

Bacteriological study for some aerobic bacteria contaminated the post-operative wounds

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Abstract

This study includes isolation and diagnoses of some aerobic bacteria contaminated the post-operative wounds from wounds infection, 100 samples were collected from surgery units of teaching Hospital, and AL-Samawah General Hospital during Sep 2014 to February 2015, then the samples cultured on various media (Blood agar, MacConkey agar, chrom agar). Our results showed that from 100 samples included, 73 (73%) had growth and 27 (27%) had no growth.

Our result reported that *S. aureus* as the commonest isolate at percentage (23.2%), followed by *Staphylococcus epidermidis* (20.6%), *Escherichia coli* (12.3%), *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Klebsiella pneumoniae* (8.2%), *Enterococcus faecalis* (6.8%), *Citrobacter* sp (2.7%) and *Klebsiella oxytoca*, *Serratia marcescens*, *Acinetobacter* sp at percentage (1.4%). Fomites should be regarded as a possible source of since bacteria from them can be carried from the hands of theatre personnel to the patient undergoing surgery or through redispersed bacteria from surfaces during surgery.

Key words: Operative wounds, Nosocomial infection, *Staphylococcus aureus*, *Pseudomonas aeruginosa*

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Introduction

A wound is a breach in the skin and the exposure of subcutaneous tissue following loss of skin integrity provides a moist, warm, and nutritive environment that is conducive to microbial colonization and proliferation [1]. Infection in a wound delays healing and may cause wound breakdown, herniation of the wound and complete wound dehiscence [2].

Unrestrained and rapidly spreading anti-microbial resistance among bacterial populations has made the management and treatment of post-operative wound infections a serious challenge in clinical and surgical practice. Patients with post-operative wound infections face additional exposure to microbial populations circulating in a hospital set up as the hospital environment is always charged with microbial pathogens. Most post-operative wound infections are hospital

acquired, and vary from one hospital to the other and are associated with complications, increased morbidity and mortality [3,4]. Wound infections by resistant bacteria have further deteriorated the condition in this regard [5]. Rapid spread of resistant microbes affected the effectiveness of antimicrobials and created world-wide problem [6]. The condition is serious in developing countries owing to irrational prescriptions of antimicrobial agents [7]. These surgical site infections (SSIs) rates varied from 2.5% to 41.9% [8]. The most likely organisms to infect clean operation wounds in hospital are *Staph. aureus*, *Ps. aeruginosa*, and *E.coli*, as with accidental wounds local treatment often sufficient[9]. If infection is deep- seated or becomes generalized appropriate systemic treatment must be administered [10].

Methods

A total of 100 specimens were collected from surgery units of teaching Hospital, and AL-Samawa General Hospital during Sep 2014 to February 2015.

Culture and identification

Swabs collected were streaked on blood agar and MaCconkey agar (oxid) by sterile inoculation loop. The plates were incubated at 35–37°C for 24–48 hours. Preliminary identification of bacteria was based on colony characteristics of the organisms such as haemolysis on blood agar, changes in physical appearance in differential media and enzyme activities of the organisms. Biochemical tests were performed on colonies from primary cultures for identification of the isolates. Gram-negative rods were identified by performing a series of biochemical tests(oxid). Namely: Kligler Iron Agar (KIA), Indole, Simon's citrate agar, Lysine Iron Agar (LIA), urea and motility. Gram-positive cocci were identified based on their gram reaction, catalase and coagulase test results.

Results

100 samples included, 73 (73%) had growth and 27 (27%) had no growth. About 100 isolates were possible with post-operative wound infections included in this investigation. The microbial pathogens isolated from the pus samples of post-operative wound cases are summarized in Table 1.

Table1.

Isolates of 73 from 100 patients with post-operative wound infections

Type of pathogens	Bacterial pathogens	Number of isolates
Gram positive bacterial pathogens	<i>Staphylococcus aureus</i>	17 (23.3%)
	<i>Staphylococcus epidermidis</i>	15(20.6%)
	<i>Enterococcus faecalis</i>	5(6.8%)
Gram negative bacterial pathogens	<i>Escherichia coli</i>	9 (12.3%)
	<i>Klebsiella pneumoniae</i>	6 (8.2%)
	<i>Citrobacter sp.</i>	2 (2.7%)
	Non fermenting Gram negative bacilli	4 (5.5%)
	<i>Pseudomonas aeruginosa</i>	6 (8.2%)
	<i>Proteus mirabilis</i>	6 (8.2%)
	<i>Klebsiella oxytoca</i>	1 (1.4%)
	<i>Serratia marcescens</i>	1 (1.4%)
	<i>Acinetobacter sp.</i>	1 (1.4%)

Discussion

Management and treatment of post-operative wound infections remain a significant concern for surgeons and physicians in a health care facility. The problem has been magnified due to the unrestrained and rapidly spreading resistance to the available array of antimicrobial agents, the only choice with us to treat the infections. In-patients face additional exposure to hospital acquired infections due to longer stays. The selection of patients was restricted to those admitted in the post-operative surgical wards after undergoing various surgeries as the infection rates are highest in the surgical wards among the clinical departments.

Through this study confirmed that the isolation of Coagulase Negative staphylococcus (COANS), *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Strept spp.*, *S. aureus*, *E. faecalis*, *Proteus vulgaris* and *E. coli* presents a serious concern for possible nosocomial transmission.

Some researchers [11] concluded in their study that the common nosocomial pathogens may well survive or persist on surfaces for months and can thereby be a continuous source of transmission if no regular prevention surface disinfection is performed. Although a researcher [12] remarked that the inanimate environment has little relevance to the spread of infection, other workers [13] noted that the fomites are involved in the transmission of pathogens in health care environments.

The results from this study in which established bacterial pathogens were isolated from fomites agrees with the findings of some workers [14] but varies with the reports of other researchers [15, 16] who did not find any pathogenic bacteria on fomites from their study.

Competing interests

The author declares that there is no conflict of interest.

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