

# Streptococcal Pharyngitis in an Adult Emergency Room Population

Paul S. Heckerling, MD, and Alan A. Harris, MD  
Chicago, Illinois

Antimicrobial therapy of pharyngitis due to group A  $\beta$ -hemolytic streptococci prevents both suppurative<sup>1</sup> and nonsuppurative<sup>2-4</sup> complications. Clinically to distinguish patients with streptococcal sore throat from those with pharyngitis of other causes, however, may be difficult.<sup>5-8</sup> Throat cultures reliably distinguish these two groups in approximately 90 percent of cases<sup>9,10</sup> but require a 24- to 48-hour delay in diagnosis. A culture-and-wait approach, recommended in certain patient populations,<sup>11</sup> may not be feasible in an emergency room setting, where reliable follow-up cannot always be assured. Treatment with oral penicillin without taking a throat culture may be cost effective in populations with rates of endemic streptococcal disease of greater than 20 percent<sup>12</sup> but would expose many culture-negative patients to unacceptable risks of penicillin anaphylaxis and allergy.<sup>13</sup>

A clinical score that predicts streptococcal pharyngitis with greater than 77 percent accuracy in a pediatric population has been developed.<sup>14</sup> There has been speculation that emergency department health care providers could use such scores to make therapeutic decisions without ob-

taining throat cultures.<sup>15</sup> To clarify the relationship between clinical signs and throat culture results in an adult emergency room population, patients with pharyngitis were studied retrospectively. Although several clinical findings were significantly associated with streptococcal pharyngitis, none were sufficiently predictive to allow discrimination of culture-positive and culture-negative cases.

## Methods

The charts of all patients aged 18 years or older who were discharged from emergency services with a diagnosis of pharyngitis, between April 1 and June 30, 1982, were reviewed. All patients had received a throat culture. The following information was collected: (1) physical findings (the presence or absence of fever [oral temperature > 100° F], pharyngeal erythema, pharyngeal exudate, and tender anterior cervical adenopathy); (2) antibiotic treatment, and (3) throat culture result. Cultures were considered positive if a  $\beta$ -hemolytic bacitracin-sensitive streptococcus of any serotype was identified. For each patient, a modified Breese score<sup>14</sup> based on the percentage of positive throat cultures associated with the presence or absence of each physical finding was computed (Table 1). Sensitivity, specificity, and positive and negative predictive values were calculated by standard methods.<sup>16</sup> Statistical significance was determined by chi-square analysis.

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From the Sections of Emergency Services and Infectious Diseases, Department of Medicine, Rush-Presbyterian-St. Luke's Medical Center, Chicago, Illinois. Requests for reprints should be addressed to Dr. Paul S. Heckerling, Rush-Presbyterian-St. Luke's Medical Center, 1753 W. Congress Parkway, Chicago, IL 60612.

**Table 1. Percentage of Positive Cultures and Modified Breese Score\* Associated With Clinical Findings**

Clinical Signs	Number of Patients	Percentage With Positive Cultures	Modified Breese Score
Fever present	56	41.0	4
Fever absent	55	12.5	1
Pharyngeal exudates present	48	39.6	4
Pharyngeal exudates absent	63	17.5	2
Anterior cervical adenopathy present	38	42.1	4
Anterior cervical adenopathy absent	73	19.2	2

\*Scores were derived by determining the percentage of positive cultures found to be associated with the presence or absence of any clinical finding, dividing this percentage by 10, and rounding off to the nearest integer

## Results

Of a total of 111 patients who presented with pharyngitis, 30 (27 percent) had a positive throat culture. Of the positive cultures, 22 (73 percent) were Lancefield group A, 7 (23 percent) were non-group A, and 1 (3 percent) was not typable.

Fever, pharyngeal exudate, and the combinations of fever and exudate alone or with tender anterior cervical adenopathy were found significantly more frequently in patients with streptococcal than nonstreptococcal pharyngitis (Table 2). Pharyngeal erythema was equally common in both groups (Table 2). Clinical findings were not sufficiently discriminatory to separate culture-positive from culture-negative patients (Table 3). The triad of fever, exudate, and adenopathy, found in 14 percent of patients, had a positive predictive value of 67 percent but a sensitivity of only 33 percent, thus failing to detect two out of

every three cases of streptococcal pharyngitis. The absence of all three findings, found in 24 percent of patients, was 95 percent predictive of nonstreptococcal disease, and only 3 percent of culture-positive patients were misclassified as culture negative. Clinical findings could also not discriminate patients with streptococci of Lancefield group A from all other patients. The combination of fever, exudate, and adenopathy was only 47 percent predictive of group A streptococcal pharyngitis.

The modified Breese score (Table 1) did not improve discrimination of streptococcal and nonstreptococcal sore throat. Scores greater than or equal to 8, 9, or 10, found in the majority of patients, had positive predictive values of only 39 percent, 43 percent, and 49 percent, respectively.

Of 60 patients treated with antibiotics at the time of their emergency room visit, only 20 subse-

Clinical Signs	Patients With Positive Cultures No. (%)	Patients With Negative Cultures No. (%)	Level of Statistical Significance (P)
Fever	23 (77)	33 (41)	<.001
Pharyngeal erythema	22 (76)	58 (77)	n.s.
Pharyngeal exudates	19 (63)	29 (36)	<.01
Fever and exudates	14 (47)	14 (21)	<.001
Fever, exudates, and anterior cervical adenopathy	10 (33)	5 (6)	<.001

Clinical Signs	Sensitivity	Specificity	Positive Predictive Value
Fever	77	59	41
Pharyngeal exudates	63	64	40
Fever and exudates	47	83	50
Fever, exudates, and anterior cervical adenopathy	33	94	67

quently proved to be culture positive. Ten of the 30 patients who ultimately proved to have streptococcal pharyngitis had not received antibiotics after clinical evaluation. The association between having a positive throat culture and having received antibiotic treatment was not statistically significant ( $.25 > P > .10$ ).

## Discussion

Clinical findings could not predict the presence of  $\beta$ -hemolytic streptococci in throat cultures of adult emergency room patients with pharyngitis.

Individual signs such as fever or pharyngeal exudate, although statistically associated with a positive culture, were relatively nonspecific and were present in many patients with nonstreptococcal disease. Combinations of signs, such as fever plus exudate or fever plus exudate plus tender anterior cervical adenopathy, were highly specific but quite insensitive, falsely excluding greater than 54 percent and 66 percent of cases of streptococcal pharyngitis, respectively. These results confirm the findings of others that clinical signs do not reliably distinguish adult<sup>7,8</sup> or pediatric<sup>5,6</sup> patients with positive and negative throat cultures.

These results differ, however, from those of Breese,<sup>14</sup> who found that a clinical score could

accurately predict throat culture results in a pediatric population. A Breese score of greater than 30 was 83 percent sensitive and 72 percent specific for streptococcal pharyngitis. The prevalence of streptococcal disease in his patients was 54 percent, considerably in excess of reported frequencies of 15 to 20 percent in adults<sup>7,8</sup> and of 35 percent in other pediatric populations.<sup>5,17</sup> A test with the sensitivity and specificity of the Breese score, when applied to a population similar to the study population reported here with a 27 percent prevalence of streptococcal disease, would correctly predict a positive throat culture only 52 percent of the time. To reliably distinguish culture-positive from culture-negative pharyngitis in an adult population, clinical parameters with substantially greater sensitivity and specificity than this score would be required. Neither these data nor those of others<sup>7,8</sup> support the existence of such parameters.

The decision to initiate antibiotic treatment did not significantly correlate with subsequent isolation of streptococci from the pretherapy throat culture. Although physician strategies for management of pharyngitis may differ, it is likely that this lack of correlation reflects to some extent their inability to predict which patients did or did not have streptococcal disease.

In a pediatric population, agreement has been noted between the bacitracin disc method and the Lancefield precipitin technique in 96 percent of  $\beta$ -hemolytic streptococcal isolates.<sup>18</sup> On this basis, other studies in adults<sup>7,8</sup> have classified  $\beta$ -hemolytic colonies inhibited by a bacitracin disc as "group A." Over 23 percent of the isolates in this study that exhibited  $\beta$ -hemolysis and bacitracin sensitivity, however, were Lancefield typed as non-group A. In this patient population, therefore, a strategem of treating streptococcal pharyngitis solely to prevent rheumatogenic complications would necessitate serotyping all  $\beta$ -hemolytic bacitracin-sensitive isolates to identify those that are group A.

In conclusion, the majority of adults with pharyngitis in an ambulatory emergency room population cannot be segregated into culture-positive and culture-negative cases on the basis of clinical findings or derived clinical scores. The minority without signs of fever, pharyngeal exu-

date, or adenopathy will almost uniformly prove to have nonstreptococcal disease and may not require throat culture or treatment.

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