Title	Comparison of the BACTEC™ blood culture system with conventional culture of cerebrospinal fluid samples
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Objective - Many invasive and life-threatening infections are diagnosed by microbial culture of sterile bodyfluid specimens. The standard procedures used for conventional cultivation of bacteria and yeasts from sterile body fluids other than blood involve inoculation onto a solid medium. The aim of this study was to evaluate the Bactec blood culture system (Becton Dickinson, Sparks, MD) in comparison with the conventional culture method for microbial isolation from cerebrospinal fluid (CSF) samples.

Methods - From January 2012 to November 2013, 788 samples of CSF collected from 390 patients with the clinical suspicion of central nervous system infection (meningitis, encephalitis) or polytrauma involving central nervous system were routinely sent to the Bacteriology laboratory of the Unit of Clinical Microbiology at the University Hospital of Parma for the diagnosis of infections by bacteria and fungi.

Conventional cultures were performed on chocolate agar, blood agar, MacConkey agar plates for aerobic bacteria, and when possible depending on the volume of sample available on bile-esculine agar and Schaedler agar plates for anaerobic bacteria (KIMA, Piove di Sacco-PD, Italy) according to standard procedures; in parallel, an aliquot (1ml) of each sample was inoculated directly into an aerobic Bactec Ped Plus/F bottle added with Fastidious Organism Supplement (Becton Dickinson) which improves the opportunity for growth of fastidious organisms. When a bottle signaled a positive result by the Bactec FX instrument a Gram stain was performed and analiquot was subcultured onto conventional media.

Results - Among the 87 positive samples belonging to 51 patients analyzed, clinically significant microorganisms(mainly bacteria and in three cases fungi) were identified from 45 samples(51.72%) by both methods. For the remaining 42 specimens (48.28%), growth was detected by the Bactec system, while there was no growth onto solid media inoculated directly with the samples. No microorganism which went undetected by the Bactec system was detected by conventional cultures. The most frequently microorganisms recovered only by the Bactec system were gram-positive cocci (21coagulase-negative staphylococci, 5 *Streptococcus* spp., 1 *Kocuriakristinae* and 1 *Rothia mucilaginosa*) while the Gram-negative bacilli and Gram-positive bacteria were equally recovered by both culture methods. In two samples belonging to different patients the Bactec system alone allowed the isolation of *Staphylococcus aureus* and in eight

samples (belonging 4 patients) of Gram-negative bacilli.

Conclusion - The Bactec system was shown to enhance the detection of microorganisms in CSF *versus* conventional methods of 48.28%. Although part of these additional positive results could be likely referred as due to contamination during sample collection, we can conclude that when applied and evaluated on a wider group of samples, the Bactec blood culture system might be in the future routinely used to improve the yield of clinically significant microorganisms from cerebrospinal-fluid.