PUBLICAÇÃO OFICIAL DO NÚCLEO HOSPITALAR DE EPIDEMIOLOGIA DO HOSPITAL SANTA CRUZ E
PROGRAMA DE PÓS GRADUAÇÃO EM PROMOÇÃO DA SAÚDE - DEPARTAMENTO DE BIOLOGIA E FARMÁCIA DA UNISC

Revista de Epidemiologia e Controle de Infecção

ISSN 2238-3360 | Ano III - Volume 3 - Número 2 - 2013 - Abr/Jun

Hospital Santa Cruz

EDITORIAL

Increased of resistant to antibiotics among bacteria isolated from burn wounds

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Recebido em: 30/04/2013
Aceito em: 30/04/2013

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The burn wound can be considered as one of the major health problems in the world.[1] The most important factors that influence morbidity and mortality from burn wound infection and sepsis include burning more than 30% of total body surface area (TBSA), significant amounts of full-thickness burns, prolonged open wounds or delayed initial burn wound care.[2]

A typical burn wound is initially colonized predominantly with gram-positive organisms which are rapidly replaced by antibiotic-susceptible gram-negative organisms, usually within a week of the burn injury. Risk factors identified in patients colonized with drug-resistant organisms include prior use of third-generation cephalosporins and antibiotics active against anaerobes, critically ill patients with severe underlying disease or immunosuppression, and prolonged hospital stay.[2] Organisms of particular concern are methicillin-resistant *Staphylococcus aureus* (MRSA), enterococci, group A b-hemolytic streptococcus, gram-negative rods such as *Pseudomonas aeruginosa, Acinetobacter spp, E. coli* and *K. pneumoniae.*[3]

The pattern of antimicrobial susceptibility of *S. aureus* and other organisms has changed worldwide, especially in developing countries that antimicrobial agents have become increasingly less effective.[4]

Historically, group A beta-hemolytic *Streptococcus* was the most frequent cause of life-threatening burn wound and systemic infections. The use of penicillin altered the spectrum of gram-positive pathogens, leading to the emergence of *S. aureus* as the most common gram-positive early colonizer of the burn wound.[5] Within approximately 6 years, 25% of hospital strains were resistant. One to two decades later, 25% of community isolates were penicillin resistant. Although the rates are approximation, they have been collected based on reports from numerous locations. Hence, a clear association can be seen between the prevalence of penicillin resistant strains of *S. aureus* reported in hospitals and the rates in the community.[6] The latest studies suggest the resistance rate to vary from 97.5% (penicillin) and 69.85% (oxacillin) to 3% for vancomycin.[3,7-9]

Gram-negative pathogens continue to cause the most severe infections in burn patients. Recent survey of 104 U.S. burn units reports *P. aeruginosa* (44%) and methicillin-resistant *S. aureus* (MRSA) (33%) as the most prevalent organisms isolated in burn centers. Other pathogens in this report are acinetobacter (9%) and vanocomycin-resistant enterococci (5%) respectively.[10]

Selection and dissemination of intrinsic and acquired resistance mechanisms increase the probability of burn wound colonization due to resistant of species such as *P. aeruginosa. P. aeruginosa* is inherently resistant to common antibiotics and continue its survival even in common antiseptics. All this makes the organism difficult to eradicate from the patient as well as from the environment.[11] Recent studies suggestthe resistance rate to piperacillin; 65.8%, imipenem; 62%, ciprofloxacin; 60.25%, gentamicin; 63.3%, and ceftazidime to be 65%.[3, 5, 7, 8, 12, 13]

In the past few years, *A. baumannii* has emerged as a common pathogen in burn units, often with increasing antimicrobial resistance. Chim et al (2007). found *Acinetobacter spp.* to be highly prevalent in Singapore, mainly due to constant introduction of *Acinetobacter spp.* carried on human skin (endemic to tropical climate) with every admitted patient.[3] The impact of the affected patients had clinical evidence of infection requiring a treatment with a carbapenem antibiotic and acquisition of *A. baumannii*, associated

with an increased length of stay in the burn unit. The attributable mortality rate was estimated to be approximately 12%.[14] Recent studies suggest following resistant rates for *A. baumannii* strains such piperacillin (75.8 %), imipenem (69%), ciprofloxacin (86.2%), gentamicin (85%), and ceftazidime (90%).[3, 7, 8, 12, 16, 17]

Once MDR strains become established in hospital environments they can persist for months.[1] Therefore, the growth of MDR organisms such as *Acinetobacter*, resistant to quinolones, cephalosporins, and carbapenems should be considered as key risks of burn wound infections.

Microbial colonization and antibiotic sensitivity trends in burn over time necessitate periodic monitoring of these changes in each burn center separately.[12] Aggressive infection control measures should be applied to restrict the emergence and spread of multidrug-resistant pathogens.

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