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The Prevalence of Post-Operative Infection among the Male and Female Patients in a Tertiary Care Hospital of Western U.P India

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Abstract: ***Postoperative nosocomial infections remain a major problem in health care facilities, resulting in extended length of stay, substantial morbidity and mortality, high excess of cost, and less frequent cause of death in the surgical patient. Aims: To determine the prevalence of various pathogens among male and female patients with postoperative wound infections. Materials and Methods: One Hundred Five wound swabs were collected from patients who had developed postoperative infection. Conventional technique for isolation of bacteria was applied with analytical profile index (API system) for identification to confirm primary and secondary isolates. Results: The isolates were S. aureus 10(33%), Pseudomonas 7(23%), E. coli 3(10%), Klebsilla spp.4 (13%), Protious spp. 2(6%),Citribacter spp. 2(6%)& Acitinobacter 2(6%). The prevalence rate of hospital acquired infection were 25.23%Conclusion: The highest prevalence rate of nosocomial postoperative wound infection due to poor hygienic conditions, lack of proper antibiotics selection. Other factors that may be considered as risk factors are presence of anemia, diabetes, obesity, increased preoperative stay in hospital, proper timing of antibiotics administration etc.***

Keywords: Wound infection, Post operative, Surgery

1. Introduction

WHO described Hospital acquired infections as one of the major infectious diseases having huge economic impact [1]. Surgical site infection is a one of the most common postoperative complications and causes significant postoperative morbidity, mortality, prolongs hospital stay, and increase hospital costs also. Surgical site infection is categorized under a broad term Nosocomial infection (NI). Nosocomial infections are the infections acquired during hospital stay. They are important contributors to morbidity and mortality. These infections concern 2 million cases annually worldwide [2]. It is estimated that surgical site infections develop in 2%-5% of the 16 million patients undergoing surgical procedures each year [3,4]. They account for about 24% of all nosocomial infections. The problem is aggravated in developing countries where resources are scarce and staffs are always in short supply [5]. Infection of a wound is difficult to define and no clear rules can be given to distinguish it from contamination and colonization. Wounds and other lesions are prone to contamination with a multitude of organisms from the body surfaces and environment; the contaminating organisms are at first generally present in relatively small numbers, as originally introduced, and need not subsequently multiply [7]. Infection occurs when one or more of the contaminant evades the clearing effect of the host's defenses', replicates in large numbers and attacks and harms the host's tissues. In the case of commensal or low-grade pathogen, the multiplication may cause little or no harm to the host and may be best described as colonization [7]. Whether harmful infection or harmless colonization occurs is dependent on the virulence of the organisms and the local and the general resistance of the host. Knowledge of the patient's general and local condition is therefore important in assessing the significance of bacteriological findings. Infection in a wound delays healing and may cause wound breakdown, herniation of the wound and complete wound dehiscence [8]. In spite of technological advances that have been made in surgery and wound management, wound infection has been regarded as the most common nosocomial infection especially in patients undergoing surgery [9]. A wide variety of aerobic and anaerobic species of bacteria may be present, either singly or in combination, in infections of wounds, are generally associated with the production of pus and the bacteria involved are said to be "pyogenic" (pus producing)[7]. Postoperative infection complications are a frequent cause of morbidity and mortality in surgical patients. These septic events usually involve the urinary and the respiratory tracts or occur in the operative wound. The overall incidence of the postoperative wound infections varies from surgeon to surgeon, from hospital to hospital and from one surgical procedure to anther [10]. The lowest infection rate (less than 2%) followed clean operations, such as elective orthopedic procedures, in which the possible sources of contamination were solely airborne or exogenous. Clean-contaminated operations that resulted in additional exposure of the operative site to the endogenous microflora had high rates of infections (10-20%) [10].The average hospital stay doubled and the cost of hospitalization were thus increased when post-operative wound infection developed after any commonly performed operation [11]. The majority of post-operative wound infections are uncomplicated, involving only the skin and subcutaneous tissues. Infrequently, they progress to become necrotizing infection, which may involve

the fascia and muscle 8. The usual clinical presentation of uncomplicated wound infection includes local incisional pain and tenderness, swelling, redness, and increased warmth and elevated body temperature, which most often begin between the fourth and the eighth postoperative day [9]. The aims of this study are to determine the prevalence of various pathogens among male and female patients with postoperative wound infections.

2. Material and Methods

This study was prospective cross sectional study. During the period from February 2012 to January 2013, One hundred five wound swabs were collected from patients who had developed postoperative wound infection with purulent discharge and clinically diagnosed as postoperative sepsis. Purulent materials were collected on sterile commercial cotton swabs aseptically and gently to avoid contamination of the specimens with normal microbial flora of the skin. Specimens were collected before redressing and administration of antibiotic therapy. Specimens were labeled, kept in a thermoflask containing ice and transferred immediately to the laboratory for bacteriological examination.

2.1 Culture Methods

Post-operative wound swabs were used to inoculate blood agar, nutrient agar, chocolate agar plates and mannitol salt agar (Hi Media Pvt. Ltd Mumbai). These inoculated plates were cultivated aerobically at optimum temperature 37°C for overnight (18-24 h).

2.2 Examination of cultures and identification of isolates

All cultures were examined with the naked eye for growth and colonial morphology as well as any changes in the media. Plates, which showed visible growth, were subjected to subsequent bacteriological tests. Those which did not show visible growth were reincubated and examined daily for up to 7 days. Standard bacteriological identification of the isolates using Biochemical test previously describe [11].

3. Result

A total of 105 sample were collected from the post operative infection site, out of which 35 sample (33%) were positive in which 21 male (60%) followed by 14 female (40%) were found. It was observed that the ratio male patient as compared to female patient is much higher. Total number of male patient operated (n=69) and female patient (n= 36).[Table.1]

Table 1: Gender wise distribution of infected patients

Sex of Patients	*Patients Operated*	*Infected*	*Percentage (%)*
Male	69	21	60
Female	36	14	40
Total	105	35	100

Maximum number of male patient from normal were from the age group of (41-50 yrs.) were 15 while maximum number of infected patient from age group of (31-40) were 8, on other hand maximum number of normal female patient from age group (31-40 & 41-50) were 8 while maximum number of infected female patient from the age group (51-60) were 6. [Table.2]

Table 2: Age wise distributions of infected male and female patients

Age	*Male*		*Female*	
	Normal	*Infected*	*Normal*	*Infected*
0-10	0	0	0	0
11-20	0	2	0	0
21-30	6	2	2	0
31-40	5	8	8	0
41-50	15	4	8	4
51-60	12	4	0	6
61-70	10	1	4	2
71-80	0	0	0	2
Total	**48**	**21**	**22**	**14**

The infection causing organisms were identified as *Staphylococcus aureus*10 (33%), *Pseudomonas spp.*7 (23%), *Escherichea coli* 3 (10%), *Klabsilla spp.* 4 (13%), *Proteus spp.* 2 (6%), *Citrobactor spp*. 2 (6%) & *Acitinibactor spp.* 2 (6%).[Table.3]

Table.3: Number of isolated bacteria

Microorganism	*No. of bacteria isolates*	*Percent (%)*
Staphylococcus aureus	10	33.33
Pseudomonas spp.	7	23.33
Escherechia coli	3	10
Klebsiella spp.	4	13.33
Proteus spp.	2	6.66
Citrobacter spp.	2	6.66
Acinetobacter spp.	2	6.66
Total	**30**	**100**

4. Discussion

Hospital acquired infections have increased worldwide, contributing considerably to morbidity of the hospitalized patients. This can prolonging hospital stays, which can add significiantly to the economic burden to manage the underlying disease. In our study, the results revealed that the prevalence of post operative infection was found to be 30 %. Thirty percent of the patients were identified as having one more of the following bacteria present in their sample as *Staphylococcus aureus*, *Pseudomonas ssp.*,*Klabsella spp*., *E.coli*, *Proteus spp*., *Citrobacter* and *Acinetobacter*.

In my study the prevalence of bacterial infection was 30% which is quite higher. These results are consistent with those of previous studies conducted in subtropical areas. Other studies in different hospitals in India recorded the prevalence 10-30% (Rattan et al.,1992) and other study in new Delhi reported prevalence of 2% to 35% (Nigaranjan et al., 1998). The prevalence found in present study is comparable to the prevalence of 21.90%, 27.7%, 35%, 43% and 44% in Ahmadabad, New Delhi, Andhra Pradesh, Mumbai and Lucknow [13].

Other studies have reported the prevalence of bacterial infection 25.2%, 27.9%, 31.27% and 35.8% in eastern parts of Sudan, Nigeria, Bangladesh and Ethiopia [14]. Which is comparable to present and some of the studies have reported the higher prevalence of 53% and 58.5% in Ethiopia and in

Uganda (Biadglegne et al., 2009 and Anguzu JR et al.,2007). In my study the prevalence of Staphylococcal infection was higher than that of other bacterial infection. The result of the present investigation indicated that the total prevalence of staphylococcal infection was 33% out of 18 male and 12 female infected patients. Prevalence of other bacteria such as *Pseudomonas spp.*(23%), followed by *klebsilla spp.* (13%), *E.coli* (10%). *Proteus spp.*, *Citrobacter spp.* and *Acinetobacter spp.* (6%) was low.

The prevalence found in the present study is comparable to 26.3%, 28%, 32.2% and 37.83% prevalence seen in Gujarat, South India, Mangalore and Bhopal [15]. Studies from Ethiopia have found the prevalence of *Staphylococcus aureus* ranging 15.9% and 26.2% (Endalafer et al.,2011 and biadglegne et al., 2009) and 25%, 29% and 42.30% in the other studies in Nigeria(adegoke et al.,2010;A.A. oni et al., 2006 and nuwachukwu et al.,2009)other studies in Dehradoon (Sahu SK et al., 2009) however reported *E.coli* to be most offendinding pathogen, which appeared to occur in high percentage of patients 5% here and study in Haryana (K Prabhat Ranjan et al., 2010) found *pseudomonas spp.* as most common pathogen, which appeared to occur in percentage 29.9%.

In present study we found the higher prevalence of post operative infection is more common in male patients between (31-40 yrs) and female patients between (51-60 yrs) of age. In previous study of Bhopal (Anand Saxena et al., 2013) found that post operative infection is more common in patients above 50 yrs of age. Studies in Andhra Pradesh and Gujarat also recorded same trend [16].

5. Conclusion

The highest prevalence rate of nosocomial postoperative wound infection due to poor hygienic conditions, lack of proper antibiotics selection. Other factors that may be considered as risk factors are presence of anemia, diabetes, obesity, increased preoperative stay in hospital, proper timing of antibiotics administration etc.

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