

USE OF SIMULATED BLOOD CULTURES FOR ANTIBIOTIC EFFECT ON TIME TO DETECTION OF THE TWO BLOOD CULTURE SYSTEMS BACT/ALERT AND BACTECTM 9240

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SUMMARY

To avoid the influence of pre-analytical steps, this study was performed using sterile blood spiked with defined loads of microorganisms as inoculum. Time-to-Detection (TTD) was evaluated for the most frequently encountered bacteria comparing two commercially available blood culture systems, BD BACTEC™ 9240 (Becton Dickinson) and BacT/ALERT™ (Organon Teknika). The effect of the most widely used antibiotics on TTD was evaluated on both systems. TTD was measured with antibiotics at their trough and at increasing concentrations.

The results show that the BACTEC PLUS system recovers more pathogens with shorter time to detection than the BacT/ALERT FAN system when beta-lactam antibiotics (Ampicillin, Cefotaxime) are present at their respective trough concentration corresponding to parenteral therapy.

The two systems seem to be equally efficient when Gentamicin, Ciprofloxacin and Trimethoprim/sulfamethoxazole are used; in the case of Vancomycin, BACTEC seems more effective than BacT/ALERT.

KEY WORDS: Blood culture, Bactec, BacT/ALERT, antibiotic effect

Received February 15, 2004

Accepted February 28, 2004

INTRODUCTION

Blood cultures are considered one of the most significant specimen types that the microbiology laboratory processes and every laboratory has strict notification policies to ensure that positive blood cultures are promptly reported to the physician (Gill *et al.*, 2000).

Reports show that the frequency of bloodstream infections is rising worldwide. The National Hospital Discharge Survey carried out in the US showed an increase of sepsis from 74 to 176 cases per 100.000 inhabitants between 1979 and 1987 (CDC, 1990). Nosocomial infections play an important role in this trend: in the US alone, 250.000 cases are reported each year (Pittet, 1997).

Septicemia attributable mortality is estimated to be around 15%, thus representing the 8th cause of death in the US (Wenzel & Edmond, 2001). Therefore rapid diagnosis and timely and appropriate empiric treatment are crucial to the outcome of septicemia.

The majority of hospitalized patients receive antibiotic treatment, either as therapy or as prophylaxis; transplanted and other immuno-suppressed patients are treated daily with one or more broad-spectrum antibiotics. There are many literature references that identify such antibiotic treatment as the cause of false negative blood cultures, e.g. in case of infective endocarditis (Werner *et al.*, 1967; Pesanti & Smith, 1979; Pazin *et al.*, 1982).

For this reason blood cultures commercial