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Epidemiology of infections in a Burn Unit, Albania

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ABSTRACT

Background: Many types of nosocomial infections (NIs) can be present in the burned patient. The purpose of this study is to calculate the rates for NI in the Intensive Care Unit of the Service of Burns and Plastic Surgery in University Hospital Centre (UHC) in Tirana, Albania.

Method: The study is prospective, clinical and analytical. The study is continued/longitudinal because monitors all patients with severe burns during a specified time period (1 year). For data analysis was used SPSS 19.0.

Results: The infection prevalence rate was 12 infected patients per 100 patients. The colonisation prevalence rate was 43 colonised patients for 100 patients. The most frequent infection microorganisms were *Pseudomonas aeruginosa* and *Staphylococcus aureus* (67% and 24%). Incidence of BSI was 3 BSI for 1000 hospitalization days. Incidence of catheter-related bloodstream infection (CRBSI) was 11.7 BSI for 1000 catheter days. Colonisation of the tip of the central catheter (CTC) was 15.6 for 1000 catheter days.

Conclusions: The epidemiology of burn wound infections as well as the definitions have changed due to important changes in burn wound treatment but further studies should be done documented the factors that can reduce the burn wound infection rates.

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1. Introduction

Nosocomial infections (NIs) are defined as infections acquired in the hospital by a patient who is hospitalised for a reason other than infection. These infections occur worldwide and affect both developed and developing countries [1,2]. The burn patient is at high risk of NI as a result of the nature of the burn itself, the immunocompromising effects of burns, prolonged hospital stays and intensive diagnostic and therapeutic procedures [3]. Infection in the burn patient is a leading cause of morbidity and mortality and remains one of the most challenging concerns for the burn team. They constitute a significant problem not only for patients but also for public health.

Because infection precedes multiple-organ dysfunction syndrome and sepsis in almost the major part of the burn patients, it is important to identify the site and source of it. The American Burn Association (ABA) has developed and published standardised definitions for sepsis and infection-related diagnoses in the burn population. The diagnosis of wound infection is based on objective and subjective defined criteria. There are different types of burn wound infections such as wound colonisation; wound infection; invasive infection; and cellulitis and necrotising infections/fascitis. The implementation of the ABA criteria, through standardised definitions for sepsis and

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infection-related diagnoses in the burn population, helps not only to unify the terminology used to conduct the surveillance valid for the hospital service but also to make comparisons with advanced services that address the same problem [4]. The most important complications of infection, bloodstream infections (BSIs), pneumonia and urinary tract infections (UTIs), diagnosed using standard definitions, generate epidemiological data about infection rates [5,6].

The purpose of this study was to evaluate the epidemiology of burn wound infection in the Intensive Care Unit (ICU) of the Service of Burns and Plastic Surgery in University Hospital Centre (UHC) in Tirana, Albania. Calculating the rates estimates the frequency of infection taking into consideration the length of exposure or the length of stay (LOS) and gives a better reflection of risk and facilitates comparison with the ultimate aim being the reduction of NIs and their costs [7].

Concretely the study was designed to determine the incidence of burn wound infections during 1 January 2010–1 January 2011 expressed in percentage and per 1000 hospitalisation days.

The specific objectives of this study are:

- to give data about microbial infection and colonisation of burn wounds,
- to identify the microorganisms responsible for infection and colonisation,
- to identify the susceptibility and resistance patterns of microorganisms,
- to give data on patients with pneumonia and UTI,
- to give data on blood cultures H (haemocultures), BSI and especially data on catheter-related blood stream infections (CRBSIs), the incidence of catheter tip colonisation (CTC) for the central venous catheter (CVC) and if there are statistical links between them, and
- to give data on antibiotic treatment, topical antimicrobials, surgical interventions, hospital LOS, mortality and prognosis in the patients with infections.

2. Patients and methods

2.1. Study type

The study is prospective, clinical and analytical. The study is continued/longitudinal because it monitors all patients with severe burns during a specified time period (1 year). Patients are followed up throughout the period of hospitalisation in intensive care. This study is a unit-oriented surveillance in the ICU of the service of burns that is considered as a unit with a high risk for infections. Through this surveillance it is possible to define 'attack rates', 'infection rates' and 'incidence rates' as considerably accurate evaluation parameters [7].

2.2. Calculation of rates

2.2.1. The burn wound infection prevalence rate

$$\frac{\text{Number of patients infected at the time of study}}{\text{Total number of patients observed at the same time}} \times 100$$

2.2.2. The burn wound colonisation prevalence rate

$$\frac{\text{Number of patients colonised at the time of study}}{\text{Total number of patients observed at the same time}} \times 100$$

2.2.3. The burn wound infection incidence rate

$$\frac{\text{Number of new infections in a period}}{\text{The total number of patient days for the same period}} \times 100$$

2.2.4. Attack rate (cumulative burn wound incidence rate)

$$\frac{\text{Number of new infections in a period}}{\text{Number of patients observed in the same period}} \times 100$$

2.2.5. The incidence of BSI

$$\frac{\text{Number of BSIs}}{\text{The total number of patient' days}} \times 1000$$

2.2.6. The incidence of CRBSI

$$\frac{\text{Number of BSIs}}{\text{The total number of days with CVC}} \times 1000$$

2.2.7. The incidence of CTC

$$\frac{\text{Number of events with the colonisation of the CVC}}{\text{The total number of days with CVC}} \times 1000$$

2.3. Inclusion criteria

From all patients admitted with major burns were excluded those who presented no burns and those who did not survive the burn shock.

The study was conducted near the ICU of the Service of Burns. It has 10 beds and is the only centre for the treatment of major burns in our country. The major and moderate burns according to the criteria of the ABA are referred to this unit. Patients from the city of Tirana may be presented directly without passing by primary care, while patients coming from districts are presented after receiving first aid in regional hospitals.

2.4. Baseline description of the ICU of the Burn Unit

The ICU is located in close proximity to operating rooms, emergency ward and investigational department. Patients are housed in single rooms with a bed area floor space of 18.5 m^2 and with bedside service equipment conforming to normal standards. Medical staff consists of three intensivists and seven burn surgeons directed by the chief of the Burn Unit. At all time all critical ill patients have 1:1 nursing. Administrative policies (clinical management responsibilities, admission

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