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Original Article

Microbial epidemiology and antimicrobial susceptibility profile of wound infections in out-patients at a level 1 trauma centre

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ABSTRACT

Background: Wound is a disruption of normal anatomic structure and function of the skin, and any infection in this constitutes wound infection. Wound infection delays wound healing, and it causes wound breakdown, leading to increased hospital stay, morbidity and mortality. Most of the published data available focus on surgical site infections. In the developing countries, however, wound infection is an important cause of hospital mortality and morbidity. No data are available on the microbial profile of the wounds presenting at our hospital.

Objective: This study was thus designed to describe the microbial epidemiology and the antimicrobial resistance profile of the wounds of the patients presenting to the OPD.

Methodology and results: Retrospective review of records of all wound samples sent over 3 years from OPD was done. OPD sent 827 wound samples of 571 patients. Most common organism isolated was *Staphylococcus aureus* [132 (35%)], followed by *Escherichia coli* [54 (14%)] and *Pseudomonas aeruginosa* [49 (13%)]. Of the 145 *S. aureus* strains, 43 (30%) strains were Methicillin Resistant Staphylococcus aureus, and none were resistant to vancomycin/linezolid/teicoplanin. Gram-negative organisms were resistant to most antibiotics tested.

Conclusion: Wound healing is halted in the presence of prolonged inflammation such as due to infection. Presence of bacteria delays wound healing, but the presence of low number of microbes is required for wound healing. Absence of appropriate signs to guide treatment becomes a reason for prolonged indiscriminate use of antibiotics which leads to rapid emergence of resistant organisms. Data generated by our study would help in the formulation of antibiotic policy for OPDs and also help in checking inadvertent antibiotic usage.

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1. Introduction

A wound is defined as a disruption of normal anatomic structure and function of the skin leading to breakdown of the protective function of the skin.[1] Wound healing is influenced by numerous environmental and host factors. An infection in this breach in continuity constitutes wound infection.[2] Wound infection can delay wound healing, and it also can cause wound breakdown leading to increased hospital stay, morbidity and mortality. Wound infection is characterized by discharge in the lesion associated with signs of local inflammation such as pyrexia, pain and induration or systemic signs of sepsis.[3,4] However, the presence of discharge at the wound site does not always signify infection.[5] Wound infections can be reduced by good surveillance programs and feedback to the surgeons.

Most of the published data available focus on surgical site infections (SSIs).[6–8] SSIs are important in the developed world where good infection control standards have already been established. In the developing countries, however, lack of resources to meet the basic needs such as hand hygiene makes wound infection an important source of hospital mortality and morbidity. Rampant use of antibiotics in the community adds on to the problem leading to the emergence of resistant organisms.[9–11]

The epidemiology of the pathogens and their antibiotic resistance shows local and regional variation.[12] No data are available on the microbial profile of the wounds presenting at our hospital. This study was thus designed to describe the microbial epidemiology and the antimicrobial resistance profile of the wounds of the patients presenting to the OPD, to guide the physicians on the antibiotics to be prescribed empirically.

2. Methodology

2.1. Study design

A retrospective study was conducted over a period of 3 years, January 2012 to December 2014. Records of all samples related to wounds of the patients were obtained from the hospital information system and the data were analyzed.

2.2. Study population

The study was performed at Jai Prakash Narayan Apex Trauma Centre, a 200-bedded level 1 trauma centre attached to a tertiary care centre. Only patients having history of trauma are treated in the hospital. Patients presenting after fresh trauma and patients under follow-up after discharge from the hospital are received in the OPD.

2.3. Inclusion/exclusion criterion

Details of samples related to wounds were obtained from the Hospital Information System. Other samples sent from the OPD such as blood, urine, sputum or tracheal aspirate were not included.

2.4. Sample collection and processing

Desired samples (pus/wound swab/tissue) were sent by the attending physician and were subsequently processed as per the standard protocols. The pathogens obtained were identified using Vitek 2 automated system. Antibiotic susceptibility of the pathogens was determined using the Vitek 2 automated system and the Kirby Bauer disc diffusion method.

3. Results

Samples suggestive of wound infection were sent from 571 patients. Of these, 456 patients were male, so the male:female ratio was 4:1. The mean age of the patients attending the OPD was 33 years with a range of 2–82 years. From the 571 patients, 827 wound samples were sent to the laboratory with 112 patients having double samples sent and 72 patients had up to 3 samples sent. Of these 455 (55%) samples either had no growth at all or had growth of non-pathogenic organism.

3.1. Organism distribution

The most common organism isolated was *Staphylococcus aureus* [132 (35%)] followed by *Escherichia coli* [54 (14%)] and *Pseudomonas aeruginosa* [49 (13%)]. *Enterococcus* spp. 4 (1%) had the least rate of isolation. The details of the organisms isolated from the wound swabs are given in Fig. 1.

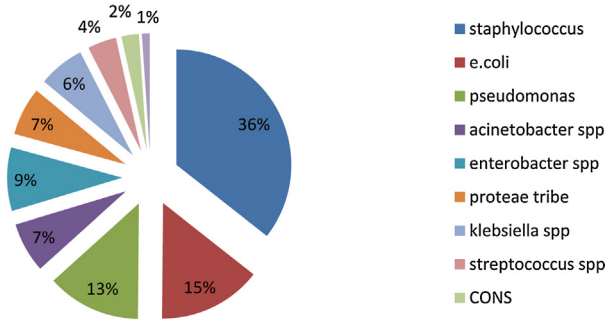

Fig. 1 – Distribution of the pathogens isolated from the wound samples.

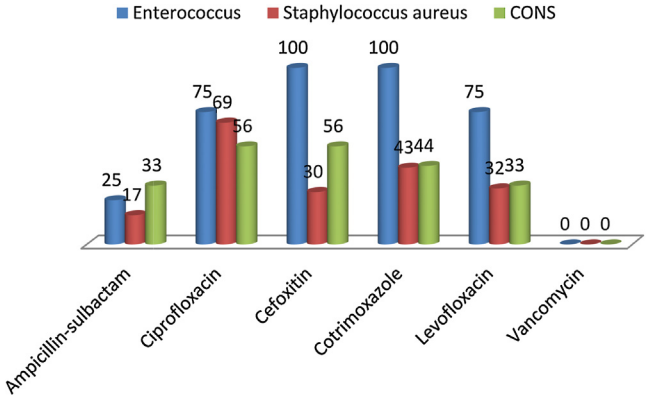

Fig. 2 – Antimicrobial resistance (R%) of Gram-positive isolates.