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Analysis of Drug Resistance Characteristics of Acinetobacter Baumannii in Burn Wound Infection

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Abstract:Analysis of drug resistance characteristics of Acinetobacter baumannii in burn wound infection is studied in this paper. The resistance rates of Acinetobacter baumannii to amikacin, ampicillin-sulbactam, and cefoperazone-sulbactam were low, and the resistance rates to these drugs were not significantly correlated with the intensity of their use. The study of MDR Acinetobacter baumannii bloodstream infection suggests that admission to ICU and application of more than 2 types of antibiotics are independent risk factors for MDR Acinetobacter baumannii bloodstream infection. This paper studies the background and the related applications.

Keywords: Drug resistance; characteristics; Acinetobacter baumannii; burn wound infection

1. INTRODUCTION

Burn wound infection is closely related to the general sepsis, inflammatory response syndrome, and multiple organ failure, and the emergence of the antibiotic-resistant strains poses a severe challenge to the use of burn infection medication. The severe wound infection is an important cause of systemic infection and even sepsis. Therefore, it is necessary for us to further understand burn wound infection.

The occurrence of burn infection is mainly due to the presence of a large amount of exudate in the burn wound, which is rich in protein and necrotic tissue, coupled with the destruction of the complete barrier function of the skin after burn injury. The exudate is rich in proteins and also necrotic tissues, and the complete barrier function of the skin is destroyed after burns, thus providing the very favorable condition for infection. The bacterial ecological pattern of burn wounds has changed over time, reflecting changes in burn treatment methods, and the choice of topical and systemic antibiotics is the main factor affecting the bacterial ecological pattern of burn wounds.

Based on the review, the basic solution can be considered from the following aspects.

(1) Topical application of the general anti-infective drugs and antibacterial dressings, the purpose of topical application of anti-bacterial drugs is to delay or reduce the colonization and invasion of microorganisms on the wound, prevent the spread of infection, deepen the wound, and gain time for surgery.

(2) Before the results of the clinical drug susceptibility test are available, drugs that are sensitive to the above pathogenic bacteria should be considered for treatment. After the results of the drug susceptibility test, sensitive drugs should be selected for treatment according to the results of the drug susceptibility test. At the same time, measures such as the disinfection and isolation should be strictly implemented to reduce the occurrence of cross-infection.

(3) The patient should be operated as soon as possible to remove necrotic tissue from the trauma, with special attention to the removal or drainage of infected lesions. In the figure 1, we firstly present the Sample of the Burn Wound Infection

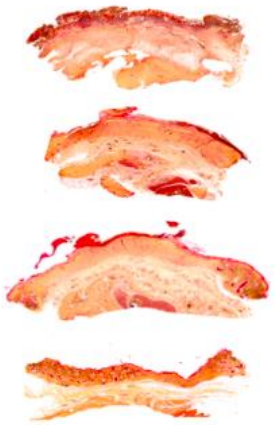

Figure. 1 The Sample of the Burn Wound Infection

2. THE PROPOSED MODEL

2.1 The Burn Wound Infection Overview

The skin barrier function of burn patients is damaged, the body's immunity is weakened, and also patients are prone to infection after long-term use of antibacterial drugs. Infection is an important cause of death in burn patients, so prevention and control of infection is very important. Among the main pathogenic bacteria, Staphylococcus aureus is more harmful to patients. Gram-positive bacteria can produce streptokinase, protease, etc., which can decompose cellulite, making it easier to spread and enter the blood, and the toxin produced by Staphylococcus aureus can further make the wound surface Deepening, granulation tissue necrosis, difficult to clean the wound, more damage to the body.

Progress in prevention and treatment of burn wound infection have the following aspects.

(1) Silver ions, many of similar antibacterial drugs lose their effect after bacterial strains are resistant, so the application of other antibacterial drugs, especially silver ions, is considered to be an ideal external agent, which can then effectively prevent and treat local infections.

(2) Blue light technology, compared with keratinocytes, blue light treatment is more likely to cause the inactivation of the multi-drug resistant Acinetobacter baumannii strains.

(3) Some studies have utilized wound cleansers containing the surfactant component undecylenamidopropyl betaine, which removes bacteria and their debris and disrupts biofilms. The wound cleanser has already begun to be used in surgical clinics. Therefore, the development of anti-infective drugs for external use on wounds targeting drug-resistant bacteria and their biofilms has a good prospect.

2.2 The Acinetobacter Baumannii Resistance Analysis

Drug-resistant Acinetobacter baumannii (including multidrug-resistant, extensively drug-resistant, and fully drug-resistant Acinetobacter baumannii) is prevalent in the world, and has become one of the most important pathogens for nosocomial infections at home and abroad. Acinetobacter baumannii is one of the most important pathogenic bacteria causing the nosocomial infection. It can survive for a long time in the hospital environment and colonize the skin, respiratory tract, digestive tract and genitourinary tract of the human body that can lead to a variety of serious infections.

The reason why Acinetobacter baumannii can form drug resistance to almost all clinically available antibiotics is that three factors play a key role: ① The diversity of bacteria's inherent and acquired drug resistance mechanisms. ② It has the ability to survive for a long time in a dry environment. ③Bacterial biofilm formation, the formation of biofilm is generally considered to be an important step for bacteria to invade the host. The infection rate is particularly high in patients with in vivo implants. In addition, in hospital wards, especially in ICUs solid surfaces, A. baumannii can survive as biofilm for a long time in the form of biofilm.

At present, most of the research on the bacterial resistance focuses on the mechanism of resistance of specific pathogens to specific antibacterial drugs. Studies have reported that there is a macro-quantitative relationship between the level of bacterial resistance and the amount of antibacterial drugs, and the two are closely related. The selection pressure of antibacterial drugs has accelerated the increase of bacterial drug-resistant strains.

3. CONCLUSION

Analysis of drug resistance characteristics of Acinetobacter baumannii in burn wound infection is studied in this paper. The drug resistance mechanism of Acinetobacter baumannii to various commonly used clinical drugs is characterized by diversification and complexity, and the research on it at home and abroad is not comprehensive at present. Hence, this paper gives the initial analysis for the model and in the future, the designed model will be applied to the ICU.

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