

# Evaluation of a commercial kit for detection of *Streptococcus pyogenes* in a burns unit

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## Summary

The presence of *Streptococcus pyogenes* (group A *Streptococcus*) may increase morbidity in burns patients. A rapid detection system enabling early therapeutic intervention is therefore desirable. A commercial kit (Wellcome Diagnostics Reveal Colour Strep A) was evaluated in a burns unit. Two separate studies were undertaken. The first compared two swabs taken from a particular burn site, one of which was cultured conventionally and the other processed for rapid detection. In the second study, swabs were processed routinely and then subjected to the rapid detection test in order to assess reproducibility of results. In our hands the rapid test was easy to perform and correlated well with conventional culture. We recommend the use of a rapid detection system for *S. pyogenes* as a useful adjunct to conventional culture methods.

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The presence of *Streptococcus pyogenes* may pose a serious problem for the surgeon in a burns unit.<sup>1</sup> Wound swabs processed in a bacteriology laboratory take 24 - 48 hours before results are available, a delay that may lead to increased patient morbidity and even mortality.

Several commercial kits are now available that enable the rapid detection of this organism at the patient's bedside.<sup>2,3</sup> We

evaluated the reliability of the Wellcome Reveal Colour Strep A kit in both a clinical setting as well as in a bacteriology laboratory.

Although bedside identification of *S. pyogenes* has been studied in throat swabs, we believe this study is the first involving patients in a burns unit.<sup>2,3</sup>

## Material and methods

The investigation comprised two separate studies of burn wounds. In the clinical study swabs were taken by the nursing staff in the Burns Unit. All wounds were cleaned with saline before sampling and were then dressed with povidone iodine or silver sulphadiazine. One swab was sent in transport medium to the bacteriology laboratory for culture — a process that took up to 24 hours. The other swab was tested with the Wellcome Diagnostics Reveal Colour Strep A kit within 1 hour of 'taking'. A total of 256 (2 × 128) swabs were taken. Results obtained by the kit were compared with the culture results reported by the laboratory.

In the laboratory study, swabs were received in transport medium, cultured by conventional methods, then returned to their containers and stored at room temperature. Streptococci were identified using bacitracin-sensitivity patterns as well as Phadebact grouping antisera. Growth of the organisms were quantified from 1+ to 3+ according to accepted practice.<sup>4</sup> With culture results known, 50 of these swabs were subjected to the commercial test according to the manufacturer's specifications.

## Results

In the clinical study of 126 specimens (Table I), 7 swabs (5.5%) were positive and 119 were negative for *S. pyogenes* with the rapid identification system. All positive results were confirmed by culture. Three tests (2.4%) were false-negative

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TABLE I. RESULTS OF CLINICAL STUDY (126 SPECIMENS)

Culture	RK	No. of specimens
Positive	Positive	7
Negative	Negative	116
Positive	Negative	3*
Negative	Positive	0

\*Only 1+ growth of *S. pyogenes*.  
RK = Reveal kit.

when compared with culture results. However, all three cultures were assessed as having only 1+ growth of the organism. No false-positive results were encountered when compared with the culture results.

In the second study, 50 tests were performed in the laboratory (Table II); 21 did not indicate *S. pyogenes* by either method. Five swabs with 1+ growth of *S. pyogenes* resulted in 1 weak positive, 1 nonspecific reaction and 3 negative results. In 23 swabs 2+ and 3+ growth of the organism resulted; these were all positive using the rapid identification system. One swab with 3+ growth of group B streptococci gave a positive result with the kit.

TABLE II. RESULTS OF LABORATORY STUDY (50 SPECIMENS)

Culture	RK	No. of specimens
Positive	Positive	24
Positive	Negative (NS)	4*
Negative	Negative	21
Negative	Positive	1†

\* One nonspecific reaction (NS) and 3 negative reactions with 1+ growth of *S. pyogenes*.  
† 3+ growth of streptococcus group B.  
RK = Reveal kit.

## Discussion

*S. pyogenes* is ubiquitous and the isolation of this organism occurs in approximately 7% of patients admitted to the burns unit at Woodstock Hospital, which is part of the Groote Schuur Hospital group. The incidence is similar to that reported in another major burns unit in South Africa.<sup>5</sup> The presence of *S. pyogenes* may bring about rapid deterioration of a wound with progression to death of the patient. In a burn wound this organism may convert a superficial burn to a deep burn; it can also lead to graft lysis and convert a donor site to a full thickness injury.<sup>1</sup> Thus rapid identification of this organism and appropriate treatment is imperative in diminishing patient

morbidity and mortality. Pus swabs take 24 - 48 hours to process by culture methods, hence the search for a more rapid method of identification. Approximately 20 kits are now commercially available for the detection of *S. pyogenes* at the patient's bedside.<sup>6</sup> The Wellcome kit is an example of these, whereby extracted antigen can be detected directly from clinical material.

The group A streptococcal antigen, a carbohydrate component of the cell wall, is first extracted by the nitrous acid technique and then agglutinated with latex particles coated with specific group A streptococcal antibody. Latex particles coated with non-immune globulin are included in the reagent, providing a built-in negative control for each test. The two types of latex particles are of different colours, which further enhances interpretation of the agglutination result.

Rayon swabs were used for this study. These have been reported to yield better results than other swabs.<sup>7</sup> Dry swabs are recommended by the manufacturer as most suitable. However, all our tests were performed using swabs that had first been placed in transport media. Despite the potential loss of organisms in the laboratory study, where swabs were first used for culture, satisfactory results were still obtained.

The sensitivity of the kit was 100% with specimens yielding 2+ or more growth of *S. pyogenes*. One false-positive result was obtained; however, this occurred with a 3+ growth of group B *Streptococcus* and may be explained by sharing of antigenic components.

False-negative results were recorded when only 1+ growth was documented. This finding concurs with the manufacturer's stated experience as well as results in published reports on the use of other kits.<sup>2,3</sup>

In our hands the test is easy to perform and interpret. It can readily be performed at the patient's bedside, yielding results in approximately 5 minutes. However, since some specimens yield a very light growth of *S. pyogenes*, which may possibly not be detected using a rapid detection system, we feel that it is still important to obtain confirmation by conventional culture methods.

In our opinion rapid identification systems, such as the Reveal kit, are of invaluable assistance to the surgeon in a burns unit.

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