

Assessment of Biosafety Practice in A Hospital Gynae Department; An Eye Opening

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ABSTRACT

The patients can acquire the nosocomial infections by the hands of surgeon and surgical instruments because they are highly contaminated with hospital pathogens. Protective measures should be taken in hospital setting to stop transmission of infections. Therefore, the steps are established to remove the contamination as much as possible. In this study, were collected the different samples from the surgical tools in gynecology department to check the microbial load and antibiotic susceptibility against the isolated microorganisms. The isolated micro organisms were *Staphylococcus aureus*, *Escherichia coli*, *Enterococci spp* and *Pseudomonas aeruginosa* (*P. aeruginosa*). These organisms are susceptible to Novobiocin, Erythromycin, Meropenem except *Pseudomonas aeruginosa* showed resistance to amikacin. The study provides the knowledge about the presence of possible hospital pathogens and the chances to cause infectious diseases in the patients.

Keywords

Nosocomial infection, *Escherichia coli*,
Novobiocin, Prerequisite

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INTRODUCTION

The aim of research is to highlight the routes of transmitting the irresistible illness and the reasons of post operative complications faced by the common people. That illness obtained from the doctors facility however showed up after released, and also occupational infections among staff members of the hospital. Surgical site infection are occur in affecting tissues, surgical incisions, cavities and organs manipulated during surgery and may be to identify an illness in patients up to one month after a procedures. In many hospitals, Surgical site infections are one of the second most common sites of illness, occasionally surpassed only by UTI (urinary tract infection) (1). Hospital acquired infection constitutes a major health problems in public worldwide. It is the most important cause of mortality and morbidity, emotional suffering, functional disability and economic burden

among the hospitalized patients (2). The most widely method of containment is sanitization of instruments and especially hospital staff members and visitors (3). The most important health-care associated pathogens were β -hemolytic streptococci and *S. aureus* and can continue present in the natural environment for prolonged periods of time. Many type of bacteria, virus, fungi and parasites may cause hospital acquired infection or (nosocomial infection). Diseases may be occurred by microorganisms obtained from the individual who is admitted in the hospital (cross-infection) or may be caused by the patient's own flora (endogenous illness). Some microorganisms may be acquired from an inanimate object currently contaminated from environmental infection or individual's sources. Prior the start of essential basic disinfected practices and antibiotics into medicinal

practice, most hospital infection were due to pathogens of exterior source (food borne disease, airborne disease, tetanus and gas gangrene etc) or then again were caused by microbes not present in the normal flora of the patients or (individuals) e.g. diphtheria , tuberculosis .advanced in the anti-infection treatment of bacterial diseases has impressively lessened mortality from numerous irresistible sicknesses . Numerous diseases obtained in hospital nowadays were caused by microorganisms which are frequent present in the common people, in whom they cause no or milder disease than among hospital patients (Enterococci, Enterobacteriaceae, Staphylococci *aureus* Coagulase negative *Staphylococci*).

They can shed and can lead to illness when health care personal are intensely colonized with these micro organisms. β -hemolytic Streptococci and *S. aureus* have been connected to airborne transmission in operation theaters, neonatal units and burn units. Occasional screening, treatment of shedders and isolating them from the operation till the treatment is finished or completed would ensure that the risk of transmission infection is reduced or minimized. Before using sterile surgical instruments when performing sterile procedures and hand hygiene is performed prior with an antiseptic hand wash/gel or surgical scrub. To low the risk of contamination of health care workers hands with blood and other body fluids ,germ dissemination to the environment and transmission from the health care worker to the patients and vice versa , as well as from one patients to another (4).

S. aureus is a most virulent pathogen and the frequent cause SSI (Surgical site infection). Methicillin resistance futher complicates therapy for *Staphylococci aureus* SSI (surgical site infection. The prevalence of methicillin resistance *Staphylococci aureus* has increased dramatically since it was first described in the 1960s. (5)

For hospitals with apparent rates of MRSA surgical site infection, hazard factor or (risk factor) for MRSA surgical site infection should be evaluated and preoperative antimicrobial prophylaxis with an agent active against MRSA should be considered for high-risk patients. Contaminants are originated from three main sources. (i)Those introduced by traumatic injury or the exogenous environment (or from the environment) (ii) the surrounding

skin involving members of the normal skin flora such as *staphylococcus epidermidis*, *micrococci*, skin diphtheroids and propionibacteria. And (iii) Endogenous sources involving mucous membranes primarily the gastrointestinal, oropharyngeal and genitourinary mucosae.

This study was basically indirect transmission of pathogenic microorganisms. In this study, samples of surgical instrument were taken from the department of gynecology to check or evaluate the possible contamination of pathogens. The isolated organisms were identified using specific protocol (from Clinical laboratory manual) and then antibiotic susceptibility was checked against the isolated organisms.

Surgical instruments have tendency to be polluted or contaminated during operations by micro organisms that inhibit the skin and organs. Surgical instrument could act as fomites for the pathogens of SSI even if the surgical field is not apparently contaminated through application of appropriate practices adhering to surgical site infection guidelines. (6)

MATERIALS AND METHODS

Sample Collection: The samples were collected from the surgical instruments of operation theatre, Gynea Department, Abbassi Shaheed Hospital. 20 samples were collected with the help sterile cotton swabs.

Isolation of Bacterial Colonies: The samples were cultured on the selective and differential media including nutrient agar, eosin methylene blue agar, MacConkey agar, MSA agar and blood agar for the isolation of microorganisms. The samples incubated at 37°C for 24 hours.

Identification of Bacterial colonies: The isolated colonies were observed under the light microscope for the identification by performing gram staining. Different biochemical test were also performed including oxidase test, catalase test, Coagulase test, starch hydrolysis test, Urease test also IMVIC.

Antibiotic Susceptibility Test: The microorganisms tested against the antibiotics by the Kirby and Bauer

Method. Antibiotics used for susceptibility testing: Trimethoprim, Nalidixic acid, Ampicillin, Erythromycin, Gentamycin, Chloramphenicol, Penicillin, Vancomycin, Cephalexin, Novobiocin and, tetracycline.

RESULTS

The microbes were isolated from the gynecology department are gram positive cocci and rod and gram-negative rod. The most common microorganism recovered from the gynecology were *Escherichia coli*, *Staphylococcus aureus*, *Bacillus spp*, *Streptococcus bovis*, and *Pseudomonas aeruginosa* and then performed

antibiotic susceptibility against these pathogens. *The Escherichia coli* were sensitive against Meropenem (Mem), Gentamycin (Cn) and they give no zone against Trimethoprim-Sulfamethoxazole (Sxt) and *Staphylococcus aureus* were sensitive against Vancomycin (Va), Novobiocin (Nv), Gentamycin (Cn), Chloramphenicol(C) and *S.Bovis* gives no zone against Penicillin (P) and Novobiocin (Nv) and were sensitive against Erythromycin (E), Cephalexin (Cl) *Bacillus spp* sensitive against Vancomycin(Va), Gentamycin(Cn), Erythromycin(E) and the *Pseudomonas aeruginosa* gives no zone against Meropenem(Mem), Amikacin.

Table I: Isolated Pathogens from Gynaecology

Organisms	Catalase	Coagulase	Antibiotics	Interpretation
<i>S.aureus</i>	+ve	+ve	Novobiocin	sensitive
<i>E.coli</i>	-ve	+ve	Meropenem,Gentamycin	sensitive
<i>S.bovis</i>	-ve	-ve	Gentamycin (Cn)	sensitive
<i>P.aeruginosa</i>	-ve	-ve	Meropenem,amikacin	Resistant

Table II: Microorganism isolated from the gynecology and their percentages

Microbes	Number of Positive Culture	Percentage
<i>Escherichia coli</i>	7	35%
<i>S. aureus</i>	3	15%
<i>Streptococcus bovis</i>	2	20%
<i>Pseudomonas</i>	3	15%
<i>Bacillus</i>	2	10%
Total	17	90%

Table III: Antibiotic Susceptibility

Bacterial Isolates	Antibiotics	Susceptibility
<i>E.coli</i>	Meropenum (Mem)	1.6cm (S)
	Gentamycin (Cn)	1cm(S)
	Trimethoprim-Sulfamethoxazole (Sxt)	No Zone (R)
	Nalidixic Acid (Na)	No Zone (R)
<i>S.aureus</i>	Vancomycin (Va)	0.9mm
	Novobiocin (Nv)	1cm
	Gentamycin (Cn)	1cm
	Chloromaphenicol(C)	0.9mm
<i>S.bovis</i>	Penicillin (P)	No Zone (R)
	Ampicillin (Aml)	No Zone (R)
	Erythromycin (E)	0.8mm
	Cephalenin (Cl)	1.3cm
	Novobiocin (Nv)	No Zone (R)
<i>Bacillus</i>	Vancomycin(Va)	4mm
	Chlormachenicol(C)	4mm
	Gentamycin(Cn)	5mm
	Erytromycin(E)	8mm
	Amoxycillin(Aml)	No Zone (R)
<i>Pseudomonas</i>	Meropenum(Mem)	No Zone (R)
	Amikacin	No Zone (R)



Fig 1: Green Metallic Sheet of *E.Coli* on EMB Agar



Fig 2: Pink Pin Pointed Colonies of *Staphylococcus Specie* on Mackonkey Agar



Fig 3: Alpha & Gamma Hemolysis On Blood Agar

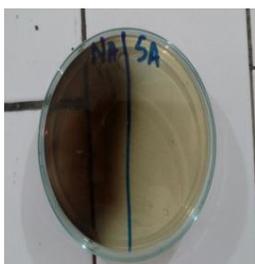


Fig 4: Black Appearance of *Strep. Bovis* on Bile Esculin Agar



Fig 5: Antibiotic Susceptibility Test



Fig 6: Black Appearance of *Streptococcus bovis* on Bile Esculin Agar

DISCUSSION

The study is conducted to discover the ways of surgical site infections and the relation of nosocomial infection to surgical procedures. This study found that hospital staff apparel are variously contaminated by bacteria many of which are recognized pathogens. Although the direct involvement of hospital staff apparel in a case of disease transmission was not investigated in this work. The isolated microbes was *Staphylococcus aureus*, *Escherichia coli*, *Enterococci spp* and *Pseudomonas aeruginosa* (*P. aeruginosa* is a concern for possible nosocomial transmission (7)). The importance of surgical wound sepsis is related to accompanying morbidity, occasional mortality, increased hospital expenses and extra days in the hospital. Some workers have reported deaths as a result of wound sepsis. We could not however, confirm that any deaths did or did not occur as a result of postoperative wound sepsis (8).

We have collected samples from the gynecology department of a Government hospital & we were able to isolate pathogen like *Staphylococcus aureus*, *Escherichia coli*, *S. bovis*, *Pseudomonas aeruginosa* were the pathogens responsible to cause infections and convert them into life threatening diseases. It is reported that roughly 1.7 million nosocomial infection, from all types of microorganism, including bacteria and fungi combined to cause or contribute to more than 99,000 deaths each year. Transmission result because of lack of awareness about the simple Biosafety practices in hospital setting.

CONCLUSION

The isolated organisms were highly pathogenic and multidrug resistant. Their transmission from one patient to

the other patient through doctors and nursing staff during the treatment cause spread of infection. Surgical tool should be proper autoclaved and standard disinfection procedure should be used to reduce the transmission of infection. Standard Biosafety protocol should be taken into consideration before the start of OPD and IPD ward visit and in surgical procedures.

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