The use of polymerase chain reaction to detect septicemia in critically ill patients.


Source
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Abstract

OBJECTIVE:

To describe the use of bacterial DNA amplification of conserved bacterial 16S ribosomal DNA nucleotide sequences by polymerase chain reaction (PCR) to detect the presence of septicemia in critically ill septic patients.

DESIGN:

Case series of blood samples from septic patients comparing the PCR results with conventional blood culture results.

SETTING:

A general intensive care unit in a tertiary referral hospital.

PATIENTS:

Two sets of samples (n = 101 and n = 55) from patients diagnosed as clinically septic and requiring blood cultures. They were classified by internationally accepted criteria into systemic inflammatory response syndrome, severe sepsis, and septic shock groups.

INTERVENTIONS:

Blood samples taken in a sterile fashion concurrently for blood culture, and PCR of the bacterial 16S ribosomal RNA gene in leukocytes and plasma. Two different DNA extraction techniques for PCR were tried sequentially.

MEASUREMENTS AND MAIN RESULTS:

Blood culture and PCR positivity were measured in relation to the clinical classification of severity of sepsis. Using the initial extraction method (n = 101), ten patients were
positive by both PCR and blood culture, eight patients were PCR positive and blood culture negative, and seven patients were blood culture positive and PCR negative. From the clinical criteria, PCR detected at least six true positives that had been missed on blood culture and missed four true Gram-positive bacteremias. When the initial code was broken, this deficiency was rectified using the improved extraction technique (n = 55), in which ten patients were positive by PCR and blood culture, 29 patients were PCR positive and blood culture negative, and two patients were PCR negative and PCR positive.

CONCLUSIONS:

We conclude that the use of PCR (for the 16S ribosomal DNA in the plasma) was significantly more sensitive than the use of conventional blood culturing techniques for the detection of bacteremia in seriously ill patients. This could prove to be a valuable adjunct to conventional blood cultures.

Comment in

- Polymerase chain reaction: a new chapter in critical care diagnosis. [Crit Care Med. 1999]

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