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# A study on isolation of different type of bacteria from pus

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## Abstract

The microbiological analysis of infection in 245 patients was undertaken in the outpatient departments of the Pt. Jawahar lal Nehru memorial medical college and Dr. B.R.A.M. hospital, Raipur (C.G.). Identification of bacterial isolates was determined by standard microbiological techniques. A total of one hundred and sixteen bacterial isolates were obtained from different cultures. In 86 cases, cultures were monomicrobial, 16 cultures were polymicrobial but no bacterial isolate was obtained in 149 cases. *Staphylococcus aureus* was the predominant microorganism (40%) followed by *Klebsiella* sp. (33%), *Pseudomonas* sp. (18%), *Escherichia coli* (16%), and *Proteus* sp. (7%). The diversity of microorganisms and the high incidence of polymicrobic flora in this study give credence to the value of identifying one or more bacterial pathogens from pus cultures. Continuous dialogue between the microbiology department and wound care practitioners and education of patients on personal hygiene is strongly advised.

Key-Words: Diversity, *Staphylococcus aureus, Pseudomonas* sp, *E. coli, Klebsiella* sp, *Proteus* sp.

## Introduction

Invasion of the body by disease causing organism that become established, multiply and produce symptoms. Bacteria and viruses cause most diseases, but diseases are also caused by other microorganism, protozoans and other parasites (Anathanarayan, *et. al*., 2006). A less common route of entry is through the skin, either by contamination of an open wound or by penetration of the intact skin surface (Brook, 2004). Selection of an effective antimicrobial agent for a microbial infection requires knowledge of the potential microbial pathogen, an understanding of the pathophysiology of the infectious process and an understanding of the pharmacology and pharmaco kinetics of the intended therapeutic agents (Kelwin *et al*., 1999). Also, antibiotic resistance to the commonly used antibiotics is now emerging as a result of misuse and abuse of particular antibiotics (Lipsky *et al*., 1990). Hence the treatment of infection are required to assess the right kind of antibiotics and the appropriate concentrations to be used in infections, taking into consideration the etiology of the infection and the duration of the antibiotic treatment ( Rajalakshmi *et al*., 2012). The pus forming microorganisms like *Enterococci* sp. and *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Klebsiella* sp. and *Proteus* sp.(Wren *et. al*., 1977).

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The magic bullets, the miraculous drugs, antibiotics can be to heal the wounds and thus the complications, which are a threat to all patients and thus can be minimized to a great extent. The aim of this paper was to substantiate the bacterial pathogens isolated from pus samples.

## Material and Methods

**Sample collection:** Wound samples were collected using sterile cotton swabs (fresh pus) but small screw capped bottle a firmly stopper tube or syringe or a sealed capillary tube it must be bearing the patients name, age (Koneman *et. al*., 2005).

**Initial examination:** The appearance of a specimen of pus and that of any appreciable amount of pus on a swab was observed (Koneman *et. al*., 2005).

**Characterization of Bacterial Isolates:** The pus specimen was inoculated on blood and MacConkey agar plates. The streaked plates were incubated at 37°C for 24 hr. Bacterial colonies on blood agar plates were later Gram stained. Characterization of bacterial isolates was based on standard microbiological methods. Identification of isolates were done based on colony morphology, motility, catalase test, oxidase test, coagulase test and biochemical tests like Tripal sugar iron agar, Hydrogen sulfide test, Carbohydrate fermentation test, Phenylalanine deaminase test, Methyl red test, Nitrate reduction test, Urease test, Voges proskauer, Citrate utilization test, Indole test (Koneman *et. al*., 2005).

## Results and Discussion

Pus infection has been a major concern among health care practitioners not only in terms of increased trauma to the patient but also in view of it's burden on financial resources and the increasing requirement for cost-effective management within the health care system (Alexander, 1994). The microbiological analysis reveals that *S. aureus* is the leading etiologic agent of infection in these health institutions. (Emele *et. al.*, 1999; Mashita *et. al.*, 2000). *S. aureus* was the most frequently isolated microorganism from pus caused by incision to reach pus or fluid collection under the skin surface and from wound types observed in this study. Microbiological investigations have noted that this organism is the single causative bacterium in approximately 25 to 69% of cutaneous abscess (Mahdi *et. al.*, 2000). In out of 100 patients both female and male suffered but number was different 45 and 54 respectively. In both male and female *Staphylococcus aureus* was the most frequently isolated microorganism (40%) followed by *Klebsiella* sp. (33%), *Pseudomonas* sp. (18%), *Escherichia coli* (16%) and *Proteus* sp. (7%). Microorganism was confirmed by biochemical test (Table 1). Oni *et al.,* (1997) working in a tertiary hospital in Ibadan observed different prevalence rates of the gram negative organisms in their work in which *Proteus* species were the least prevalent. The difference in the *Proteus* species prevalence rates may be related to their distribution in the various environments. The *Staphylococci aureus* were the predominant Gram positive organism (40%) because its are present in worldwide in all over environment and the family Enterobacteriaceae constituted 60% of the total number of isolates. Bacterial isolates identified as Proteus sp. accounted for only seven percent of the total number of isolates.

## Conclusion

The postulated sequence of events which leads to infection is initiated with *S.aureus* nasal carriage which is then disseminated via hand carriage to other body sites where infection can occur with breaks in the dermal surfaces. Infecting microorganisms may be derived either from an exogenous source (i.e. water-borne from water-related injury or microorganisms from soil in a soil-contaminated injury) or the endogenous microflora of the patient (File, 1995). Most of the wound infection in these health institutions were polymicrobic in nature and in most cases, associated with *S. aureus* and other microorganisms. It can be concluded that Gram positive bacteria were present in greater number than Gram negative bacteria in the pus sample. The variety of organisms observed in this study support the need to obtain culture specimens from infected wounds for microbiological evaluation and antibiotic susceptibility determination, so that adapted chemotherapy can be prescribed. We did not investigate the impact of hygiene in the development of wound infection but we suggest that education of patients on personal hygiene will be helpful in enhancing wound healing and management of patients.

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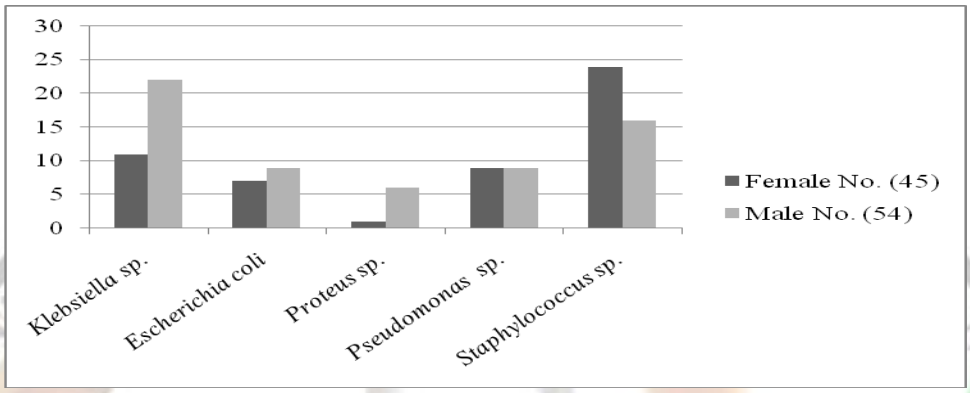


**Fig 1: 46 sample of female & 54 of male**

**Table 1: Biochemical Test for the identification of microorganism**

| Test Bacteria | I | N | MR | Co | O | VP | Ci | PPA | $H_2S$ | U | Cat | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Staphylococcus aureus* | - | + | + | + | - | + | - | - | - | + | + | + |
| *E.coli* | - | + | + | - | - | - | - | - | - | - | + | + |
| *Pseudomonas* sp. | - | + | + | - | + | - | + | - | - | - | + | + |
| *Proteus* sp. | ± | - | + | - | - | - | ± | + | + | + | - | + |
| *Klebsiella* sp. | ± | - | - | - | - | + | + | - | - | ± | - | - |

(I)Indole; (N)Nitrate reduction; (MR)Methly red; (Co)Coagulase; (O)Oxidase; (VP)Voges proskauer; (Ci)Citrate; (PPA)Phenylalanine deaminase; ($H_2S$)Hydrogen sulfide; (U)Urease; (Cat)Catalase; (M)Motility.

**Table 2: Tripal sugar iron agar (TSIA) and Carbohydrate fermentation test**

| Genus of bacteria | TSI reaction | | | Carbohydrate fermentation | | | |
|---|---|---|---|---|---|---|---|
| | Slant | Butt | Gas | $H_2S$ | Glucose | Sucrose | Lactose |
| *E.coli* | Ac | Ac | + | - | +, gas | - | +,gas |
| *Klebsiella* sp. | Ac | Ac | + | - | - | ±,gas | - |
| *Proteus* sp. | Ak | Ac | ± | ± | +, gas | + | + |
| *Pseudomonas* sp. | Ak | Ak | - | - | + | - | - |
| *Staphylococcus aureus* | - | - | - | - | - | - | - |