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Coagulase-Negative Staphylococci Clinical Isolates: Infectious or Contaminant, That is the Question

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Currently, the genus of Staphylococci consists of at least 40 species of gram-positive catalase-positive cocci, including the recently proposed S. microti. Ten of these species also contain subdivision with subspecies designations. Among the coagulase-negative Staphylococci (CoNS) subset, 18 species have been isolated from clinical specimens. Until now, five species of CoNS have repeatedly been implicated in nosocomial infections. Clinical studies have indicated *Staphylococcus epidermidis, Staphylococcus haemolyticus, Staphylococcus warneri and Staphylococcus hominis* as the most prevalent CoNS in hospital infections [1-3].

For many years, CoNS have long been considered as non-pathogenicdue to inadequate blood sampling, sample transportation or laboratory examination, and were rarely reported to cause severe infections. However, as a result of the combination of increased use of intravascular devices and an increase in the number of hospitalized immune compromised patients, CoNS have emerged as a major cause of nosocomial bloodstream infections. Clinical studies have indicated *Staphylococcus epidermidis, Staphylococcus haemolyticus, Staphylococcus warneri and Staphylococcus hominis* as the most prevalent CNS in hospital infections. Recently, other uncommon species as S. capitis, S. chromogensand S. conhii have been reported as clinically emerging nosocomial pathogens [3-5].

It remains difficult and challenging to distinguish true CoNS bacteremia from contamination. An additional potential concern is the false identification of *Staphylococcus* species by automated systems in diagnostic microbiology laboratories [6]. Previous studies reported poor reliability of these systems for some uncommon CoNS strains. Moreover, multiple positive blood culture results are not sufficient to determine true bacteremia. Misinterpretation of contaminated blood cultures as true bacteremia has two major consequences; it initiates an increase in unnecessary health-careexpenditures and contributes to the emergence of vancomycin resistance staphylococci [4,5].

Various clinical or laboratory definitions have been proposed to determine the clinical relevance of CoNS bacteremia. Of these, the CDC definition of a primary blood stream infection (BSI) is the most commonly used, requiring clinical evidence of an infection plus an appropriate antibiotic therapy if an intravenous catheter is present; or at least two positive blood cultures [7]. These criteria showed that they correlate poorly with molecular genotyping such as pulsed-field gel electrophoresis and evaluation of biofilm-forming properties, suggesting that they are an inaccurate diagnostic method. However, the routine use of molecular techniques may impose a prohibitive cost for some laboratories. Alternative and inexpensive diagnostic techniques are needed.

Several authors investigated different guidelines and protocols for more accurate definition of true CoNS bacteremia. Elzi et al designed bedside criteria for definition of CoNS bacteremia, based on a positive blood culture with CoNS with at least three systemic inflammatory syndrome (SIRS) criteria or two SIRS criteria and a central venous catheter [8]. Schnell et al have proposed a diagnostic algorithm to document CoNS bacteremia. Positive blood culture is defined as true infection by associated presence of an obvious infective focus on physical examination in a patient with fever and/or biological signs suggestive of infection, with respect to the CDC diagnostic criteria for healthcare associated infection [9].

Antimicrobial resistance has always been an important problem challenging treatment of CoNS infections. CoNS species associated with human infections are usually resistant to oxacillin and β-lactams as well as other antibiotics, including aminoglycosides, quinolones, macrolides and tetracyclines [5,10]. Results of recent in vitro studies, combined with the clinical efficacy and safety of daptomycin, indicate that it is an acceptable alternative for the treatment of serious CoNS infections, especially when bactericidal activity is desirable [4,10].

The treatment of the patients with CoNS isolated from blood cultures has been doubtful and diverse clinical guidelines have been proposed suggesting catheter removal with no antibiotic therapy applied. However, serious complications have been registered due to the omitted antimicrobial treatment in patients with CoNS isolated from blood cultures, resulting in prolonged hospitalization, although mortality increase has not been confirmed [7]. An adequate early antibiotic therapy may improve the final treatment outcome in the patients with CoNS isolated from blood cultures that play a particularly important role in patients in whom the clinical symptoms of the infection persist more than 48 hours.

In conclusion, clinicians and microbiologists in healthcare settings should follow a well-designed clinical-laboratory protocol for accurate identification and susceptibility testing of CoNS isolates from nosocomial bloodstream infections, and consider uncommon CoNS species as S. capitis and S. warneri as possible emerging nosocomial blood pathogens.In conjunction with improved blood samples collection strategies, strict infection control measures, specially hand hygiene help reduce the contamination rate of blood cultures. These guidelines are crucial to minimize excessive antibiotic use and unnecessary catheter removal and to prevent spread of MDR strains.

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Moreover, due to high CoNS resistance the most commonly used antibiotics, daptomycinmay be efficiently an alternative therapeutic option.

Competing Interests

The author declare that she has no competing interests.

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