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or other inappropriate initial therapy. Inappropriate therapy promotes
standard clinical lab cultures require 2-3 days. Identifiable risk factors
in frequency. For critically ill patients, the physician must begin therapy
suboptimal/redundant therapy observed while awaiting results from conventional cultures.

numbers of bacteria from clinical isolates with an inoculum size compatible with direct ex
new method could have raised the active/optimal rate from 46% to 97%, reduced the inac-
57/208 (27%) days were inactive. If it had been used directly with patient specimens, the
apy were considered active/optimal; 55/208 (26%) days were suboptimal/redundant; and
respectively. For 50 charts reviewed, 208 days of therapy were prescribed
incorrectly classified isolates were small colony variants from the same patient. Sensitivity
Results:

Prescriptions actually used were categorized as active/optimal, suboptimal/
the 3 days that followed original specimen collection while the clinical lab performed culture

ame the potential impact of rapid phenotype identification on an

MATERIALS & METHODS

INTRODUCTION

Infections due to methicillin resistant S. aureus (MRSA) are increasing in frequency. For critically ill patients, the physician must begin therapy
within a few hours of deciding for the need of intervention. However, standard clinical lab cultures require 2-3 days. Identifiable risk factors
for MRSA are not always evident, prompting empiric use of vancomycin or
other inappropriate initial therapy. Inappropriate therapy promotes emergence, selection, and spread of resistant pathogens.

Rapid phenotype identification using automated microscopy could po-
entially improve antimicrobial prescribing by identifying more appro-
imate initial therapy. Our study objectives were to —

1. Determine the sensitivity, specificity, and speed of automated mi-
croscopy to detect MRSA in clinically significant S. aureus isolates.

2. Measure the potential impact of rapid phenotype identification on an-
timicrobial prescribing.

Study Design. Retrospective chart review and concurrent microbial analysis of stored isolates using automated microscopy.

Setting. Denver Health Medical Center, a 495 bed teaching public hospital and Level 1 Trauma Center.

Study Population. 54 patients with 58 clinically significant S. aureus isolates retrieved from -70 °C storage. 50 charts were sufficiently complete to permit review.


Microbiology. Frozen SA isolates were resuspended in tryptic soy broth after 24-h growth on blood agar.

After 2-4, 20 µl aliquots of log-phase S. aureus at 1x10^6 CFU/mL were spotted onto microfluidic flowcells.

Each isolate was also tested in separate flowcell channels with no

Figure 1: 3D immobilized bacterial cultures.

RESULTS

The MRSA analytical method therefore offers potential to inte-
grate into a rapid diagnostic with same-day time to result.

If applied in a direct-from-specimen analysis, the method has the po-
tential to significantly reduce the use of injectable and subopti-
mal multidrug therapy in critically ill patients.

Limitations of the study include its retrospective design, due to current unavailability of an automated system approved for use in clinical trials. However, previous studies with direct-from-specimen BAL fluid have shown the potential for test integration.

References

resistant Staphylococcus aureus in sputum using a novel automated
system. Luminex Corporation, San Diego, CA.

Staphylococcus aureus from Bacterial Lysis Using Automated


AMENDED ABSTRACT

Background: Automated microscopy rapidly measures growth rates of total numbers of bacteria to identify MRSA. This rapid identification of this method using clini-
sical A. auris, and rodent strains, and retrospective chart review to assess potential impact of empiric prescribing. The purpose is to test a model of experimental design for future trials to determine the potential to reduce the duration of initial/suboptimal initial therapy in critically ill patients.

Methods: Frozen SA isolates were resuspended after 24-h growth on blood agar. After 2-4, 20 µl aliquots of 1x10^6 CFU/mL were spotted onto the microfluidic surface. 5000 bacteria were immobilized onto poly-L-lysine coated glass. An image analyzer processed micro-
scopy images and measured growth rates after 1-h induction by 1 µg/mL then 3-h of 6 µg/mL FOX. The MRSA analytical method therefore offers potential to integrate

Figure 2: Scatter plot of sensitivity vs specificity for automated microscopy.

Figure 3: Examples of growth control, MRSA, and MSSA growth curves.

Figure 4: Analytes of growth control, MRSA, and MSSA growth curves.

Figure 5: Predictive effect of rapid microbiological phenotyping on appropriateness of ini-
tial antimicrobial therapy. Appropriate vs empiric therapy. N= 3 after patient specimen obtained.