# PRACTICE OBSERVED

## *Practice Research*

# Rational decisions in managing sore throat: evaluation of a rapid test

PETER BURKE, JOHN BAIN, ANDREW LOWES, ROGER ATHERSUCH


### Abstract

**Sixty nine general practitioners recorded what they had prescribed for a total of 1189 episodes of sore throat. Antibiotics were prescribed in 763 (64%) episodes and broad spectrum antibiotics in 161 (21%) of these. If there was dysphagia, hoarseness, cervical adenopathy, and inflamed or purulent tonsils a prescription was more likely to be written. An enzyme immunoassay rapid test was evaluated as a means of rationalising prescribing. Among 23 general practitioners and 250 patients the sensitivity of the test was 63% and the specificity 91·7% compared with 74% and 58% for clinical assessment alone. Test results rarely caused previous prescribing decisions (155 (13%) episodes) to be altered.**

**We suggest that the time is not ripe for the use of the enzyme immunoassay rapid test on a wide scale in the routine assessment of sore throats.**


### Introduction

Sore throat is the most common respiratory symptom that patients present with in general practice, accounting for an estimated 300 consultations per general practitioner a year.[1] Most sore throats are due to viral infections and about 20% to 30% to bacterial infections. Nearly all of the bacterial infections are caused by infection with group A β haemolytic streptococcus.[2,3] The results of studies carried out in general practice have shown that antibiotics are prescribed for up to 80% of patients presenting with sore throat.[4,5] In the face of uncertainty about the diagnosis prescribing decisions are often based on social and other non-clinical factors.[5-7]

Although most general practitioners have access to laboratory facilities, throat swabs are taken in only a few cases (less than a tenth in the Southampton health district). This is largely because it takes up to 48 hours before results become available. Though delaying treatment does not increase the small risk of rheumatic fever[8] or relapse, it is associated with a longer duration of illness and a higher probability that other people in the household will become infected.[9] A quick, simple, and accurate diagnostic technique would be of help to the general practitioner: it might mean that fewer patients received prescriptions for unneeded antibiotics, and it might enable general practitioners to reassure patients with greater confidence that their condition was self limiting.

It is now possible to use rapid diagnostic tests.[10-16] These are of three types, coagglutination,[17,18] latex agglutination,[16,19-21] and enzyme immunoassay. The enzyme immunoassay system is now being marked in the United Kingdom as Abbott Test Pack Strep A. In this test streptococcal antigen is bound to a matrix, using rabbit antibodies. The procedure takes about 10 minutes, and each test costs £4.

The results of previous studies evaluating this test, carried out largely in American specialist practice, have been promising. Schwabe *et al* judged its sensitivity to be 90·0% and its specificity to be 97%.[22] There is still uncertainty whether in general practice in the United Kingdom under normal working conditions such good results would be found and whether the test would be acceptable and practicable in this setting.

The findings in previous studies have been equivocal on the extent to which prescribing decisions are influenced by the use of rapid tests.[15,23] This was therefore a secondary question in our study.

The aims of our study were to: (*a*) describe general practitioners' prescribing behaviour for sore throat; (*b*) assess the sensitivity and

**Department of Primary Medical Care, University of Southampton, Aldermoor Health Centre, Southampton SO1 6ST**
PETER BURKE, MRCPI, MRCGP, senior lecturer
JOHN BAIN, MD, PHD, professor

**Public Health Laboratory Service, Southampton General Hospital**
ANDREW LOWES, MRCP, MRCPATH, consultant
ROGER ATHERSUCH, BSC, FIMLS, scientific officer

Correspondence to: Dr Burke.

specificity of the rapid diagnostic test and compare this with the sensitivity and specificity of clinical assessment; and (*c*) determine whether the availability of the test influences prescribing behaviour in general practice.

## Methods

### PHASE 1

Members of the Wessex faculty of the Royal College of General Practitioners were invited to participate in a study of antibiotic prescribing for sore throat. Ninety two general practitioners expressed an interest, and 69 were selected to represent a variety of urban, rural, group, and single handed practices. Each was asked to record information on study cards on presenting symptoms and signs in 20 consecutive episodes of sore throat in patients aged 10 to 45 years of age.

### PHASE 2

The rapid diagnostic test was made available to seven group practices which were not participating in phase 1 and which employed a treatment room nurse. The nurse was trained how to use the test by a company representative. The general practitioners were then invited to enter patients into the study who (*i*) had a new primary complaint of sore throat and (*ii*) had erythema of the fauces with or without tonsillar enlargement, pus, or cervical lymphadenopathy.

The general practitioner completed a form stating the clinical findings and what treatment he or she would normally give the patient. The nurse then swabbed the throat twice using cotton swabs. She carried out the rapid test on one of the swabs in accordance with the manufacturer's instructions.[22] When the result of the test was available the patient was reviewed by the general practitioner, who decided on the treatment.

The second swab, preserved in Ames's transport medium, was sent to the laboratory. It was streak plated onto two bilayered horse blood agar plates: one selective (gentian violet 2·25 mg/l and nalidixic acid 50 mg/l) and incubated anaerobically and the other unselective and incubated aerobically. After incubation plates were scrutinised for β haemolytic streptococci, confirmed by Gram's stain, and then Lancefield grouped. Any growth of group A β haemolytic streptococci was graded from +/− (colonies on the inoculum only) to +++ (colonies on the third streak). Where possible plates and swabs were kept for one week and reappraised in the event of discordance with the rapid test result.

The patient record cards, the results of rapid antigen test, and laboratory reports were returned to the investigators for analysis.

## Results

### PHASE 1

The 69 doctors recorded information on 1189 consecutive patients; 763 (64·2%) received an antibiotic, and in 426 (35·8%) symptoms only were treated. There was a wide range of prescribing rates from 20% to 100%. Table I gives the presenting symptoms and signs that were recorded for antibiotic and non-antibiotic use in 1189 patients. The presence of dysphagia, hoarseness, earache, cervical adenopathy, halitosis, and large inflamed tonsils with pus or exudate were all associated with a statistically significantly increased likelihood of an antibiotic being prescribed. Cough was associated with significantly less antibiotic prescribing.

TABLE I—*Presenting symptoms and signs in 1189 patients*

| Symptom or sign | No with symptom or sign | No (%) prescribed an antibiotic | 95% Confidence intervals |
|---|---|---|---|
| Sore throat | 1189 | 763 (64·2) | 61·5-66·9 |
| Dysphagia | 626 | 471 (75·0) | 71·6-78·4 |
| Hoarseness | 317 | 223 (70·3) | 65·3-75·3 |
| Cough | 297 | 115 (38·7) | 33·2-44·2 |
| Earache | 245 | 208 (84·9) | 80·4-89·4 |
| Inflamed tonsils | 1002 | 700 (69·9) | 67·1-72·7 |
| Enlarged tonsils | 338 | 289 (85·5) | 81·7-89·3 |
| Pus on tonsils | 332 | 314 (94·6) | 92·3-96·9 |
| Halitosis | 137 | 126 (92·0) | 87·5-96·5 |
| Tender/enlarged nodes | 630 | 524 (83·2) | 80·3-86·1 |

Table II shows which antibiotics the general practitioners chose. There was a wide variation, with 13 general practitioners choosing four or more drugs. Penicillin V accounted for 69·3% of the antibiotics prescribed, broad spectrum antibiotics for 21%, and erythromycin for 9·6%.

TABLE II—*Use of antibiotics in the treatment of sore throat in 763 patients*

| Antibiotic | No (%) of times prescribed |
|---|---|
| Penicillin V | 529 (69) |
| Amoxycillin/clavulanic acid | 86 (11) |
| Erythromycin | 73 (9·6) |
| Tetracycline | 21 (2·8) |
| Pivampicillin | 21 (2·8) |
| Co-trimoxazole | 12 (1·6) |
| Cephalosporin | 10 (1·3) |
| Phenethicillin | 9 (1·2) |
| Flucloxacillin | 2 (0·3) |

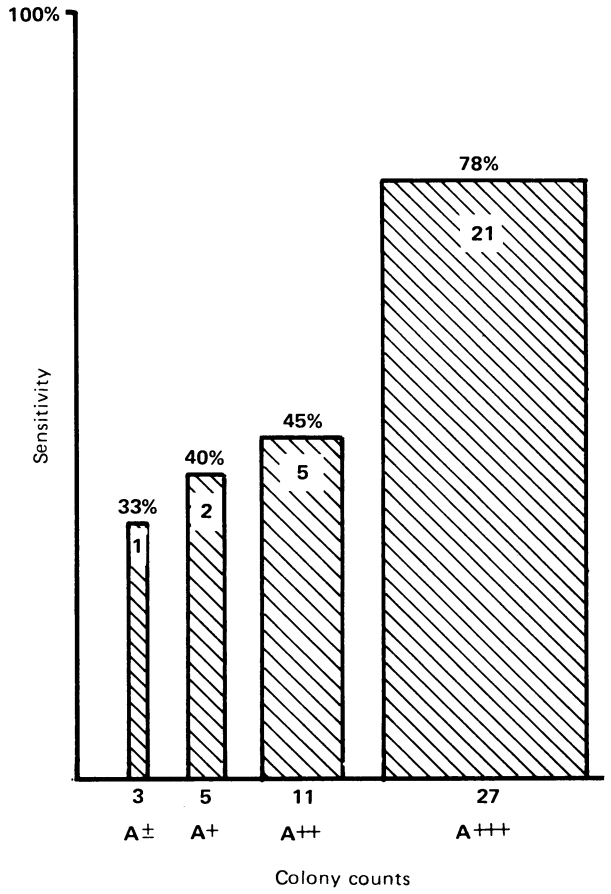


FIG 1—Sensitivity for various colony counts of group A β haemolytic streptococci.

### PHASE 2

Between October 1986 and June 1987 23 general practitioners in seven practices recruited 272 patients for a study of the rapid test. It was not possible to analyse the records of 22 patients, leaving a total of 250 records for study. Forty six patients (18%) had positive rapid tests, and 46 were found to have group A β haemolytic streptococci on culture. There were an additional 28 patients from whose throats bacteria were cultured: β haemolytic streptococci of group B (nine), group C (two), group D (one), group F (two), group G (nine), other groups (three), and staphylococci (two).

#### *Accuracy of the test*

The test was concordant with the results of laboratory culture in 216 of 250 patients (accuracy 86·4%). Of the 46 patients with proved group A

haemolytic streptococcal infection 29 were positive on the rapid test, which yields a sensitivity of 63%. Of the 204 patients who did not have group A on culture, 17 were positive on the rapid test and 187 negative. This yields a specificity of 92%.

Predictive values were calculated as 63% for a positive test and 92% for a negative test. Figure 1 shows that the sensitivity of the test increases in proportion to the colony count. Sensitivity figures were obtained for each month of the study and these showed a gradual increase, which may indicate a learning effect.

For the 17 patients with "false positive" reports on the rapid test it was possible to reculture seven swabs, and of these, one showed a light growth of group A. If this patient is taken into account the sensitivity of the test rises to 64% and the predictive value to 65%.

*Rapid test v clinical assessment*

There were 119 patients for whom the general practitioner would have chosen an antibiotic on clinical assessment alone. These included 34 of the patients whose cultures were positive and 36 of the patients in whom the rapid test was positive (fig 2).

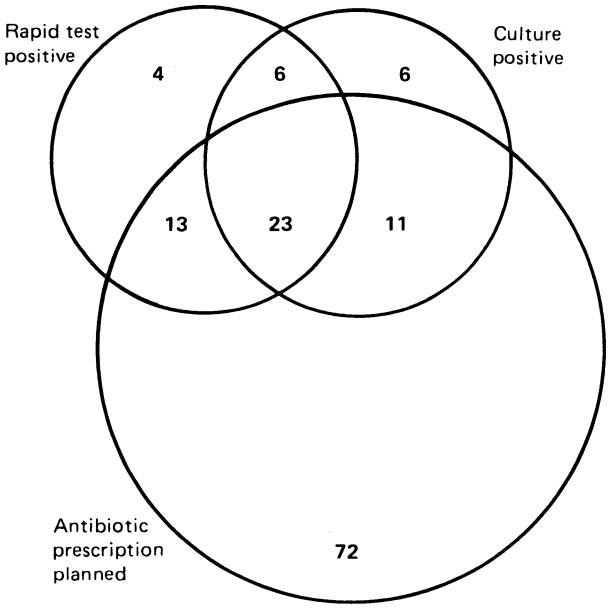


FIG 2—Distribution of test results, culture results, and prescribing intention for 250 patients.

Based on these figures, clinical assessment was correct in 61·2% of cases, and correctly identified 74% of positive results (fig 3)—that is, its sensitivity was somewhat higher than that of the rapid test. Its specificity however, was only 58%, owing to the relatively high rate of clinical "false positives."

*Influence on prescribing decisions*

One hundred and nineteen patients (48%) had been selected for antibiotic treatment. In the event 109 (44%) received antibiotics after the test result was known. In 34 patients there was a change in the prescribing decision: in favour of prescribing in 12 and against it in 22. This change was correct, as judged by the results of laboratory culture, in 22 of the 34 patients. The number who would have received an unneeded antibiotic fell from 34% (85) to 30% (75).

## Discussion

In phase 1 of the study general practitioners' decisions to prescribe antibiotics for sore throat were influenced by specific symptoms and signs. The presence of dysphagia, abnormalities in the tonsils, and tender enlarged cervical glands all led to a statistically significantly higher likelihood of antibiotics being prescribed. But if cough was present this was associated with a significant reduction in the use of antibiotics. These findings are in accordance with the work of Platts *et al*[24] and with studies from the United States,[25,26] all of which emphasised that the presence of pharyngeal exudate and enlarged or tender cervical glands and the absence of cough favoured positive culture of group A β haemolytic streptococci.

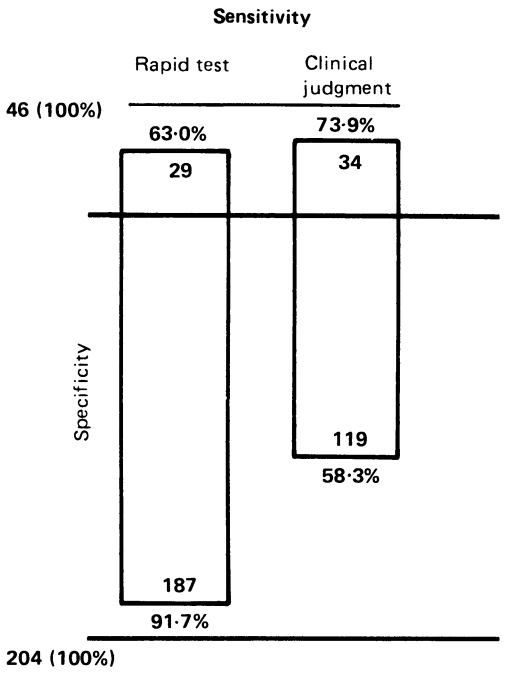


FIG 3—Sensitivity and specificity of enzyme immunoassay rapid test and of clinical assessment.

In the absence of the results of throat swabs we cannot assess whether the clinical judgment of the Wessex general practitioners was satisfactory although it seems that they used criteria for prescribing that are associated with a greater or lesser likelihood of streptococcal infection. One disturbing feature of the findings was that a fifth of the antibiotics prescribed were broad spectrum antibiotics. The likelihood that there was infection with bacteria which required treatment with such antibiotics is negligible and does not justify the additional cost and possible side effects.

In phase 2 of the study one of the aims was to find out whether a rapid test was superior to clinical judgment in managing sore throat. Based on the result of first culture the number of false positives by the rapid test was equal to that of false negatives. This resulted in specificity figures that were comparable with those in other studies[22] and considerably better than those that would have been achieved by clinical judgment alone. None the less the sensitivity of the test in our study was disappointing.

One possible explanation for this is technique. The test may have been performed suboptimally, and the gradually improving sensitivity during the study may be indicative of this. Secondly, throat swabs for both analyses were taken in random order. It is conceivable that as a result of the patient gagging the second swab taken carried fewer organisms than the first.

We expected that the use of the results of a rapid antigen test would lead to fewer prescriptions being written. Even where the test indicated the absence of group A β haemolytic streptococci the general practitioners changed their prescribing decisions in relatively few cases. This may be because they were already fairly low prescribers with an initial prescribing rate of 48%. Among general practitioners who write a lot of prescriptions for antibiotics the use of an accurate rapid diagnostic test might have a greater influence on prescribing habits. Our investigations of this rapid test suggest that the sensitivity is not sufficiently high to warrant regular use in general practice. The cost (£4 per test) is an additional deterrent,

though it might be justified if the test was available on an ad hoc basis for the few patients in whom a previous decision has been made that prescribing would be based solely on the outcome of the test. This would result in little use and be uneconomical for the average group practice because of quantity and shelf life.

In the treatment of uncomplicated sore throat our priorities must include reducing overall prescribing rates and avoiding indiscriminate use of broad spectrum antibiotics. Despite recent reports of isolated outbreaks of complicated streptococcal infections from the United States[27 28] there is good evidence from studies in the United Kingdom that antibiotics have a limited role in preventing glomerulonephritis and rheumatic fever.[29 30]

While improvements in the sensitivity of rapid antigen tests would be valuable to doctors who seek diagnostic precision, clinical assessment based on a combination of symptoms and signs remains an acceptable alternative.

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# Survey of general practitioners' treatment of the discharging ear

R C BICKERTON, C ROBERTS, J T LITTLE


## Abstract

**The prescribing habits of all (401) general practitioners in the North Staffordshire health district for the treatment of otorrhoea was ascertained by questionnaire; 301 (75%) responded. Of those, 198 (66%) would not give topical treatment when the tympanic membrane was perforated. Only 41 (14%) would give topical treatment in cases of discharging grommets. Although there is a theoretical risk of ototoxicity to aminoglycosides in topical preparations, this is the most effective medical treatment and is the standard teaching advocated in specialist textbooks and practised by otolaryngologists.**

**The results of the survey suggest that there is undue concern about possible ototoxicity and a degree of confusion in the management of this common clinical condition.**


**North Staffordshire Royal Infirmary, Stoke-on-Trent ST4 7LN**
R C BICKERTON, FRCS, senior registrar
C ROBERTS, FRCS, registrar
J T LITTLE, FRCS, consultant otolaryngologist

Correspondence to: Mr R G Bickerton, Birmingham Ear, Nose and Throat Hospital, Birmingham B3 3HH.

## Introduction

Both the general practitioner and the otolaryngologist commonly see and treat patients with a discharging ear. This condition occurs in, for example, otitis externa, active chronic suppurative otitis media with a perforated tympanic membrane, and cases of infected grommets.

The standard medical treatment recommended by all recognised textbooks of otolaryngology is adequate aural toilet and periodically instilling a topical preparation containing an antibiotic and steroid solution.[1 2] The use of systemic antibiotics is invariably ineffective as chronic infection results in fibrosis, so preventing adequate concentrations of antibiotic reaching the site of disease.[3]

The otolaryngologist who is confronted with a case of otorrhoea secondary to a tympanic membrane defect and infection will follow the guidelines laid down in the standard textbooks. The treatment includes instilling a topical preparation, despite the theoretical risks to the inner ear from the use of potentially ototoxic aminoglycosides in the solution.[4]

The number of requests that we have received from general practitioners asking for advice about the most effective method of treating otorrhoea suggested there was some confusion about the correct management.

We therefore decided to find out how a population of general practitioners treated the discharging ear and what were the attitudes that influenced treatment.