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FREQUENCY OF SEPTIC WOUNDS AND ITS SOURCE OF INFECTION AT A TERTIARY CARE UNIT

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Abstract:

Objective: *Skin is the largest organ of body and plays an important role in protecting against germs. Damage to skin through cut, surgical incision, burn and road traffic accident etc. make it susceptible for micro-organisms to invade our body. Septic wounds further put stress on immune system of already injured person and hence increase morbidity and mortality. Approximately 38% of the human population is colonized with Staphylococcus aureus. It is a leading cause of wound complication, soft tissue and skin infections, infective endocarditis, bacteremia and sepsis etc. The purpose of our study is to determine frequency of septic wound infections.*

Methodology: *It was a cross sectional study done at surgical wards, burn center, orthopedic department and intensive care unit of Jinnah Hospital, Lahore from June 2019 to July 2019. We obtained 100 consecutive pus samples from wounded patients presenting with clinical symptoms of septic wound. The collected samples were transported aseptically to the microbiology laboratory for culture within 30 minutes and segregation was done on the basis of infection site such as knee joints, burn sites and operated sites etc. Data was analyzed in the form of frequency and percentage with Microsoft Excel.*

Results: Out of 100 patients, there were 62 (62%) males and 38 (38%) females. Mean age of our patients was 28.91 ± 5.56 years, ranging from 20 – 50 years. Out of 100 pus samples, 70 (70%) had septic wound with S. aureus growth out of which methicillin sensitive Staphylococcus (MSA) was 45% and methicillin resistant S. Aureus (MRSA) was 50% and 5% were resistant to Vancomycin. 4 patients (4%) had fungal infections while 18 patients (18%) showed only gram negative rods and all were Catalase test negative and 8 (8%) were MDRO (multi drug resistant organism). Source of infection was also found to be significant factor as 55 patients (55%) had poor unhygienic condition, 40 patients (40%) showed poor or improper dressing.

Conclusion: *Staph aureus is the most common cause of septic wound infection, which may be due to hospital acquired infections and nosocomial due to improper unhygienic condition. There is special need of strategy implementation to control hospital acquired and nosocomial infections for a healthy community. It is recommended that consultants should update their knowledge due to continuously emerging antimicrobial resistance.*

Keywords: *infected wound, Staphylococcus Aureus, MRSA, VRSA, MDRO.*

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INTRODUCTION:

Skin is the largest organ of body that protects underlying tissue from different kinds of microbes, which invade the skin, by providing innate immunity and thus controlling bacterial colonization [1]. Mechanical disruption due to any type of injury damages the skin breaking barrier and facilitating different microorganisms including parasites, bacteria, fungi and viruses by establishing infection [2]. Septic wound infections exert detrimental effects on patient's life and disease prognosis. There is a big contribution of septic wound infections in hospital acquired infections among surgical cases and burn patients, increasing complication and mortality rate [3,4]. It is difficult to control bacterial infection in wound patients especially in hospital environment. Staphylococcus aureus is facultative anaerobe that falls in gram positive category of bacteria having grape like structures in appearance. It is very important microbe causing skin infections that may lead towards serious systemic infections [5,6]. It is one of the most versatile nosocomial and dangerous human pathogen. In spite of the introduction of antimicrobial agents and improvements in the frequency and morbidity of staphylococcal diseases in the twentieth century, staphylococci have persisted as an important hospital and community pathogen [7]. It is responsible for more than 80 percent of the supportive diseases encountered in medical practice. Staphylococcus aureus is now the leading causative pathogen in surgical site infections and burn septic wounds [8]. The pattern of antimicrobial susceptibility of Staphylococcus aureus is increasingly less effective in developing countries due to unnecessary and incomplete antibiotic course. Methicillin resistant Staphylococcus aureus (MRSA) was the most common pathogen of SSIs in the patients who underwent surgery [9]. A considerable increase in the prevalence of MRSA has been observed globally during the last decade. MRSA is the most common cause of hospital acquired infections, Hospital staff, infants, surgical patients and long staying patients in hospital are commonly affected by S. aureus [11]. Studies have proven sepsis in patients after surgery in operation theatre and/or in ward [4]. Hospital strains of Staphylococcus aureus are usually resistant to many useful antibiotics except vancomycin, although some microbiologist had reported the resistance of vancomycin [10]. The objective of this study was to determine the frequency of Staphylococcus aureus in septic wound infections. Among the less common causes septic wound infections are fungi, gram negative organisms and multi drug resistant organisms.

MATERIALS AND METHODS:

It was a cross sectional study done at surgical wards, burn center, orthopedic department and intensive care unit of Jinnah Hospital, Lahore from June 2019 to July 2019. We obtained 100 consecutive pus samples from wounded patients presenting with clinical symptoms of septic wound. Informed consent was taken from all the patients. All the patients were interrogated with the help of a preformed questionnaire. A brief history including sociodemographic details, duration of symptoms and its treatment, family history of Diabetes, Hypertension and Cardiac problems, etc. All necessary laboratory investigations were also performed including a lipid profile, Serum urea creatinine, urinary albumin levels, serum albumin and complete urine examination. The collected pus samples were transported aseptically to the microbiology laboratory within 30 minutes and segregation was done on the basis of infection site such as knee joints, burn sites, operated sites etc. The diagnostics tests like blood culture, sample culture, fungal culture, gram stain and antimicrobial susceptibility were performed. The culture were analyzed for morphological, physiological and biochemical characteristics. For the identification of bacterial isolates samples were subjected to biochemical tests; catalase test, coagulase test and DNAse test. Data was analyzed in the form of frequency and percentage with Microsoft Excel.

RESULTS:

We collected the septic wound pus sample from 100 patients, in which there were 62 (62%) males and 22 (32%) females. Mean age of our patients was 28.91 ± 5.56 years with a minimum age of 20 years and a maximum of 50 years. 35 (35%) were aged 20 – 30 years, 40 (40%) were aged 31- 40 years, 25 (25%) were aged 41-50 year. Out of 100 pus samples, 70 (70%) had septic wound with s. aureus growth out of which methicillin sensitive Staphylococcus (MSA) was 45% and methicillin resistant S. Aureus (MRSA) was 50% and 5% were resistant to Vancomycin. 4 patients (4%) had fungal infections while 18 patients (18%) showed only gram negative rods and all were Catalase test negative and 8 (8%) were MDRO (multi

drug resistant organism). Source of infection was also found to be significant factor and shown in **table 1.**

Table 01:

Risk factor	No of patients (%)
Poor hygiene	55 (55%)
Malnutrition	15 (15%)
Obesity	10 (10%)
Immobility	12 (12%)
Diabetes	11 (11)
Poor or suppressed immune response	7 (7)

Demographic details of patients are given in table 02.

Table 02:

	Frequency	**Percentage**
Age (years)		
30-39	28	28%
40-49	41	41%
20-30	31	31%
Gender		
Male	62	62%
Female	32	32%
Educational status		
Illiterate	23	23%
Primary	05	05 %
Secondary	12	12%
Higher secondary	15	15%
Graduation	25	25%
Post-graduation	20	20%
Residence		
Rural areas	41	41 %
Urban areas	59	59 %

Out of one hundred cases 18 (18%) were having hypertension and smoking habit respectively. Only 21 (21%) patients were taking the medication with compliance.

DISCUSSION:

In our study, we found that most of cases were infected by S. Aureus. It has been also observed that septic infections was the most common illness recorded in hospitals which further poor the prognosis of disease. Presence of S.aureus will not necessarily lead to development of a clinical infection but when this occurs it can lead to sepsis/bacteremia and ultimately death [13]. S. aureus can be found in normally healing wound as it is present in our normal human flora and it is very difficult to completely eliminate this pathogen [14]. In our study, S. aureus was the most

common organism (70%) among all the pathogens isolated from wound infection. Our results in surgical wound were consistent with similar studies carried out by elsewhere in India [15]. Surgical site infections are a major cause of morbidity of postoperative surgical patients and in spite of using broad spectrum antibiotics including potent anti-staphylococcal drugs for perioperative prophylaxis, S. aureus remains most common cause of surgical site infection (SSI) that may be due to multidrug resistant pathogens i.e. MRSA or VRSA. The incidence of MRSA is different all over the world. A multicenter study was conducted in Pakistan to see prevalence of MRSA strains in various cities. It was found to be 42% over a 10 months period. There was a difference in the MRSA frequency in different parts of the country; highest seen in Lahore (61%), closely followed by Karachi (57%), Rawalpindi (46%), Peshawar (36%) and Azad Kashmir (32%) while minimum resistance were seen in Sukkur (2%) [15]. Studies also reported that S. aureus is a killing human pathogen cause a variety of diseases in human i.e. skin infection, life threatening septicemia, meningitis and toxic shock syndrome. These pathogens are difficult to eradicate because it possess abilities to colonize and exploit the host functions [16]. Similar to current study, a study in burns patients showed that about two third patients had burns wound infected with staph. Aureus [17]. Assessing the risk of recurrence, past history of infections was found to be the strongest risk factor. Patients with positive history of aseptic infections had at least two episodes of infection in past. In this work, it was observed that, there were higher risks of septic diseases among those who are post-operative wound infections then those who have other wounds infections due to poor hygiene and overcrowding. We also observed that knowledge of antimicrobials regarding their susceptibility and resistance and empirical therapy was not satisfied or outdated among consultants. There was no concept of multidisciplinary approach regarding treatment of such cases. It is recommended that consultants should update their knowledge due to continuously emerging antimicrobial resistance.

CONCLUSION:

Our study showed that two third of the septic wounds were infected with staphylococcus aureus, which may be due to hospital acquired infections and nosocomial due to improper unhygienic condition. There is special need of strategy implementation to control hospital acquired and nosocomial infections for a healthy community. It is recommended that consultants should update their knowledge due to continuously emerging antimicrobial resistance.

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