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Study of effectiveness of prophylactic use of antibiotics in clean surgical cases in a tertiary care hospital

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ABSTRACT

Aim & objectives

The aim of the study is to analyze the effectiveness of the prophylactic usage of antibiotic in clean surgical cases as per WHO guidelines in the tertiary care hospital. To study the incidences of prophylactic usage of antibiotic in clean operative surgeries and analyze the deviations if any from the standard procedure established in the hospital. To find if a correlation exists between the frequency of incidences of drug resistance and the type of antimicrobial agent used in clean operative procedure, using post operative infection markers

Material and methods

The study was conducted at PK Das Institute Of Medical Sciences. The study was conducted as a hospital based prospective observational study. Variables collected were demographic factors like age,gender, previous history of surgery and Comorbid conditions. Past medical and medication history were recorded. Patient Demography, Prophylactic antibiotic used, Comorbidities present in patients prior to surgical intervention, Incidences of SSI occurrences within a period of two weeks post-surgery. Patients who underwent surgical procedure in the Dept. of ENT, and GENERAL SURGERYat P.K. DAS Hospital, a 300 bed tertiary care hospital. Patients undergoing clean surgery in the **Dept. of Surgery** and **ENT** who consented to participate in the study. Patients with no obvious source or signs of infection. Patients with co morbidities like uncontrolled diabetes, compromised immune system, concomitant infection present at other sites and pre-existing local immune response (foreign bodies, damaged tissue or hematoma) that are patient related pre-surgical risk factor for SSI. Patients undergoing emergency, bowel and urinary tract surgeries.

Discussion

Based on the inclusion and exclusion criteria, 94 patients from the Dept. of surgery who were to undergo clean surgery were recruited to participate in the study over a period of six months. Demographic information, medical history, the name of the surgical procedure to be adopted, existence of comorbidities was recorded.

Of the 94 patients who were included in the study 71 were adults (Older than 19 years to 60 years)who represented 75.53% of the study population and 23 were elderly (Above 60 years) representing 24.46% of the population. Analysis of the incidences of SSI with respect to distribution among genders revealed that there was no incidence of SSI in females patients involved in the study who constituted 40.42% of the study population, whereas there were 4 incidences among the males who constituted 59.57% of the population.

Result and conclusion

Surgical procedures carried out were 60 cases of Hernioplasty, 17 cases of Thyroidectomy 12 cases of Trendelenburg Procedure for Vericose Vein and 5 cases of Excisional Breast Biopsy. Among 60 patients who underwent Hernioplasty combination of Ampicillin 500mg +Cloxacillin 500 mg was used in 46 cases, Amoxicillin 1000 mg with 200 mg potassium Clavulanate in 6 cases and CEFOTAXIME 1gm in 8 cases. Of the 17 patients who underwent Thyroidectomy combination of Ampicillin 500mg +Cloxacillin 500 mg was used in 12 cases, Amoxicillin 1000 mg with potassium clavulanate 200 mg in 2 cases and Cefotaxime 1gm in 3 cases. Of the 12 patients who underwent Trendelenburg procedure for Vericose Vein, combination of Ampicillin 500mg +Cloxacillin 500 mg was used in 8 cases, Amoxicillin 1000 mg with 200 mg Potassium Clavulanate in 2patients and Cefotaxime 1gm in 2cases.Of the 5 patients who underwent Excisional Breast Biopsy combination of Ampicillin 500mg +Cloxacillin 500 mg was used in 4cases, and Cefotaxime 1gm in 1cases.

The study of effectiveness of prophylactic use of antibiotics in clean surgical cases was done. From the study it was found that the hospital was following the prophylactic antibiotic as per the WHO guidelines.

Keywords: Prophylactic, Antibiotics, Surgery, Guideline, Demographic, WHO

INTRODUCTION

Surgical site infection

Infection occurring in a patient in a hospital or other health care facility in whom the infection was not present or incubating at the time of admission is referred to as Hospital-acquired infections (HAI) or nosocomial infection .It also includes infections acquired in the hospital but appearing after discharge, and also occupational infections among staff of the facility.

Causative pathogens are usually virus, bacteria or fungi. Blood stream (BSI), respiratory track (ventilator assisted pneumonia), urinary tract (UTI), and surgical site are prominent areas that are prone to HAI.

Invasive surgical procedure involves incision of the skin or other body surfaces to reach the surgical site. Post-operative infections of the incisions and the surgical site are generally referred to as surgical site infections (SSIs) and they account for approximately a quarter of all nosocomial infections .[1] SSI occurs even in hospitals with most modern facilities following standardized protocols of preoperative preparation and a practice of using antibiotic prophylaxis as pre-surgical measure.[2]. The frequency with which surgical site infection occur vary widely (2.5 to 41.9%) as reported in medical literature. [3],[4],[5],[6],[7],[8],[9],[10].Type of surgery and underlying patient status are the probable factors that are responsible for such variation.(18, 19, 20). Recent reports by World Health Organization (WHO) reveals " surgical site infection (SSI) is the most surveyed and frequent type of HAI in low- and middle-income countries and affects up to one third of patients who have undergone a surgical procedure. Although SSI incidence is lower in high-income countries, it remains the second most frequent type of HAI in Europe and the United States of America (USA).

Risk factors for development of SSI may be associated with the preparatory stage, during actual surgical procedure or post-surgical conditions.

Presence of foreign bodies including drains; concomitant infection present at other sites; preoperative shaving; surgical team's experience in preoperative decontamination of body surface and pre-existing local immune response (foreign bodies, damaged tissue or hematoma) have been identified as pre-surgical risk factor for SSI. Suboptimal level of hand washing, poor barrier precautions, inadequate cleanliness and sterility of equipment used during surgical procedure and post-operative care promotes development of SSI. Variability in the virulence and type of microorganisms, type and location of surgical site, type of antimicrobials received by the patient prior to surgery, long exposure of tissue to exogenous conditions (as in prolonged surgical procedures),presence of co-morbidity like diabetes or malnutrition, on-going immune suppression therapy (25), for SSI at the stage of actual surgical

procedure. Unhygienic environmental conditions in the clinic and ward ; microorganism carried by health care personals who handle multiple number of patient (leading to cross infection); untreated infected site in the patients being in the ward; poorly sterilized ward equipment; fluid accumulations at wound site of patients with microbial growth in it; presence of Methicillin Resistant Staphylococusaureus (MRSA)in ward related materials such as mattresses pillows, bedside lockers, nurse call bells and commodes; use of medical devices colonized with microbes; and presence of microbes on scissors, clinicians stethoscopes and non-sterile bedpan are important post-surgical risk factors .Balance between extent of contamination of the wound site at the end of a surgical procedure and the ability of the host's immune system to respond to the challenge determines the development of SSI.

Infection of wounds caused by microorganisms from instruments, theatre environment, traumatic wounds and from organisms that have gained access to the wound before the skin has sealed post surgically are described as exogenous in nature whereas those infected from microorganisms that have originated from the skin or from an opened viscous of the patient are described as endogenous in nature. SSI caused by microorganisms from a distant source of infection (principally through haematogenous spread) or attached to a prosthesis or other implant left in an operative site are however rare.

Form the view point of risk of infection; operative wounds have been classified as under

	Class	Criteria
1	Clean	Clean: An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tracts are not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Operative incisional wounds that follow no penetrating (blunt) trauma should be included in this category if they meet the criteria.
2	Clean-contaminated	Operative wounds in which the respiratory, alimentary, genital, or urinary tracts are entered under controlled conditions and without unusual contamination. Specifically, operations involving the biliary tract, appendix, vagina, and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.
3	Contaminated	Open, fresh, accidental wounds. In addition, operations with major breaks in sterile technique (e.g., open cardiac massage) or gross spillage from the gastrointestinal tract, and incisions in which acute, no purulent inflammation is encountered including necrotic tissue without evidence of purulent drainage (e.g., dry gangrene) are included in this category.
4	Dirty	Includes old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation.

Source: United States Centres for Disease Control and Prevention9-6
https://www.cdc.gov/nhsn/pdfs/pscmanual/9pscssicurrent.pdf

The 'normal' reaction of the body to injuries including surgical interventions is to contain the damage to the tissue, clear the debris at the site of injury, followed by repair. Process of wound healing involves three major overlapping phases, an inflammatory phase, regeneration phase and maturation phase. Process is complex and involves interaction between many types of cells and release of a variety of biomolecules. Inflammatory phase involves recruitment of Platelets, neutrophils, lymphocytes and macrophages. Fibroblasts along with Macrophages are involved with regeneration and maturation phase. Cytokines, growth factors, carbohydrates and proteins also have a role in wound healing process. They cascaded into the

surgical site to participate in wound healing and act within the wound margins and across the wound bed.

Complications associated with SSI are due to the interference of the microorganism or its metabolites in the wound healing process that can lead to morbidity. Over one-third of postoperative deaths are found to be related, at least in part, to SSI. (11) SSI related non-fatal damages range from trivial wound discharge to a life-threatening condition. Scars poor in quality and spreading, persistent pain, itching, restriction of movement caused by SSI have significant impact on emotional wellbeing .12

Most common microorganism found in cultures from SSI's is Staphylococcus aureus .Enterobacteriaceae and anaerobes in the large bowel may act in synergy to cause SSI in surgeries involving the opening of bowel. Foreign body introduced in prosthetic surgery (for example, a vascular graft after arterial bypass surgery or a prosthetic joint in orthopedic surgery) are known to reduce the number of pathogenic organisms required to cause an SSI. Non-pathogenic organisms such as Staphylococcus epidermis (collagenase-negative staphylococcus) may also cause SSI under such favorable conditions.

Many preventive measures to contain the incidences of SSI have been developed. They vary in accordance with the risk associated with the class to which the operative wound belongs and cover pre-operative, operative and post-operative phases of surgical interventions.

Maintaining sterility of the operation theatre where surgeries are carried out is one of an important measure that is adopted during the course of surgical procedure. Additional practices have been brought into use to minimize microbial burden at operative site during pre and post-surgical period.

Removal of colonized microorganisms in and around the site marked for incision, use of prophylactic antimicrobial therapy, minimizing tissue damage to enhance the patient's defenses against infection, maintaining normothermia, preventing post-operative invasion of microorganisms using wound dressings are some of the important additional measures.

Antimicrobial resistance

Variation and natural selection are the essence of natural evolution of all living forms. Principle applies even to microorganisms. Genetic profile changes give rise to natural variants and those among them that can adapt to the immediate environmental conditions survive and multiply giving rise to new strains. Over usage and misuse of antimicrobials has resulted in an increase in frequency at which antimicrobials resistant strains develop. Strains that are resistant to different antimicrobial agents and some that are resistant against all the existing antimicrobials have come into existence. Their transmission is posing a serious setback in treating infections at community as well as health care facilities.

Problem is particularly amplified in the hospital due to the presence of is highly susceptible population that favours transmission. Transfer of resistant microorganism occurs among patients and resistance factors between bacteria favoring the spread of the resistant strain. Selective antibiotic pressure in the hospital (1,2) is an additional factor favoring development and spread of resistant microorganisms. Continuous use of an antimicrobial agents increases selection pressure by favoring the emergence and spread of resistant strains. Inappropriate and uncontrolled use of antimicrobial agents that includes over-prescribing, administration of sub optimal doses, insufficiency of duration of treatment and choice of wrong antimicrobial also accelerates selective antibiotic pressure. Inappropriate use of antimicrobials initiated due to lack of alternate agents, compound the risk of therapeutic failure and also the emergence of resistant strains. Empirical use of antimicrobials for therapy or as a prophylaxis in ambulatory and other healthcare settings has also emerged as a major factor that is favoring the emergence of resistant strains. Strains of pneumococci, staphylococci, enterococci, and tuberculosis haveemerged that are resistant to most or all antimicrobials which were once effective. Multi-resistant Klebsiella and Pseudomonas aeruginosa are prevalent in many hospitals. This problem is particularly critical in developing countries where more expensive second-line antibiotics may not be available or affordable (12).

Emergence of antimicrobial resistance associated with prophylactic use of antimicrobials to prevent SSI.

Usage of antimicrobial as prophylactics in preventing SSI was established in the year 1960s and is in vogue as one of the practices in reducing the incidences of SSI. Factors such as effectiveness of the antimicrobial agent against microorganisms anticipated to cause infection, its ability to reach local tissue concentration level sufficient to inhibit multiplication, side effects associated with its use, cost effectiveness and non-selectiveness against only virulent strains are consider in making a choice. Indiscriminate choice of antimicrobial prophylactic to prevent SSI has aided the early development and spread of drug resistant strains.

Pre-operative antimicrobials administered as prophylaxis for SSIs account for the majority of in-hospital antimicrobial prescriptions. Administration of the prophylactic antimicrobial for longer post-surgical periods is often associated with an increasing antimicrobial resistance, super-infection with resistant pathogens, toxicity and unnecessary cost.(ICMR guideline)

Implementation of a definitive and universal method to eliminate the development of antimicrobial resistance strains in healthcare and communities has not been possible due to the coexistence of multiple strains in the sources of infection and variability in strain component existing in different health care and community. In the absence of a universal policy on the prophylactic use of antimicrobials to prevent SSI, relying on the experience of the primary care professional and availability of the antimicrobial agent, at the health care facility was inevitable. Such reliance increases the chances of inappropriate use with resultant increase in incidences of antimicrobial resistance. Spread of resistant strain that is endemic to a community or hospital to pandemic level has increased as the result of human travel and migration with the travellers acting as carriers of the endemic microbial and spreading them to other areas.

Considering the alarming increase in the development of resistant strains of microorganism and their quick spread, World health organization has published a comprehensive range of evidence-basedrecommendations on interventions that should be considered in developing guidelines from national level to individual clinical settings aimed at preventing early develop of antimicrobial resistant strains.

A section in the document is devoted to guidance on the selection of appropriate antimicrobial agent to prevent SSI and reduce the instances of antimicrobial resistance. Important suggestions in this direction are

- Justification for the use of antimicrobial and also its selection.
- Implementation of a procedure of collecting smears or samples from the patients for bacteriological examination, before initiating antibiotic treatment.
- Considering sensitivity pattern, patient tolerance and cost of the drug along with nature of the disease and the microbe's pathogenicity, in deciding the prophylactic antimicrobial to be used prior to the surgical procedure.
- Providing routine update to clinician with details on prevalence of resistance in the facility and also the resistant microbes that is pandemic to the area
- Information regarding availability of antimicrobial having narrow antibacterial spectrum that can be used as prophylactic in prevention of SSI.
- Restrictions on the use of more than one antibiotic as individual entity or in combination and exceptions thereof.

As reported in medical literature it is likely that over [3] 15% of postoperative wounds are treated with antibiotics inappropriately and there is a high degree of variability in the frequency at which SSI occurs (2.5 to 41.9%). This variability may be attributed possibly due to the absence or poorly developed antimicrobial use policy. It is therefore imperative that health care facilities develop their own policies onprophylactic usage of antimicrobials in prevention of SSI and reduce the chances of development of antimicrobial resistant strains. Careful monitoring of SSI's occurring in the health care setting and consultations between multidisciplinary postoperative team and the primary care team should precede the selection of antimicrobials for inclusion in the policy. Other important factors to be addressed are:

- Prevention of indiscriminate selection of antimicrobial - Narrowing down the choice to a few that have been agreed upon by the surgeons, microbiologists and other healthcare professionals after due consideration of the resistant strains that are already existing

endemically and avoiding the development of others.

- Information on consequences associated with the use of doses that are lower or very high than *recommended*– to prevent ineffective treatment of infection and possible development of resistant strains associated with lower doses or increased adverse effects associated with the use of higher than recommended doses.
- Guidance for decision making on course duration- Usually between 5-14 days of an antibiotic on the bases of type of infection and specifying indications for longer courses.
- Directions regarding procedure to be adopted for discontinuation of an ineffective antimicrobialand reassessment of the situation.
- Developing an empirical antimicrobial therapy - Based on careful clinical evaluation and local epidemiological data regarding potential pathogens and antibiotic susceptibility.
- Procedures to be adopted in selection of antimicrobial when infecting microbial agent is available for identification - Testing an array of antimicrobials for effectiveness against the identified microbial using a culture and sensitivity test, to narrow down the selection.
- Guidance on choosing an appropriate antimicrobial formulation - Parenteral, oral or topical on the basis of clinical presentation (site and severity of infection).
- Specifying indications where selective use of antimicrobials in combinations (enterococcal endocarditic, tuberculosis, and mixed infections) is permitted.
- Provision for the physician to avoid antibiotic therapy in cases where fever has been judged to be due to non-infectious cause.

All tertiary care hospitals also augmenting as medical and paramedical teaching centers are mandated by ICMR to put in a place an antimicrobial use policy that is to be adhered to. Such a policy is in existence and is being followed in a large number of hospitals. The focus of the current study is to analyze the effectiveness of such a policy implemented in a tertiary care teaching hospital from where details of the incidences of SSI that occur will be collected and analyzed to find if a correlation exists.

Antimicrobials currently in use surgical prophylactics to prevent SSI are enumerated in the table
below.

Table: commonly used antimicrobials by class

Class	**Antibiotics**
Aminoglycosides	Streptomycin, kanamycin, tobramycin, gentamicin, neomycin, amikacin
Beta-lactams	
Penicillin's	Benzylpenicillin (penicillin G), procaine-benzyl penicillin, benzathine-benzyl penicillin, phenoxymethylpenicillin (penicillin V), ampicillin, amoxicillin, Methicillin, cloxacillin.
Penicillin/beta lactamase inhibitors	amoxicillin/clavulanic acid, piperacillin/tazobactam
Cephalosporin's	1st generation: cephalexin, cephalothin 2nd generation: cefuroxime, cefoxitin, cefaclor 3rd generation: cefotaxime, ceftriaxone, ceftazidime
Other beta-lactam	Aztreonam
• Carbapenems	Imipenem, meropenem
• Glycopeptides	Vancomycin, teicoplanin
• Macrolides/ Azolides	Erythromycin, oleandomycin, spiramycin, clarithromycin, azithromycin
• Tetracyclines	Tetracycline, chlortetracycline, minocycline, doxycycline, oxytetracycline
• Quinolones	Nalidixic acid, ciprofloxacin, norfloxacin, pefloxacin, sparfloxacin, fleroxacin, ofloxacin, levofloxacin, gatifloxacin, moxifloxacin
• Oxazolidinone	linezolid
• Streptogramin	Quinupristin/dalfopristin

• Others	Bacitracin, cycloserine, novobiocin, spectinomycin, clindamycin, nitrofurantoin
Sulfonamides and trimethoprim	Trimethoprim, trimethoprim withsulfamethoxazole

The tertiary care hospital where the work was carried is following the recommendations suggested in the primary aim of surveillance is the collection of data on SSI rates in order to obtain a measure of the magnitude of the problem. These data must then be analyzed to identify and investigate trends, including a careful interpretation of results. Finally, surveillance data should guide the identification of improvement actions and evaluate the effectiveness of these interventions.

AIM OF THE STUDY

The main aim of the study is to analyze the effectiveness of the prophylactic usage of antibiotic in clean surgical cases as per WHO guidelines in the tertiary care hospital.

Objectives

1. To study the incidences of prophylactic usage of antibiotic in clean operative surgeries and analyze the deviations if any from the standard procedure established in the hospital.
2. To find if a correlation exists between the frequency of incidences of drug resistance and the type of antimicrobial agent used in clean operative procedure,using post operative infection markers as specified in WHO surgical wound criteria
3. Arrive at a possible strategy aimed at reducing post operative surgical infections in clean surgical cases suitable to the environment in the hospital if any.

Plan of the work

The present dissertation work was planned as an epidemiological study and evaluation of effectiveness of prophylactic use of antibiotic in clean surgical cases in a tertiary care hospital

The plan of work included;

1. Selection of prophylactic antibiotics
2. Literature review
3. Data collection form
4. Evaluation of data
5. Statistical analysis and interpretation

METHODOLOGY

Study site

The study was conducted at PK DAS INSTITUTE OF MEDICAL SCIENCES.

Study design

The study was conducted as a hospital based prospective observational study. Variables collected were demographic factors like age, gender, previous history of surgery and Comorbid conditions. Past medical and medication history were recorded.

Duration of study

Six months starting from November 2016 to April 2017.

Sources of data

- ❖ Inpatient case sheet.
- ❖ Prescriptions written by clinicians.
- ❖ Medication chart of the patients who underwent surgery.
- ❖ Patient interviews.

Parameters for evaluation

- ❖ Patient Demography
- ❖ Prophylactic antibiotic used
- ❖ Comorbidities present in patients prior to surgical intervention.
- ❖ Incidences of SSI occurrences within a period of two weeks post-surgery.

Study population

Patients who underwent surgical procedure in the Dept. of ENT, and GENERAL SURGERYat P.K. DAS Hospital, a 300 bed tertiary care hospital.

Inclusion criteria

1. Patients undergoing clean surgery in the **Dept. of Surgery** and **ENT** who consented to participate in the study.
2. Patients with no obvious source or signs of infection.

Exclusion criteria

1. Patients with co morbidities like uncontrolled diabetes, compromised immune system, concomitant infection present at other sites and pre-existing local immune response (foreign bodies, damaged tissue or hematoma) that are patient related pre-surgical risk factor for SSI.
2. Patients undergoing emergency, bowel and urinary tract surgeries.

The ethical committee clearance for the study was obtained from the Institutional Ethics Committee, Nehru College of Pharmacy; prior to the study commencement vide circular No dated.

Collection of data

The case sheets of patients who were to undergo Clean surgery at the hospital under the Dept. of Surgery and ENT were reviewed, and data relating to Demography, history of previous surgical interventions, presence of comorbidities, diagnosis and name of the surgery was recorded. Among them those that met the requirements of inclusion criterions were requested to give a written consent regarding their voluntary participation in the study.

The data collection was for a period of six months (Nov 2016-April 2017) with the help of a pre designed patient data entry form. A total of 94 patients were available on the basis of inclusion and exclusion criteria. Patients undergoing clean surgical cases only were included in the study. Details such as the name and formulation of the Antibiotic administered to the patient, the route by which it was administered, the Prophylactic dose used, the time duration between administration and the start of surgery, continuation with an additional dose during the course of surgery and post-surgical administrations were recorded. Post-surgical changes in the use of antibiotic were also noted.

Patients were examined once daily for signs and symptoms of HAI and SSI during the post-operative stay in the hospital and then once on the first post discharge review carried out after a week. The number of cases of SSI encountered was noted and the treatment plan was altered accordingly.

ANALYSIS OF DATA

The data obtained during the course of the study were tabulated into convenient formats that allowed analysis, consistent with the aims and objectives of the study>>>>Statistical methods were made use of to test for significance and existence of any co-relation.

OBSERVATION AND RESULT

Age wise distribution of patients table 1

Sl.no	CATEGORY	NO OF PATIENTS	PERCENT OF STUDY POPULATION	INCIDENCES OF SSI	PERCENTAGE%
1.	Child 9 years or younger	Nil	0%	Nil	0.00%
2.	Adolescent 10 to 19 years inclusive.	Nil	0%	Nil	0.00%
3.	Adult Older than 19 years to 60 years	71	75.53%	02	2.13%
4.	Elderly Above 60 years	23	24.46%	02	2.13%

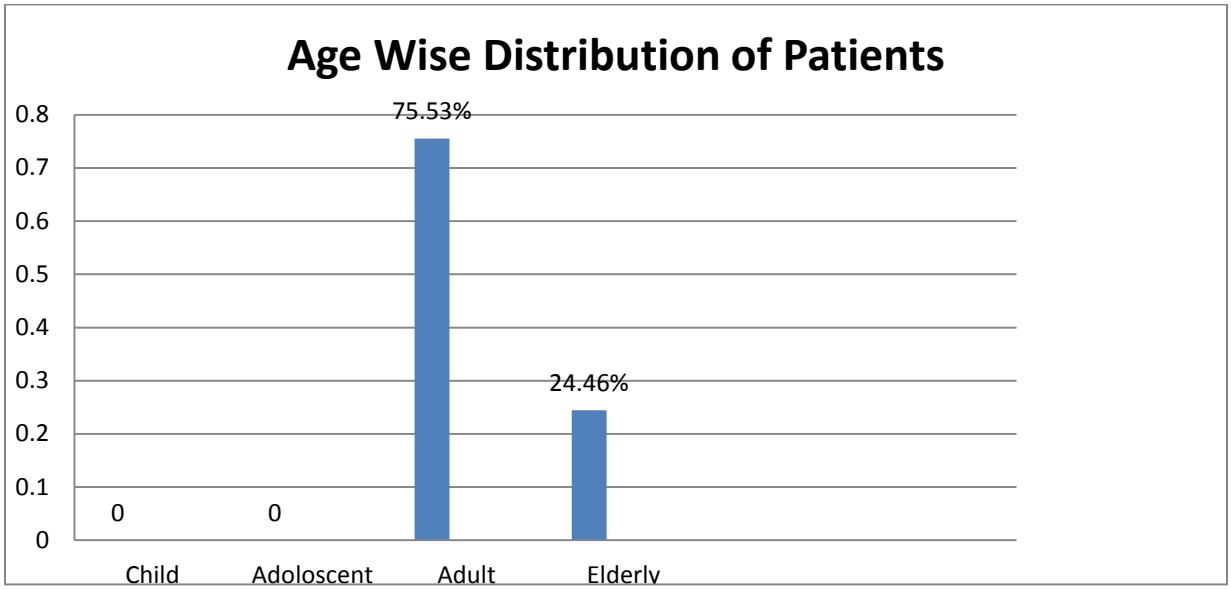

Fig.1

Table 2.GENDER WISE DISTRIBUTION OF INCIDENCES OF SSI

SL. NO	GENDER	NO. OF PATIENTS	PERCENT OF STUDY POPULATION	INCIDENCES OF SSI	SSI EVENTS PERCENTAGE%
1.	FEMALE	38	40.42%	Nil	0.00%
2.	MALE	56	59.57%	04	04.26%

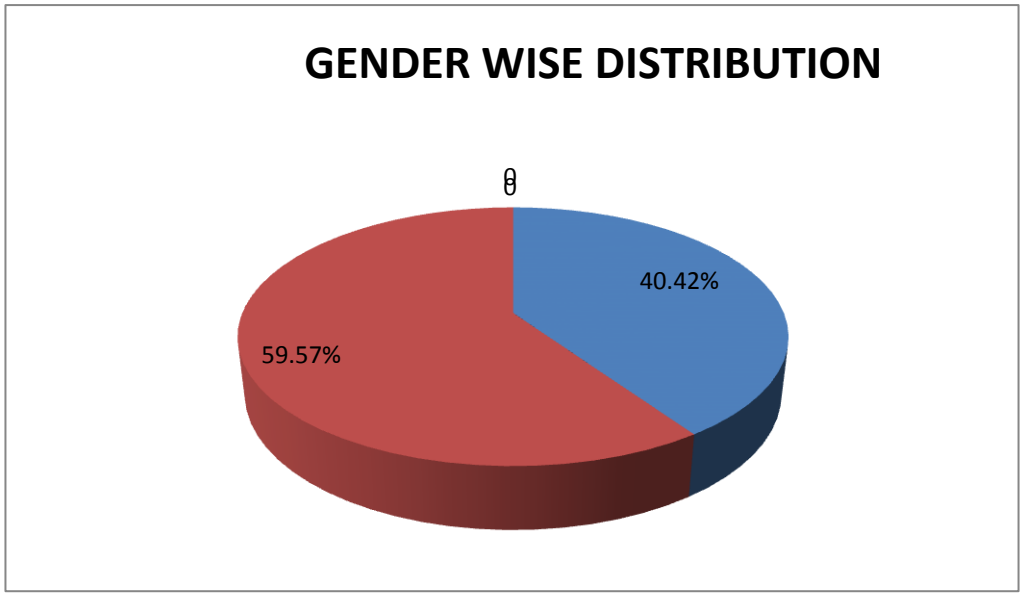

Fig.2

Table 3. TYPES OF SURGERIES PERFORMED AND INCIDENCES OF SSI

SL.NO	TYPE OF SURGERY	NO OF CASES	INCIDENCE PER 100	INCIDENCES OF SSI	SSI EVENTS PER 100
1.	HERNIOPLASTY	60	63.82%	03	5 %

2.	THYROIDECTOMY	17	18.08%	Nil	0.0%
3.	TRENDELENBURG PROCEDURE FOR VERICOSE VEIN	12	12.77%	01	8.33%
4.	EXCISIONAL BREAST BIOPSY	5	5.31%	Nil	0.0%
	TOTAL	94	100%	04	13.33 %

Incidences of clean surgical cases performed by dept. Of surgery

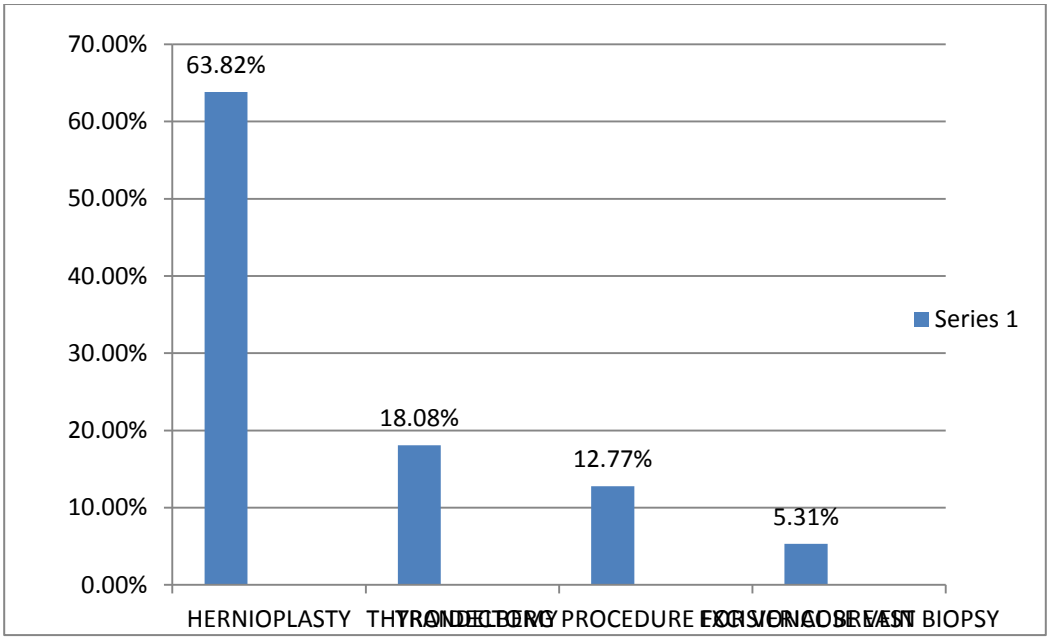

Table 4.usage of antibiotics as prophylactic in clean surgical cases

SL.NO	ANTIBIOTICS USED	BRAND NAME	DOSE USED	NO OF PATIENTS	PERCENTAGE
1.	AMPICILLIN 500mg +CLOXACILLIN 500 mg	AMPICLOX	1g I.V	70	74.47%
2.	AMOXICILLIN 1000 mg +POTASSIUMCLAVULANATE 200 mg	AUGMENTIN, AMOXICLAV	1.2 g I.V	10	10.64 %
3.	CEFOTAXIME 1gm	TAXIM	1 g I/V	14	14.89%

Table 5: LATENTENCY BETWEEN ADMINISTRATION OF PHROPHYLACTIC AND START OF SURGERY:

Time Interval	No. of Patients	Incidences of SSI	SSI events Percentage%
30 minutes	94	4	4.25%
60 minutes	Nil	0	0.00%
90 minutes	Nil	0	0.00%
120 minutes	Nil	0	0.00%

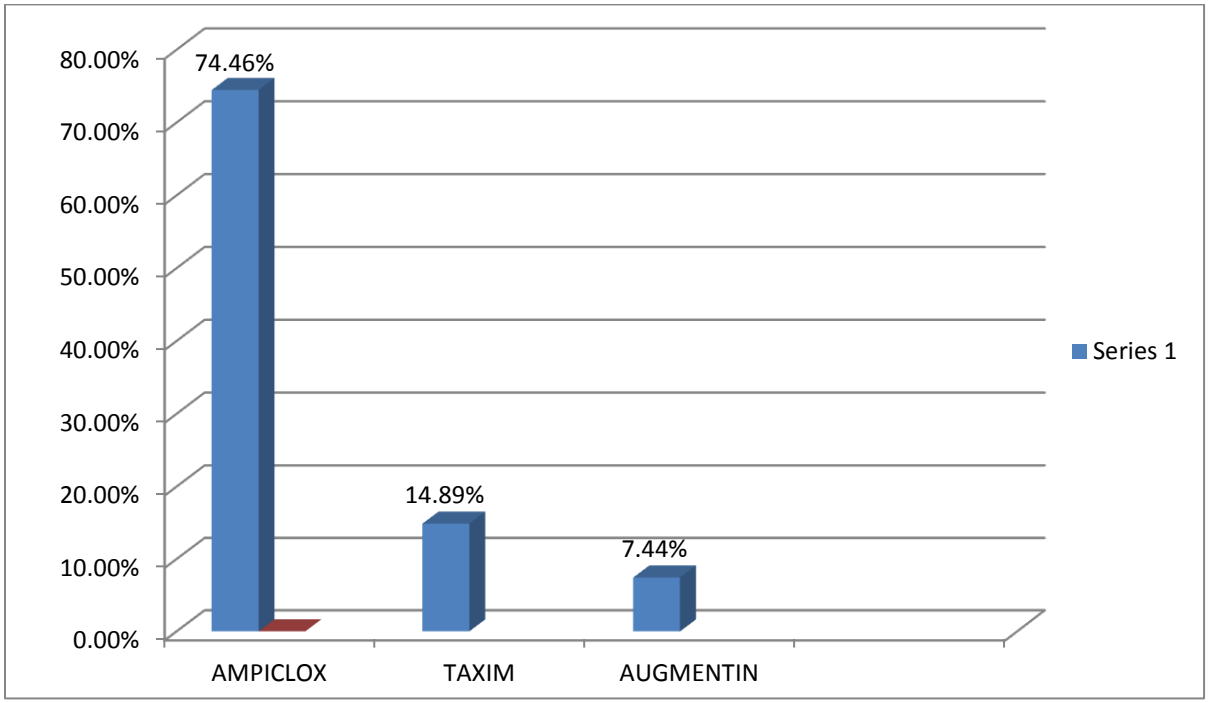

Table: 6 PROPHYLACTIC ANTIMICROBIAL SELECTIONS FOR DIFFERENT TYPES OF SURGERY:

Type of surgery	NO OF CASES	AMPICILLIN 500mg +CLOXACILLIN 500 mg	AMOXICILLIN 1000 mg +POTASSIUM CLAVULANATE 200 mg	CEFOTAXIME 1gm
HERNIOPLASTY	60	46	6	8
THYROIDECTOMY	17	12	2	3
TRENDELENBURG PROCEDURE FOR VERICOS VEIN	12	8	2	2
Excisional Breast Biopsy	5	4	0	1

Table: 7 post-surgical prophylactic usage of antibiotic:

Sl.No	PRE SURGICAL PROPHYLACTIC	NO. OF SUBJECTS	ADMINISTERED ADDITIONAL POST SURGICAL PROPHYLACTIC	NO OF SUBJECTS	NOT ADMINISTERED ADITTIONAL POST SURGICAL PROPHYLAXIS
1	AMPICILLIN 500mg +CLOXACILLIN 500 mg	70	AMPICILLIN 500mg +CLOXACILLIN 500 mg	53	17
2	AMOXICILLIN 1000 mg +CLAVULANATE POTASSIUM 200 mg	10	AMOXICILLIN 1000 mg +CLAVULANATE POTASSIUM 200 mg	5	5
3	CEFOTAXIME 1gm	14	CEFOTAXIME 1gm	14	Nil

Table: 8. EFFECTIVENESS OF PHROPHYLACTIC USAGE OF ANTIBIOTIC

Surgery Type	Incidences of SSI Observed With Use of Different Antibiotic		
	AMPICILLIN 500mg + CLOXACILLIN 500 mg	AMOXICILLIN 1000 mg + CLAVULANATE POTASSIUM 200 mg	CEFOTAXIME 1gm
HERNIOPLASTY	03/46	00/06	00/08
THYROIDECTOMY	00/12	00/02	00/03
TRENDELENBURG PROCEDURE FO VERICOSE VEIN	01/08	00/02	00/02
EXCISIONAL BREAST BIOPSY	00/04	00/00	00/01

Table 9: presence of comorbidities in patients undergoing surgery

Morbidity type	No of patients	Percentage %
HYPERTENSION	11	11.70%
COPD/ASTHMA	4	4.25%
CAD	3	3.19%
No Morbidity	76	77.56%

DISCUSSION

Invasive surgical procedure involves incision of the skin or other body surfaces to reach the surgical site. Post-operative infections of the incisions and the surgical site are generally referred to as surgical site infections (SSIs) and they account for approximately a quarter of all nosocomial infections. A Clean surgery is an uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tracts are not entered.

Based on the inclusion and exclusion criteria, 94 patients from the Dept. of surgery who were to undergo clean surgery were recruited to participate in the study over a period of six months. Demographic information, medical history, the name of the surgical procedure to be adopted, existence of comorbidities was recorded. Details of the prophylactic antibiotic used was also recorded which included the dosage form used, the prophylactic dose administered, time interval between administration of prophylactic dose and start of the surgical procedure, post-surgical administration. Incidences of SSI among the study patients and the change in drug therapy were also recorded.

Demography of patients in the study

Of the 94 patients who were included in the study 71 were adults (Older than 19 years to 60 years)who represented 75.53% of the study population and 23 were elderly (Above 60 years) representing 24.46% of the population. There were no patients representing adolescent and child group. These findings are summarized in Table1

Analysis of the incidences of SSI with respect to distribution among genders revealed that there was no incidence of SSI in females patients involved in the study who constituted 40.42% of the study population, whereas there were 4 incidences among the males who constituted 59.57% of the population. This finding is summarized in Table 2.

Types of surgeries performed and incidences of ssi

Data was analyzed to find if any correlation exists between the type of surgeries and the incidences of SSI. Of the 94 surgical procedures performed 60 were Hernioplasty, 17were Thyroidectomy, 12 were Trendelenburg procedure for varicose vein and 5 Excisional Breast Biopsy that correspondingly translated to 63.82%, 18.08%, 12.77 % and 5.31% of the total surgeries that were conducted. There were 3 incidences of SSI (5 %) among the 60 patients who underwent Hernioplasty

and 1 incidence of SSI (10%) among the 10 patients who underwent Trendelenburg procedure for varicose vein, where no incidences of SSI (0.00%) occurred among patients who underwent Thyroidectomy or Excisional Breast Biopsy. The findings are summarized in Table 3

Prophylactic usage of antibiotics

Fixed dose combination of Ampicillin 500mg with Cloxacillin500mg, Amoxicillin 1000mg with Potassium Clavulanate200 mg and Cefataxime 1gm as a single drug formulation were made use of as prophylactic to prevent post surgically development of SSI. They were administered by the Intravenous route. Ampiciilin 500 mg with Cloxacillin 500 mg was administered in 70 patients (74.47%), Amoxicillin 1000mg with Potassium clavulanate was administered to 10 patients (10.64 %), Cefotaxime 1g was administered to 14 patients (14.89%).The findings are summarized in Table 4.

Latentency between administration of phrophylactic and start of surgery

The time gap between administration of prophylactic antibiotic and the start of the surgery in all the cases was found to be maintained uniform at 30 minutes prior to surgery. Of the 94 subjects under study only 4 developed SSI (4.25%). Findings are summarized in Table 5.

Prophylactic antimicrobial selection for different types of surgery

Surgical procedures carried out were 60 cases of Hernioplasty, 17 cases of Thyroidectomy 12 cases of Trendelenburg Procedure for Vericose Vein and 5 cases of Excisional Breast Biopsy. Among 60 patients who underwent Hernioplasty combination of Ampicillin 500mg +Cloxacillin 500 mg was used in 46 cases, Amoxicillin 1000 mg with 200 mg potassium Clavulanate in 6 cases and CEFOTAXIME 1gm in 8 cases. Of the 17 patients who underwent Thyroidectomy combination of Ampicillin 500mg +Cloxacillin 500 mg was used in 12 cases, Amoxicillin 1000 mg with potassium clavulanate 200 mg in 2 cases and Cefotaxime 1gm in 3 cases. Of the 12 patients who underwent Trendelenburg procedure for Vericose Vein, combination of Ampicillin 500mg +Cloxacillin 500 mg was used in 8 cases, Amoxicillin 1000 mg with 200 mg Potassium Clavulanate in 2patients and Cefotaxime 1gm in 2cases.Of the 5 patients who underwent Excisional Brest Biopsy combination of Ampicillin 500mg +Cloxacillin 500 mg was used in 4cases, and Cefotaxime 1gm in 1cases.Findings are summarized in table 6

Post-surgical prophylactic usage of antibiotic

Out of the 94 cases 72 patients were administered prophylactic antibiotics post surgically.Of the 70 patients who were administered a preoperative dose of Ampicillin500mg with Cloxacillin only 53 received a post-surgical dose of the same whereas 17 patients were not administered a post-surgical prophylactic dose. Among the 10 patients who received a preoperative dose of Amoxicillin 1000 mg +Clavulanate potassium 200 mg only 5 patients were administered a post-surgical prophylactic dose of the same, whereas the other 5 patients were not administered any post-operative prophylactic. All the 14 patients who were administered Cefotaxime 1g as a preoperative dose of prophylactic also received a post-operative dose of the same. A total of 22 patients did not receive post-operative prophylactic dose of antibiotic. There were no incidences were in the post-surgical antibiotic used was other than the one administered pre-surgically. Findings are summarized in Table:7

Effectiveness of phrophylactic usage of antibiotic

All patients who participated in the study were administered prophylactic dose of an antibiotic prior to the start of the surgery by intravenous route. Among these only 4 developed SSI (4.25%) whereas in the remaining 90 there was no such occurrence. Incidences of SSI was observed only in a few cases where the Prophylactic used was a combination of Ampicillin 500mg + Cloxacillin 500 mg whereas no such incidences occurred where the prophylactic used was a combination of Amoxicillin 1000 mg + Clavulanate potassium 200 mg or Cefotaxime 1gm. Among the four cases of SSI reported 3 incidences were related to hernioplasty whereas 1 was related to Trendelenburg procedure for varicose vein. Findings are summarized in Table: 8

Presence of comorbidities in patients undergoing surgery

Among the 94 patients who were taken up for surgery 76 (77.56%) did not have comorbidities,

11 were hypertensive(11.70%), 4 were afflicted with COPD/Asthma (4.25%),and 3 had Coronary Artery Disease (3.19%). The findings are summarized in Table: 9

SUMMARY

The effectiveness of the treatment protocol followed in the hospital in surgical site infection was studied. The study was conducted at PK DAS INSTITUTE OF MEDICAL SCIENCES . A total of 94 patients were recruited for the study. A predesigned data entry form was used to collect demographic details ,Past medical and medication history .Comorbidities were also noted. Ampiclox was used as the standard prophylactic antibiotic in the hospital .The main aim of the study was to find out the effectiveness of the prophylactic antibiotics used in clean surgical cases .The results showed that only 4 patients developed SSI.

CONCLUSION

The study of effectiveness of prophylactic use of antibiotics in clean surgical cases was done.From the study it was found that the hospital was following the prophylactic antibiotic as per the WHO guidelines.SSI infection developed was less.Ampiclox is used as the standard prophylactic antibiotic.In the study majority of patients were given with ampiclox and in some cases they were given with other antibiotics.There were only 4 patients who developed SSI.

The antibiotics in the department of surgery is a double edged sword .The proper application of antibiotics can not only effectively prevent post operative infection and promote recovery but avoid waste of resources .However improper application of antibiotics may not only cause drug resistance but result in unwanted damage to patients.

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