaceutical department of Children's Hospital, Bangkok, Thailand.

Responses to treatment were interpreted as improved, not improved or complicated as follows:

Improved: patients were free from any signs and symptoms of URI or free from fever with other signs and symptoms of URI decreasing at the end of the 7th day.

Not improved: patients still had fever with or without the increasing signs and symptoms of URI at the end of 7th day or patients developed signs and symptoms of viral lower respiratory tract infection.

Complicated: was defined as the development of symptoms and signs of lower respiratory tract bacterial infections or infections of other systems with suggestive evidences of bacterial etiology.

Table 1

Upper Respiratory Disease Study:
Description of Patients Studied

		Oxytetracycline	Penicillin	Placebo
Age (years)	1/2-2	60	52	61
	2-4	32	40	36
	4-6	17	19	10
	6-12	8	11	17
Sex	Male	61	64	58
	Female	56	58	66
Visits	Complete	98	95	101
	Incomplete	19	27	23
Total		117	122	124

Table 2

Upper Respiratory Disease Study:
Final Diagnosis of Patients by Treatment Group

Diagnosis	Medication Group			Total
	Oxytetracycline	Penicillin	Placebo	
URI	88	86	87	261
Rubella	3	2	6	11
Measles	4	2	2	8
Exanthematous fever	2	6	8	16
Pertussis	—	1	—	1
Streptococcal pharyngitis	1	—	2	3
Undiagnosed	19	25	19	63
Total	117	122	124	363

Table 3
Upper Respiratory Disease Study:
Bacterial Pathogens Isolated from Nasopharyngeal Swabs

Bacterial Isolated	Medication Group			
	Oxytetracycline (88 Patients)	Penicillin (86 Patients)	Placebo (87 Patients)	Total (261 Patients)
Diplococcus pneumoniae only	19	22	21	62
Haemophilus influenzae only	3	8	4	15
Staphylococcus aureus	9	19	17	45
Diplococcus pneumoniae+ Staphylococcus aureus	13	4	9	26
Diplococcus pneumoniae+ Haemophilus influenzae	5	2	1	8
Haemophilus influenzae+ Staphylococcus aureus	1	3	—	4
Haemophilus influenzae+ Beta hemolytic streptococcus (gr. A)	1	—	—	1
Diplococcus pneumoniae+ Staphylococcus aureus+ Beta hemolytic streptococcus (gr. A)	—	—	2	2
Diplococcus pneumoniae+ Haemophilus influenzae+ Staphylococcus aureus	2	—	1	3
Corynebacterium diphtheriae (Toxigenic)	—	—	1	1
Total patients harboring pathogens in nasopharynx	53	58	56	167

Table 4
Upper Respiratory Disease Study:
Clinical Findings*

Medication Group	Mean duration of fever (days)	Results (Number of patients)			Total Patients
		Improved	Not improved	Complicated	
Oxytetracycline	4.3	85	2	1	88
Penicillin	4.3	81	3	2	86
Placebo	4.6	83	2	2	87

* Includes only patients completing at least 3 visits.

$$X^2_{**} = 0.131$$

$$P = 0.93685$$

** Results of treatments are interpreted as satisfactory result (improved) and unsatisfactory result (not improved plus complicated)

PROGRESS

The patients are characterized as to age, sex and number of visits in Table 1. Almost 48 percent were less than two years of age and 50.4 percent were male. A surprising 81 percent completed at least 3 of the four visits. Final diagnoses are listed in table 2. For the bacteriological portion of the study only those patients with a final diagnosis of URI were evaluated in terms of antibiotic prophylaxis effects. Bacterial pathogens isolated in order of decreasing frequency were Diplococcus pneumoniae, coagulase positive Staphylococcus aureus and Haemophilus influenzae (Table 3).

Quantitative studies at the 10^4 level showed there were decreases of D. pneumoniae and H. influenzae but not in S. aureus except in patients treated with oxytetracycline. (Fig. 1 & 2). Among non-pathogens there were decreases of Micrococcus spp, Staphylococcus epidermidis, and Corynebacterium spp. There were no instances of overgrowth by Candida albicans or enterobacteriaceae. In vitro sensitivity studies using the plate dilution method indicated that all isolates of D. pneumoniae were sensitive to penicillin G and about half were sensitive to oxytetracycline. All isolates of H. influenzae were sensitive to oxytetracycline and were resistant to penicillin G.

SUMMARY

Results of this study indicate that the prophylactic use of oral penicillin or oral oxytetracycline was without benefit to children with upper respiratory infections. Parameters studied included duration of fever, clinical complications and quantitative microbiology.

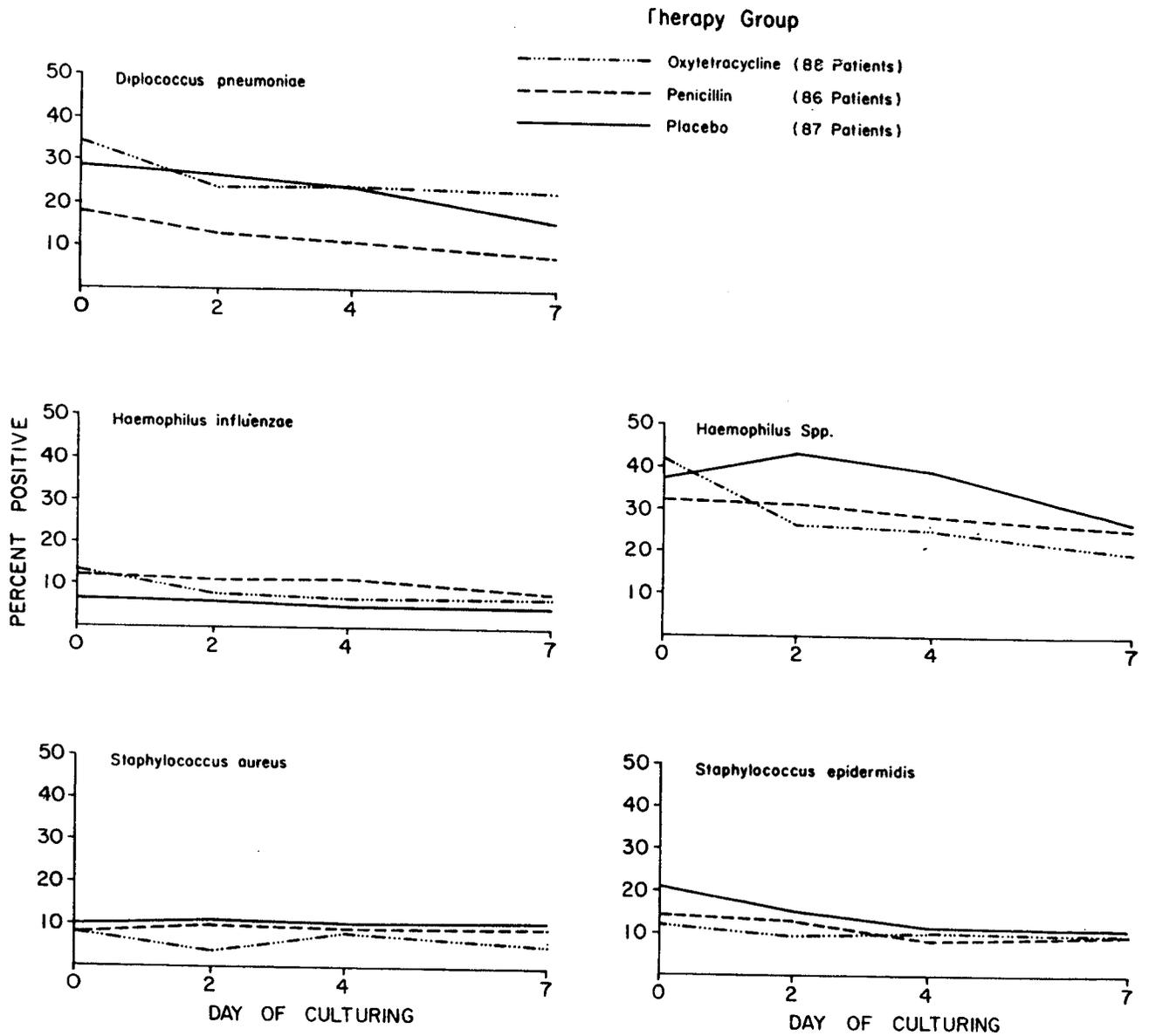


FIG. 1 PERCENTAGES OF NASOPHARYNGEAL SPECIMENS CONTAINING 10^4 OR MORE ORGANISMS/SWAB BY TREATMENT GROUP AND ORGANISM.

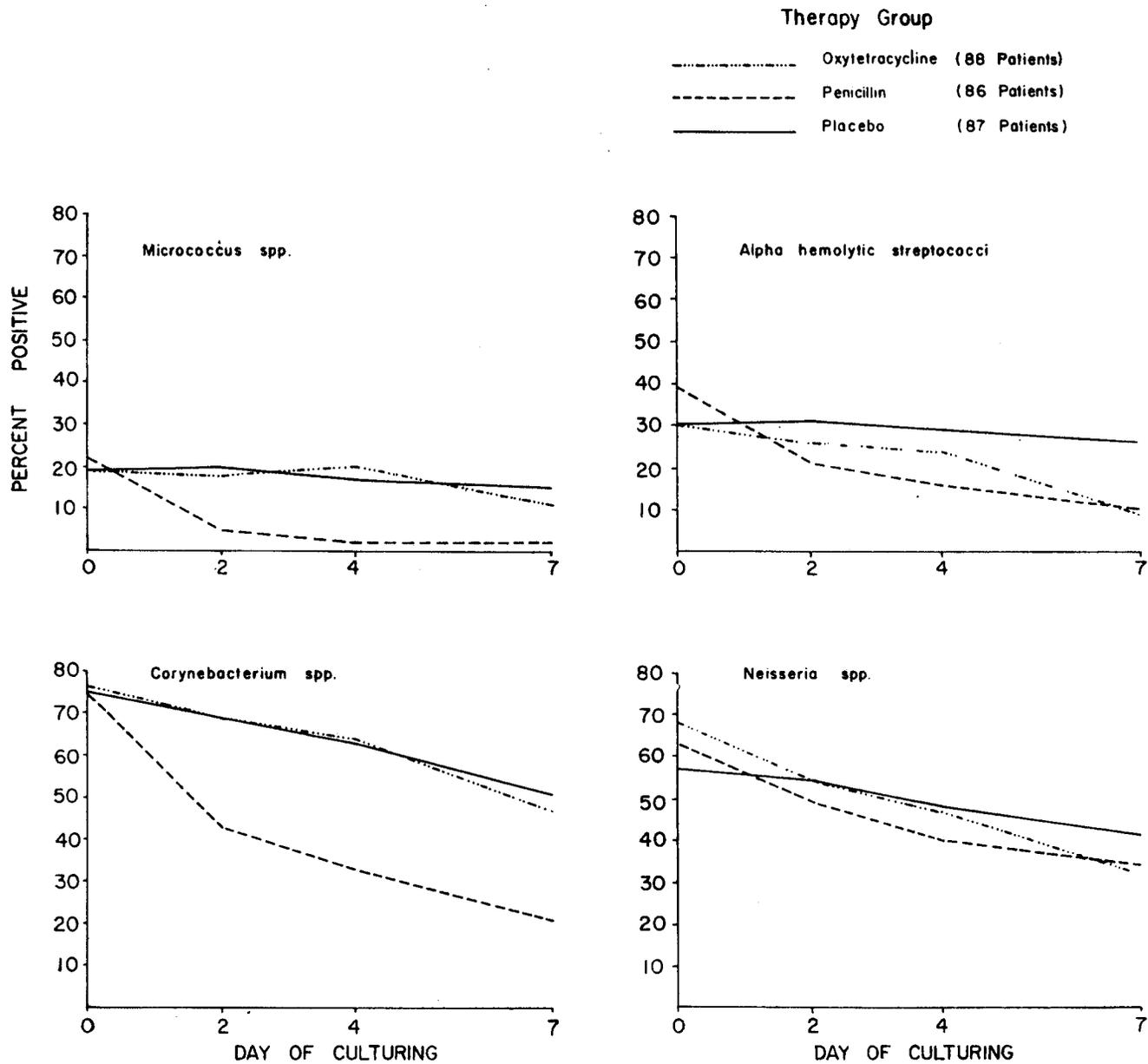


FIG 2. PERCENTAGES OF NASOPHARYNGEAL SPECIMENS CONTAINING 10^4 OR MORE ORGANISMS/SWAB BY TREATMENT GROUP AND ORGANISM.