Catheter-related bloodstream infections (CRBSI) is a common cause of nosocomial infection associated resulting in substantial morbidity, mortality, increased length of hospital stays and health-care costs. New clinical practice guidelines for the management of adults with CRBSI have been published in 2018 by the Spanish Society of Infectious Diseases and Clinical Microbiology (SEIMIC) and the Spanish Society of Intensive and Critical Care Medicine and Coronary Units (SEMICYC). This review focuses on updated recommendations for the diagnosis and management of CRBSI in adults. Prevention of CRBSI is excluded. Our aim is to show some of the key aspects concerning the following topics: diagnosis, empirical and targeted therapy.

**Key words:** Catheter-related bloodstream infection; guidelines; bacteremia.

**INTRODUCTION**

Nosocomial bloodstream infections (BSIs) have significant associated morbidity, incur increased hospital costs, and prolonged the length of stay [1]. Attributable mortality ranges between 12% and 25%. Most nosocomial BSIs are associated with intravascular (IV) catheters and central venous catheters (CVCs) in particular.

In the last years, intravascular device insertion has become a very common practice in the hospital and outpatient settings for various purposes, including hemodynamic monitoring, renal replacement therapy, nutritional support, as well as fluid and medication administration. According to national data facilitated by the study of the prevalence of nosocomial infections in Spain (EPINE), it is estimated that approximately 70% of the patients admitted to Spanish hospitals will carry one of these devices at some moment during their stay [2].

Recently published Spanish clinical guidelines provide recommendations about diagnosis and management of catheter-related bloodstream infections (CRBSI) in adults [3]. The experts identified 39 questions being possible to define 103 recommendations with different levels of gradation. Thus, within category A there were 41 recommendations, 29 in category B and 23 C. However, it is worth noting that, regarding the categorization of the recommendation, only 10 could be placed with a quality of the evidence of A1 [4]. Nevertheless, other aspects as prevention are therefore excluded. Nonetheless, a manuscript recently published provides a comprehensive review about aseptic measures recommended by scientific societies the insertion and manipulation of vascular catheters [5]. The aim of the present manuscript is to summarize the most relevant recommendations of this Spanish document updating with relevant information recently published.

**CATHETER-RELATED BLOODSTREAM INFECTION DIAGNOSIS**

It is essential to make an accurate diagnosis of CRBSI because there are serious consequences associated with inaccurate or failed diagnoses, such as unnecessary serious procedural complications and increased morbidity and mortality if the catheter origin of a BSI is not timely removed. The document defines the clinical characteristics and other factors in order to establishing a clinical suspicion and initiate a microbiological diagnostic, as well as, what conditions are needed to consider the CRBSI as complicated.

CRBSI should be clinically suspected in patients with intravenous catheters and onset of fever, chills or other signs of sepsis, even in the absence of local signs of infection, and
especially if no alternative source is recognized. Several circumstances should increase suspicion such as local sign of infection at the catheter, metastatic infections caused by hematogenous spread of microorganisms or persistent blood cultures for particular microorganisms.

There are a variety of factors associated with poorer outcomes, which make CRBSI as complicated. Factors associated with complicated bacteremia are patients diagnosed with CRBSI and with endocarditis, supplicative thrombophlebitis, septic metastasis, extraluminal infections, septic shock, non-resolving CRBSI, or immunocompromised patients.

**DIAGNOSIS CRBSI WITH OR WITHOUT CONSERVATIVE DIAGNOSIS CATHETER WITHDRAWAL**

The guidelines emphasize the recommendation that a catheter culture must only be obtained when a CRBSI is suspected, thus avoiding unnecessary cultures [6]. Removal of catheter is the most suitable approach for the diagnosis of CRBSI at least in the critical care setting.

Nevertheless, removal of a suspected CVC, may not be feasible or practical for a variety of reasons, such as including limited alternative vascular access or unacceptable complications associated with removal and replacement.

Summary of main diagnostic methods for catheter-related bloodstream infections recommended by new guidelines for the different patient subgroups with suspected CRBSI are the following:

- **Empirical antimicrobial therapy.** Once CRBSI is suspected, empiric antimicrobial therapy should be administered after appropriate cultures are obtained. These guidelines recommend choosing the empiric antimicrobial agent(s) based on an assessment of the risk factors for infection, the severity of the clinical picture and the likely pathogens based on local ecology and catheter site of insertion. Some considerations for appropriate antibiotic therapy are as follows: empiric antibiotics should always cover gram-positive organisms; based on the high frequency of *Staphylococcus* in this type of infections and its potential associated clinical severity. Coverage for other pathogens, gram-negative bacilli or fungi, should be considered especially in episodes presenting as septic shock. It is worth noting that these pathogens are more frequently involved when a femoral catheter is the BSI source [12, 13].

- **Appropriate duration of therapy.** Appropriate duration of antimicrobial therapy in CRBSI is based on the causative pathogen,
presence of complications, and host factors. Figure 1 shows the approach to the treatment of a patient with confirmed CRBSI.

Guidelines support the systematic treatment of CRBSI caused by coagulase-negative Staphylococcus (CoNS), although this decision does not provide enough clear evidence to support it. In fact, recent published studies concluded that inappropriate empirical therapy does not lead to poor outcomes in CoNS-CRBSI bacteremia [15].


