



SPECIAL ARTICLE

Blood cultures in the paediatric emergency department. Guidelines and recommendations on their indications, collection, processing and interpretation[☆]



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Abstract Blood culture (BC) is the gold standard when a bacteraemia is suspected, and is one of the most requested microbiological tests in paediatrics. Some changes have occurred in recent years: the introduction of new vaccines, the increasing number of patients with central vascular catheters, as well as the introduction of continuous monitoring BC systems. These changes have led to the review and update of different factors related to this technique in order to optimise its use. A practice guideline is presented with recommendations on BC, established by the Spanish Society of Paediatric Emergency Care and the Spanish Society for Paediatric Infectious Diseases. After reviewing the available scientific evidence, several recommendations for each of the following aspects are presented: BC indications in the Emergency Department, how to obtain, transport and process cultures, special situations (indications and interpretation of results in immunosuppressed patients and/or central vascular catheter carriers, indications for anaerobic BC), differentiation between bacteraemia and contamination when a BC shows bacterial growth and actions to take with a positive BC in patients with fever without source.

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PALABRAS CLAVE

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Hemocultivos en urgencias pediátricas. Guía práctica de recomendaciones: indicaciones, técnica de extracción, procesamiento e interpretación

Resumen El hemocultivo (HC) es el método diagnóstico de elección ante la sospecha de bacteriemia, siendo una de las técnicas microbiológicas más solicitadas en pediatría. Diversos cambios han acontecido en los últimos años como la introducción de nuevas vacunas, el aumento creciente de pacientes portadores de catéteres vasculares centrales, o la irrupción de los sistemas automáticos de procesamiento de los HC. Dichos cambios han propiciado la revisión y la actualización de los distintos aspectos relacionados con esta técnica con el fin de optimizar su uso. Se presenta una guía práctica sobre recomendaciones acerca de la extracción, el procesamiento y la interpretación de los HC elaborada por la Sociedad Española de Urgencias de Pediatría y la Sociedad Española de Infectología Pediátrica. Tras revisar la información científica disponible, se presentan una serie de recomendaciones para cada uno de los siguientes apartados: indicaciones en Urgencias, técnica de extracción, transporte y procesamiento de la muestra, factores a tener en cuenta en situaciones especiales (indicaciones e interpretación de resultados en el paciente inmunodeprimido y/o portador de catéter vascular central, indicaciones de HC para anaerobios), diferenciación entre bacteriemia y contaminación ante un HC con crecimiento bacteriano y actitud a tomar ante un HC positivo en el paciente con fiebre sin foco.

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Introduction

Blood culture (BC) is one of most frequently ordered microbiological tests in paediatrics. The detection of bacteraemia is essential, as it is associated with a considerable morbidity and mortality. On the other hand, differentiating between bacteraemia and a contaminated culture can lower the costs associated to BC. It is also necessary to restrict the indication of BC to those patients at increased risk of bacteraemia.

In recent times, various developments have led to shifts in the epidemiology of bacteraemia. The introduction of new vaccines has led to significant changes in the incidence and aetiology of bacteraemia. Furthermore, the increase in the number of immunocompromised patients, patients with intravascular catheters and patients receiving broad-spectrum antibiotics has promoted the emergence of bacteraemias by microorganisms that used to be a rare cause of infection or considered contaminants in the past. On the other hand, the advent of automated BC systems has significantly reduced the waiting times for results and increased the number of positive cultures.

In light of the new situation, the Working Group on Infectious diseases of the Sociedad Española de Urgencias de Pediatría (Spanish Society of Paediatric Emergency Care) and an *ad hoc* group of the Sociedad Española de Infectología Pediátrica (Spanish Society of Paediatric Infectology) have reviewed and updated the existing literature on this microbiological test.

Indications for drawing blood cultures in the emergency setting

There is no consensus on the indications for drawing BCs in paediatric emergency settings. There is little data on focal

Table 1 Indication for collection of BC samples in patients with fever without source in an emergency setting.

Collection is always recommended in the following situations:

- Suspected sepsis/septic shock/toxic shock
- Suspected meningococcaemia
- Investigation of prolonged fever
- Infants aged <3 months with fever without source (FWS)
- Patient admitted for parenteral antibiotherapy due to suspected bacterial infection
- Fever in immunocompromised patients
- Patient presenting with fever after returning from travel to a tropical area

Consider collection in:

- Infants aged 3–36 months with FWS >39°C and incomplete pneumococcal vaccination

Routine collection is not recommended in:

- Infants >3 months with FWS with good general health that have completed pneumococcal vaccination

infections, and when it comes to patients with fever without source (FWS), the new situation following the introduction of new vaccines has led to changes in their management.¹⁻⁶ We have divided our recommendations into three groups according to the existing evidence on the diagnostic yield of BC (Tables 1 and 2).

Group A: Drawing a BC is strongly recommended.

The recommendation for drawing a BC is unanimous:

- Clinical suspicion of sepsis.
- Focal infections with a prevalence of bacteraemia greater than 10%.

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