

Isolation of Gram Positive and Gram Negative Organisms from Pus Samples: One Center Study

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ABSTRACT

The contamination of pus organisms in infected wounds, ears, brain abscesses and post surgical infection is a common problem for many patients which causes great distress in terms of discomfort, delayed healing and significantly increased healthcare cost by creating systemic infection and complication. The aim of the study was to find out the frequency as well as antimicrobial susceptibility of gram positive and gram negative organisms isolated from pus samples. The study was conducted at the Microbiology Department of Jinnah University for Women Karachi, Pakistan during September to November 2012. For this purpose pus samples collected from infected wounds, ears and post surgical infection, from different Health care Hospitals. Out of 35 positive cultures 11(31%) of gram positive followed by *Staphylococcus aureus* was identified 8(22.85%) and *Streptococcus pyogenes* 2(5.71%), *Streptococcus epidermidis* 1(2%) on the basis of colony morphology, gram's stain, catalase and DNase test. 3(8.57%) were gram negative like *Pseudomonas spp* 3(8.57%), *Klebsiella spp* 4(11.42%), *E.coli* 9(25.71%) and *Candida spp* 1(2.85%) were identified on the basis of microbiological and biochemical test.

Keywords: Abscesses, Gram positive, Gram negative, Post surgical infection.

INTRODUCTION

Pus is a thick, whitish to yellowish material composed primarily of dead cells that generally forms as a by-product of bacterial infections. The inflammatory cells that participate in the body's immune response at the site of an infection eventually degrade and die, creating the substance known as pus. One of the most common types of bacteria that cause pus formation is *Staphylococcus aureus*, although any bacterial infection may produce pus. An infection that leads to the production of pus is called purulent infection. When pus forms within enclosed spaces in the tissues, it causes abscesses. When it forms on the skin surface, it causes lumps known as pustules or pimples. Pus can also form when infections develop in internal organs, such as the bones, brain, lungs, and gastrointestinal tract. Because the formation of pus usually indicates a bacterial infection, people with conditions that

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weaken the immune system have a higher risk of infection and subsequent pus formation. The formation of pus generally signals a bacterial infection, which may be a serious condition (Bowler *et al.*, 2001). Pus is caused by the breakdown of neutrophils, which are inflammatory cells produced by the body to fight infection. Typically, pus forms during the course of a bacterial infection. Although neutrophils initially engulf and kill bacteria, they themselves are eventually broken down and become a major constituent of pus. All types of bacteria that cause disease are capable of producing infections that lead to pus. Pus formation is usually caused due to inflammation which is a response of body tissues to injury or irritation which is what produces the pus during a bacterial infection. Pus is caused by the breakdown of neutrophils which are inflammatory cells produced by the body to fight infection. An accumulation of pus in an enclosed tissue space is known as an abscess, whereas a visible collection of pus within or beneath the

epidermis is known as a pustule or pimple (Anguzu and Olila, 2007). Pus consists of a thin, protein-rich fluid, known as liquor puris, and dead leukocytes from the body (mostly neutrophils). During infection, macrophages release cytokines which trigger neutrophils to seek the site of infection by chemotaxis. There, the neutrophils engulf and destroy the bacteria and the bacteria resist the immune response by releasing toxins called leukocidins. As the neutrophils die off from toxins and old age, they are destroyed by macrophages, forming the viscous pus. Bacteria that cause pus are called suppurative, pyogenic or purulent. If the agent also creates mucus, it is called mucopurulent. Purulent infections can be treated with an antiseptic. Despite normally being of a whitish-yellow hue, changes in the color of pus can be observed under certain circumstances. Pus is sometimes green because of the presence of myeloperoxidase, an intensely green antibacterial protein produced by some types of white blood cells. Green, foul-smelling pus is found in certain infections of *Pseudomonas aeruginosa*. The greenish color is a result of the pyocyanin bacterial pigment it produces. Amoebic abscesses of the liver produce brownish pus, which is described as looking like "anchovy paste". Pus can also have a foul odor in almost all cases when there is a collection of pus in the body, the clinician will try to create an opening for it to evacuate - this principle has been distilled into the famous Latin aphorism "Ubi pus, ibi evacua!" Some common disease processes caused by pyogenic infections are impetigo, osteomyelitis, septic arthritis, and necrotizing fasciitis (Adegoke *et al.*, 2010).

MATERIALS AND METHODS

Pus Collection. Take a swab and gently but firmly rotate it on the surface directly where infection is suspected.

Media. Blood agar, Mac Conkey agar, Nutrient agar, MSA (Mannitol salt agar)

Procedure:

1. Pus specimens inoculated on Nutrient, MSA,

Blood and Mac Conkey agar.

2. Streaked plates inoculated at 37 degree centigrade for 24 hours.
3. Identification of isolates were done based on cultural, morphological and biochemical characteristics.

RESULTS AND DISCUSSION

Among 35 positive pus samples in which most common isolates are found to be *Staphylococcus aureus* 8(22.85%), *Pseudomonas aeruginosa* 3(8.57%), *Klebsiella* 4(11.42%), *E. coli* 9(25.71%), *Streptococcus pneumoniae* 2(5.71%), *Proteus mirabilis* 2(5.71%), *Streptococcus pyogenes* 1(2.85%), *Pseudomonas specie* 3(8.57%), *Candida albicans* 1(2.85%). According to this result *E. coli* is the most significant specie (Figure 1), important pathogen in human and was found to be the most prevalent gram negative bacilli in male and female and also *Staphylococcus aureus* causes a variety of suppurative (pus forming) infection in human and also causes superficial skin lesions such as boil, carbuncle and in post surgical infection pus and drainage a very serious problem. Pus formation may indicate a serious bacterial infection.

CONCLUSION

The study concludes that the incidence of pus infection and contamination with other nosocomial infections is expected to be highest in our community. Especially *Staphylococcus aureus* and *E. coli* was

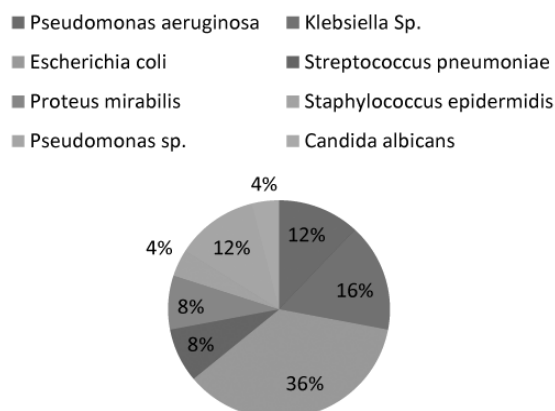


Figure 1: Prevalence rate of bacteria.

reported to be the most common pathogens. So we should take preventive measurements.

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