



REVIEW ARTICLE

Risk factors for central venous catheter-related infections in a neonatal population – systematic review ☆,☆☆

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KEYWORDS

Catheter-related infections;
Central venous catheterization;
Risk factors

Abstract

Objective: This was a systematic review of the incidence density and risk factors for central venous catheter-related infections in a neonatal population.

Data source: The MEDLINE, Embase, Cochrane, BDENF, SciELO, and LILACS databases were used without date or language restriction. Studies that analyzed risk factors for bloodstream infections in newborns were identified.

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☆☆ Study carried out at Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, MG, Brazil.

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Data synthesis: A total of 134 articles were found that met the eligibility criteria. Of these articles, 14 were selected that addressed risk factors for central venous catheter-related infection in neonates. Catheter-related bloodstream infections remain an important complication, as shown by the incidence rates reported in the studies included in this review. The observed risk factors indicate that low birth weight, prematurity, and longer catheter permanence are related to a higher incidence of bloodstream infections. It has been observed that low rates of catheter-related infections, *i.e.*, close to zero, are already a reality in health institutions in developed countries, since they use infection surveillance and control programs.

Conclusion: Catheter-related bloodstream infections still show high incidence density rates in developing countries. The authors emphasize the need for further longitudinal studies and the need for better strategies to prevent risk factors, aiming at the reduction of catheter-related infections.

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PALAVRAS-CHAVE
Infecções
relacionadas a
cateteres;
Cateterismo venoso
central;
Fatores de risco

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Fatores de risco para infecção associada a cateteres venosos centrais em população neonatal – revisão sistemática

Resumo

Objetivo: Trata-se de uma revisão sistemática sobre a densidade de incidência e de fatores de risco para infecção associada a cateter venoso central em população neonatal.

Fontes dos dados: Utilizou-se os bancos de dados Medline, Embase, Cochrane, Bdenf, Scielo, Lilacs, sem restrição de data ou de idioma. Identificaram-se os estudos que analisaram fatores de risco para infecção da corrente sanguínea em recém-nascidos.

Síntese dos dados: Foram encontrados 134 artigos conforme os critérios de elegibilidade. Destes artigos, foram selecionados 14 que abordaram fatores de risco para infecção associada a cateter venoso central em neonatos. A infecção da corrente sanguínea associada a cateter continua a mostrar-se como uma importante complicação, conforme demonstram as taxas de incidência relatadas nos estudos incluídos nesta revisão. Os fatores de risco observados apontam que baixo peso ao nascer, prematuridade e maior tempo de permanência do cateter estão relacionados à maior incidência de infecção da corrente sanguínea. Observou-se que taxas de infecção associada a cateter em valores baixos, próximos a zero, já são uma realidade em instituições de saúde de países desenvolvidos, uma vez que utilizam programas de vigilância e controle de infecção.

Conclusão: A infecção da corrente sanguínea associada a cateter ainda apresenta altas taxas de densidade de incidência em países em desenvolvimento. Destaca-se a necessidade de realização de mais estudos longitudinais e a necessidade de melhores estratégias de prevenção dos fatores de risco para a redução de infecção associada a cateter.

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Introduction

Care procedures for the neonate in intensive care units require the use of advanced technology; the central venous catheter (CVC) is one of the most common among the invasive procedures used in these patients.¹⁻³ Depending on the material and caliber, it can be inserted at the bedside, such as the peripherally inserted central catheter (PICC), and remain for a prolonged period to allow the administration of solutions and medications, sample collection for examinations, blood product transfusion, and monitoring of hemodynamics.^{3,4} Among the complications related to its use, infections show the highest frequency and the most potential for morbidity and mortality.⁵

Newborns, especially preterm, are at increased risk of infection and are considered immunocompromised due to

their immune system immaturity.⁶ Their immune response is characterized by a decrease in neutrophil-endothelial adhesion, low levels of complement factors, and immaturity regarding the different subpopulations of lymphocytes and mononuclear phagocytic system cells.^{6,7}

The use of invasive devices implies the impairment of the natural physical barrier consisting of the skin, which allows bloodstream invasion by opportunistic microorganisms. When bacteremia progresses into severe sepsis, it can lead to hemodynamic changes, and even death.⁸ The risk factors for early sepsis, defined as those that occur within the first 48 h of life, are related to the underlying disease and to the quality of the care provided. Regarding late sepsis, which occurs after the first 48 h of life, it is related to the indirect contact with the contaminated hospital environment, with low birth weight, the use of invasive devices such

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