
Family Practice Forum

Managing Pharyngitis Without the Throat Culture

Richard K. Tompkins, MD
Seattle, Washington

Evaluating and treating patients with pharyngitis is a common, routine activity for all providers of primary medical services. Sore throat is the third most common symptom that causes patients to visit a physician's office (lower extremity and back pain rank first and second), and in 1975 was responsible for an estimated 15.3 million office visits.¹

All of the effort and resources devoted to pharyngitis management are concerned with essentially one objective: to diagnose and treat patients with group A streptococcal infection. This illness has been shown to be the predisposing factor for acute rheumatic fever and acute glomerulonephritis; it is one cause of severe local infections (eg, peritonsillar abscess); and prompt treatment can prevent most of its complications and limit its spread. The throat culture is the only diagnostic test which, practically, can distinguish accurately between streptococcal and other forms of pharyngitis. Currently accepted medical care standards recommend culturing all patients with sore throat and treating with penicillin those whose cultures are positive for group A streptococci.² This straightforward approach, however, is often not used in practice, is unrealistic in many

medical care settings, and is not necessarily the most cost effective strategy for most patient populations. In actuality, therefore, patients with pharyngitis are evaluated and treated in many different ways and, because the disease is so prevalent, the medical decisions have enormous impact:

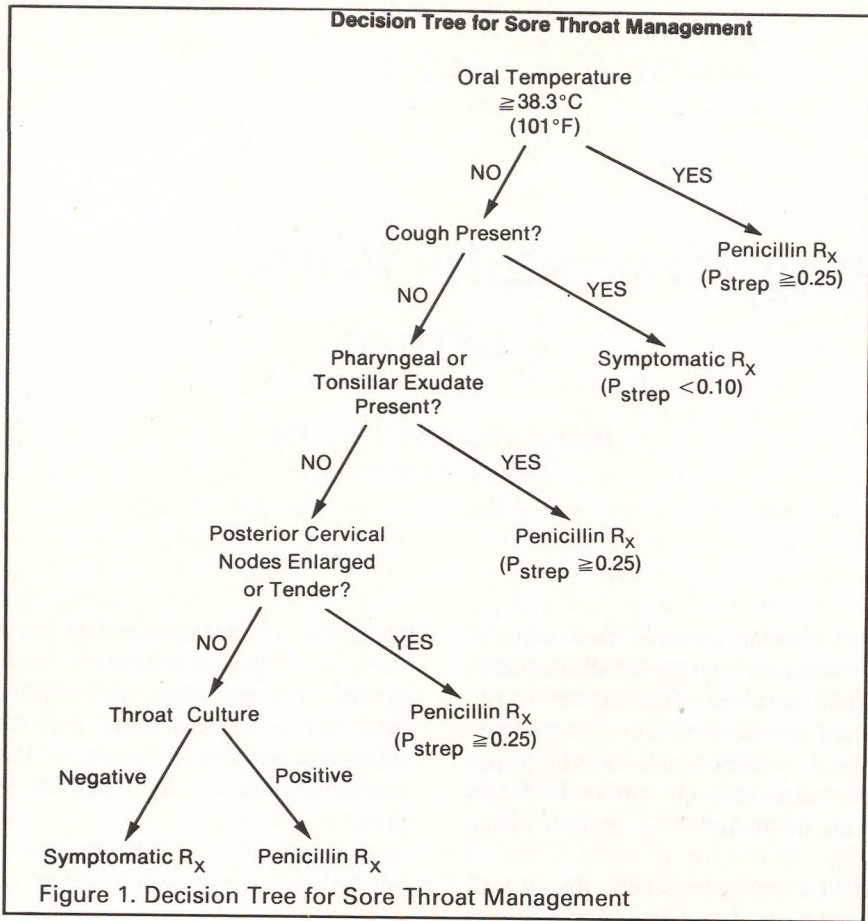
1. Pharyngitis and respiratory tract illness in general are major determinants of antimicrobial use.

2. Large sums of money are spent each year on pharyngitis management; a minimal estimate of medical care costs is about \$300 million annually.³

3. Pharyngitis management not only costs dollars but also consumes valuable human resources. Patient time is lost seeking care; provider time that might be used in addressing other health problems goes into pharyngitis management; microbiology laboratories or office technicians must process large numbers of throat cultures; clerical personnel have to handle the throat-culture paperwork and contact patients with throat-culture results.

In this issue of *The Journal of Family Practice*, Dr. Clive Caplan presents a case for eliminating throat cultures in the management of patients with pharyngitis, and he urges that treatment decisions be made solely on clinical findings (history and physical examination). A similar argument has been made after detailed analysis of the cost effectiveness of alternative pharyngitis management

From the US Public Health Service Hospital, Seattle, Washington. Requests for reprints should be addressed to Dr. Richard K. Tompkins, US Public Health Service Hospital, PO Box 3145, Seattle, WA 98114.



strategies.³ Selecting appropriate clinical strategies for pharyngitis is possible if certain constraints are observed.

There is no single clinical finding which by itself can separate streptococcal from nonstreptococcal pharyngitis.⁴ Those that are adequately sensitive (eg, age, pharyngeal erythema, cervical adenitis), lack specificity and, if used by themselves alone to determine treatment, would inappropriately treat 70 percent of the patients. Conversely, those attributes that are most specific (eg, recent streptococcal exposure, temperature of 38.3 C) are not adequately sensitive and, if used alone, would miss many streptococcal-positive patients. Additionally, some attributes are not reproducible, such as "history of streptococcal exposure" and "enlarged or tender cervical nodes;" important

throat abnormalities are also not very reproducible, although physicians do agree on these significantly more than by chance alone.⁹ Combining attributes into decision rules or algorithms can overcome some of the deficiencies noted above; that is, an acceptable sensitivity can be maintained while increasing specificity, predictive value, and overall accuracy. Treatment decisions based on combinations of attributes can be at least 70 percent as accurate as basing treatment on throat-culture results.

Noteworthy is the potential utility of Gram-stain examination of a pharyngeal swab. Crawford, Brancato, and Holmes⁵ have developed and evaluated an easily performed, reproducible, and inexpensive (about \$2) diagnostic test, the results of which can be available within minutes. A penicillin

treatment decision based on the pharyngeal Gram stain is superior to decision rules based only on historical and physical examination criteria; its use results in few streptococcal-negative patients receiving antibiotics (specificity = 0.96). When used jointly with appropriate clinical criteria for patient selection, it should permit early penicillin treatment for most streptococcal-positive patients at a cost per patient well below that of the throat culture. If the authors' results are confirmed, the pharyngeal swab Gram stain may simplify the medical management of sore throat patients.

Clinical strategies also have the appeal of potentially reducing the number of patients needing contact with a medical care provider. For instance, Honikman and Massell⁶ showed that 81 percent of streptococcal-positive children had pure or predominant sore throat and a temperature above 37 C, or they had temperatures of 38.3 C (101 F) with or without other symptoms. The remaining patients had only a 3 percent chance of being streptococcal-positive, and, furthermore, comprised 70 percent of the entire population. Based on cost effectiveness analysis,³ these latter children would not benefit enough from treatment to warrant the expense and risk of medical evaluation or intervention. Adequate telephone triage potentially could prevent these children and their families from making an unnecessary office visit. Walsh et al⁴ demonstrated a similar situation in an adult population: 33 percent of patients with sore throat lacked a history of streptococcal exposure, had a cough, and their oral temperature was less than 37.8 C (100 F). These patients had only a five percent risk of being streptococcal-positive, which is not high enough to warrant medical evaluation.

Figure 1 presents a decision tree for adults with sore throats that, in one population of 1,338 adults,⁷ would have correctly treated 81 percent of the patients, with a sensitivity of 0.86 and a specificity of 0.80. If these same adult patients had telephoned before coming to the clinic, the decision rules could have permitted a treatment decision for 51 percent of them *without* a clinic visit. Of the patients with streptococcal pharyngitis, 74 percent would have received antibiotic treatment on the same day; only 32 percent of all patients would have required a throat culture. Because of potential differences between patient populations, this strategy's efficacy should be validated prospectively (before being implemented in other clinical

sites) by obtaining throat cultures on the initial 300 to 400 patients. This will permit calculation of the population-specific sensitivity, specificity, and overall accuracy, as well as the predicted positive throat culture rate (P strep, Figure 1) for each end point in the decision tree. If an end-point's P strep falls within the expected range, and the throat culture costs at least \$2.00, then the recommended decisions are cost effective. Should the pharyngeal Gram stain be available and its use routine and accurate, it could be used to replace the throat culture and also refine the penicillin treatment decisions, with the expectation that treatment accuracy would improve and more patients would be treated at the initial office visit. The sore throat patients may need to be evaluated for other treatable diseases not addressed by this decision tree, such as otitis media, sinusitis, and pneumonia. Algorithms have been defined and evaluated which give decision rules for all adult respiratory illness patients,^{7,8} but their content is beyond this discussion.

References

1. Ambulatory medical care rendered in physicians' offices: United States, 1975. In National Center for Health Statistics (Hyattsville, Md): Advance Data from Vital and Health Statistics, No. 12. DHEW publication No. (HRA) 77-1250. Government Printing Office, 1977
2. Kaplan EL, Bisno A, Derrick W, et al: Prevention of rheumatic fever. *Circulation* 55:1, 1977
3. Tompkins RK, Burnes DC, Cable WE: An analysis of the cost-effectiveness of pharyngitis management and acute rheumatic fever prevention. *Ann Intern Med* 86:481, 1977
4. Walsh BT, Bookheim WW, Johnson RC, et al: Recognition of streptococcal pharyngitis in adults. *Arch Intern Med* 135:1493, 1975
5. Crawford G, Brancato F, Holmes KK: Streptococcal pharyngitis: Diagnosis by gram-stain. *Ann Intern Med*, in press
6. Honikman LH, Massell BF: Guidelines for the selective use of throat cultures in the diagnosis of streptococcal respiratory infections. *Pediatrics* 48:573, 1971
7. Tompkins RK, Wood RW, Wolcott BW, et al: The effectiveness and cost of acute upper respiratory illness medical care provided by physicians and algorithm-assisted physicians' assistants. *Med Care* 15:991, 1977
8. Greenfield S, Bragg FE, McCraith DL, et al: An upper respiratory complaint protocol for physician extenders. *Arch Intern Med* 133:294, 1974
9. Wood RW, Diehr P, Wolcott BW, et al: Reproducibility of clinical data and decisions in the management of upper respiratory illnesses: A double-blind comparison of physicians and non-physician providers. *Med Care*, in press