“COMPARITIVE STUDY OF EFFICACY OF SINGLE DOSE ANTIBIOTIC IN MINOR , TRIPLE DOSE ANTIBIOTIC IN MAJOR SURGERIES VS ROUTINE POST OPERATIVE ANTIBIOTIC THERAPHY IN CLEAN MINOR AND MAJOR SURGERIES“

Dissertation Submitted to

THE TAMILNADU Dr. MGR MEDICAL UNIVERSITY

Chennai-600 032

In partial fulfillment of the regulations for the Award of the degree of

M.S. (General Surgery)

Branch – I

MADRAS MEDICAL COLLEGE

CHENNAI

May 2019

CERTIFICATE BY THE GUIDE

This is to certify that the dissertation entitled **"COMPARITIVE STUDY OF EFFICACY OF SINGLE DOSE ANTIBIOTIC IN MINOR , TRIPLE DOSE ANTIBIOTIC IN MAJOR SURGERIES VS ROUTINE POST OPERATIVE ANTIBIOTIC THERAPHY IN CLEAN MINOR AND MAJOR SURGERIES"** is the bonafide original Work of **Dr.S.BABU VENKATESH SUNDAR** under my guidance During the period 2017-2018. This has been submitted to the partial fulfillment of the award of M.S degree in general surgery branch 1 of the Tamilnadu Dr.MGR Medical University, chennai-32.

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This is to certify that, the dissertation entitled **"COMPARITIVE STUDY OF EFFICACY OF SINGLE DOSE ANTIBIOTIC IN MINOR , TRIPLE DOSE ANTIBIOTIC IN MAJOR SURGERIES VS ROUTINE POST OPERATIVE ANTIBIOTIC THERAPHY IN CLEAN MINOR AND MAJOR SURGERIES"** is the bonafide work done by **DR.S.BABU VENKATESH SUNDAR,** during his M.S. (General Surgery) course 2016-2019, done under my supervision and is submitted in partial fulfillment of the requirement for the M.S.(BRANCH-I)- General Surgery of The TamilnaduDr.MGR Medical University, May 2019 examination.

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DR.S.BABU VENKATESH SUNDAR

ACKNOWLEDGEMENT

First, I would like to extend my sincere thanks and appreciation towards all our **patients** for their willingness to co-operate with the study.

My inexpressible gratitude to my mentor, **PROF.P.S.SHANTHI M.S**, **D.G.O,** Professor and Unit Chief, institute of General Surgery, Madras Medical College, chennai, for her constant encouragement and skillful guidance at each step of the preparation of this work. Her enthusiasm, zeal for perfection and eagerness for exploring the depth of learning helped me a lot to understand various aspects of the subject. It was only due to her constant inspiration, efforts and suggestions that this study was possible.

With great respect, I express my gratitude to**,** Professor and Head. Department of Surgery, who with his vast experience and enthusiasm helped me through my dissertation work.

I sincerely thank my assistant professors, fellow postgraduates, juniors for their invaluable opinion and immense help in completing the study. I also thank my family members, siblings, my sister and my friends for their constant support.

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Dear Dr.S.Babu Venkatesh Sundar,

The Institutional Ethics Committee has considered your request and approved your study titled **"COMPARATIVE STUDY OF EFFICACY OF SINGLE DOSE ANTIBIOTIC IN MINOR, TRIPLE DOSE ANTIBIOTIC IN MAJOR SURGERIES VS ROUTINE POST OPERATIVE ANTIBIOTIC THERAPHY IN CLEAN MINOR AND MAJOR SURGERIES " - NO.04062017(A)**

The following members of Ethics Committee were present in the meeting hold on **20.06.2017** conducted at Madras Medical College, Chennai 3

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We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

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ABBREVIATIONS

BT	**:**	Bleeding Time
CDC	**:**	Center's for Disease Control
CMV	**:**	Cytomegalovirus
CNS	**:**	Central Nervous System
CO_2	**:**	Carbondioxide
CSF	**:**	Cerebro Spinal Fluid
CT	**:**	Clotting Time
CVS	**:**	Cardiovascular System
CXR	**:**	Chest X-ray
DC	**:**	Differential Count
DM	**:**	Diabetes Mellitus
DNA	**:**	Deoxyribonucleic Acid
ESR	**:**	Erythrocyte Sedimentation Rate
FBS	**:**	Fasting Blood Sugar
Hb	**:**	Hemoglobin
HIV	**:**	Human Immuno Deficiency Virus
Ht	**:**	Hypertension

IV	**:**	Intra Venous
LFT	**:**	Liver Function Test
MRSA	**:**	Methicillin Resistance Staphylococcus Aureus
PA	**:**	Per Abdomen
RBS	**:**	Random Blood Sugar
RR	**:**	Respiratory Rate
RNA	**:**	Ribonucleic Acid
RS	**:**	Respiratory System
SPO_2	**:**	Partial Pressure of Oxygen
SSI	**:**	Surgical Site Infection
TC	**:**	Total Count
URTI	**:**	Upper Respiratory Tract Infection
USG	**:**	Ultrasound
UTI	**:**	Urinary Tract Infection

ABSTRACT

BACKGROUND AND OBJECTIVE:

Surgical Site infection is the most common nosocomial infection encountered in post operative surgical wards. The advent of prophylactic antibiotic in surgery has changed the face of surgical site infection and reduced its incidence dramatically. But the use of prophylactic antibiotic in elective surgical cases is still a subject of controversy to surgeons.

The objective of the study is

- to reduce the post-operative wound infection at or around the surgical sites, such surgical site infection will prolong the duration of hospitalization by one week and also costs for the patients.

- to reduce the prevalence of hospital acquired infection.

- to reduce the incidence of resistance to antibiotics.

-to reduce the overall cost effectiveness to the patients.

-Patients comfort and tolerance.

-Adverse effect of antibiotics are minimized.

Methodology:

The material for the comparative study of prophylactic antibiotics in Minor cases was collected from 100 cases admitted under two groups of 50 each Group A1 was given prophylactic antibiotic prior to sincision and Group A2 was given routine conventional 5 day Post op antibiotics. Material for Major cases was collected from 100 cases admitted under two groups of 50 each Group B1 who received 3 doses of antibiotics, first dose Prior to incision, second dose 8 hours later and third dose 8 hours after the second dosage. Cases other than clean cases were excluded from the study group. Post op wound was inspected for signs of infection and graded according to **Southampton scoring**.

Results:

In Minor surgery, two out of 50 patients in group A1 who were given one dose of antibiotic prior to incision were infected and 2 out of 50 patients in Group A2 who received conventional Antibiotic coverage were infected. In Major surgeries, amongst Group B1 who were given three dose of antibiotic coverage three cases out of 50 were infected and in Group B2 who received conventional 5 day Antibiotic, two cases out of 50 patients were infected.

Conclusion:

Based on my study I would like to conclude that it is recommendable to use single dose antibiotic prophylaxis using appropriate antibiotics for all Minor surgeries and three dose of Antibiotics for Major surgeries, as per the study results there is no significant difference in incidence of SSI when compared to the traditional regimes with the added advantage of significant reduction in hospital stay, with its resultant savings in resources. In addition as the use of antibiotics is reduced it further results in increased cost effectiveness and reduces the incidence of complications due to antibiotic overuse.

Key words:

Surgical site infection, prophylactic antibiotics nosocomial infections.

INTRODUCTION

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CONCLUSION

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INTRODUCTION

INTRODUCTION

Surgical site infection (SSI) is one of the most frequent causes of post-operative morbidity. Surgical site infection is the most common nosocomial infection in our population accounting for 38% of all infections in surgical patients. Incisional infections are the most common accounting for 60% to 80% of all SSIs.

Antimicrobial agents were considered as magic bullets and effective tools to combat infections in various therapeutic settings. However, the non-judicious usage of these antibiotics has become a subject of controversy. Rational antibiotic use is promulgated with much vigor as the resultant effect of injudicious antibiotic usage had propelled the emergence of antibiotic resistance and spiraled the cost escalation in therapeutic care.1Antibiotic resistance has become a global menace, and WHO in 2012 had given a clear call to reduce the antibiotic use and prevent resistance to antibiotics .Antibiotic prophylaxis is a therapeutic method in which antimicrobial agents are used prophylactically to prevent the infectious complications in a therapeutic procedure. In conventional antibiotic use, antimicrobials are used for a predetermined period after therapeutic procedure to combat the infection .In this era of antibiotics, the cornerstones of infection control, such as meticulous surgical skill, respectful tissues handling, inbuilt environmental sanitation, adequate preoperative preparation, congenial theater environment, and adequate wound care, are given less priority .As per various studies cited and Cochrane data reviewed the conventional use of antibiotic for much longer

period are not justified. Most often in public hospitals where the environmental hygiene is not adequately maintained and over load of surgical patients with the fear of development of surgical site infections even for clean and clean - contaminated surgeries antibiotics are given for 7-10 days. The traditional approach for this multi dose usage often leads to huge expenditure to the hospital and enhance emerging of resistance to the particular drug and the group to which it belong.

Hence this study is intended to study the effect of single dose of antibiotic in minor surgeries and 3 dose antibiotic in major surgeries against the conventional 5 day antibiotic therapy.

AIM OF THE STUDY

OBJECTIVES

- To reduce the post-operative wound infection at or around the surgical sites, such surgical site infection will prolong the duration of hospitalization by one week and also costs for the patients.
- To reduce the prevalence of hospital acquired infection.
- To reduce the incidence of resistance to antibiotics.
- To reduce the overall cost effectiveness to the patients.
- Patients comfort and tolerance.
- Adverse effect of antibiotics are minimized.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

HISTORY :

The ancient Egyptians were the first civilization to have trained clinicians to treat physical aliments. Medical papyri, such as the Edwin Smith papyrus (circa 1600 BC) and the Ebers papyrus (circa 1534 BC), provided detailed information of management of disease, including wound management with the application of various potions and grease to assist healing.

Hippocrates (Greek physician and surgeon, 460-377 BC), known as the father of medicine, used vinegar to irrigate open wounds and wrapped dressings around wounds to prevent further injury. His teachings remained unchallenged for centuries. Galen (Roman gladiatorial surgeon, 130-200 AD) was first to recognize that pus from wounds inflicted by the gladiators heralded healing (*pus bonum et laudabile* ["good and commendable pus"]). Unfortunately, this observation was misinterpreted, and the concept of pus preempting wound healing persevered well into the 18th century. The link between pus formation and healing was emphasized so strongly that foreign material was introduced into wounds to promote pus formation-suppuration. The concept of wound healing remained a mystery, as highlighted by the famous saying by Ambroise Paré (French military surgeon, 1510-1590), "I dressed the wound. God healed it."

The scale of wound infections was most evident in times of war. During the American Civil War, erysipelas (necrotizing infection of soft tissue) and

tetanus accounted for over 17,000 deaths, according to an anonymous source in 1883. Because compound fractures at the time almost invariably were associated with infection, amputation was the only option, despite a 25-90% risk of amputation stump infection.

The history of antisepsis dates back to 17th century as microbes are invisible to the unaided eyes. Definitive knowledge about them had to await the development of microscopes. The credit for having observed and described bacteria goes to Antony Van Leuwen Hock, a draper from Delft, Holland. In 1663 he made accurate description of various types of bacteria which after some two centuries gained importance in field of medicine. The causative agents of various infectious diseases were being reported differently by different investigators, so it was necessary to introduce criteria for providing claims that a microorganism isolated from a disease was indeed causative. These criteria were estimated by Robert Koch in 1898 and are known as Koch's Postulates. According to these, a microorganism can be accepted as causative agent of a disease only if the following conditions are satisfied :

1. The bacteria should be constantly associated with the lesion of the disease.
2. It should be possible to isolate the bacteria in pus culture from the lesion.
3. Isolation of such pus culture into suitable laboratory animals should reproduce the lesion of the disease.
4. It should be possible to isolate the bacteria by pus culture from the lesion produced in experimental animals.

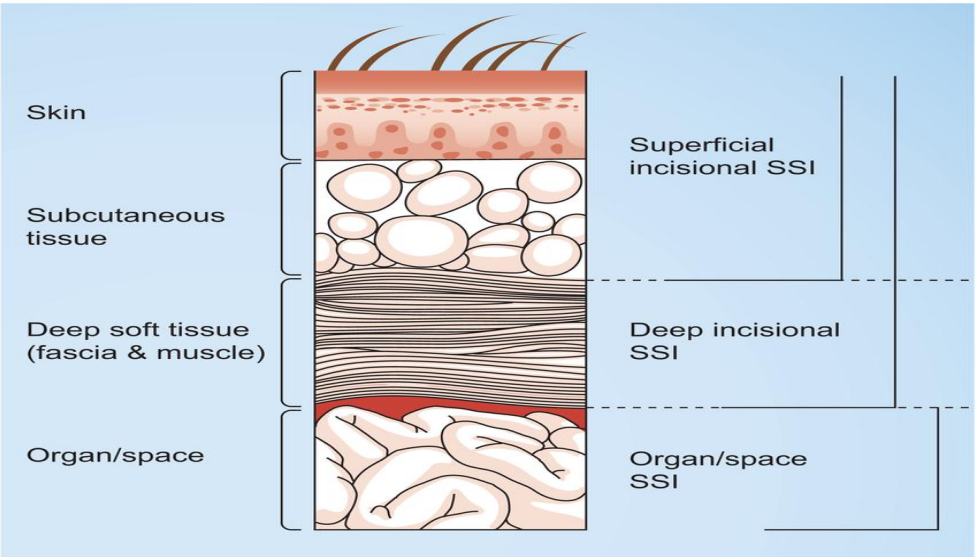
Louie Pasture's contribution to the field of asepsis was his techniques of sterilization, the development of a steam sterilizer, hot air oven and an autoclave (1880). Oliver Wendell Holmes in the USA (1843) and Ignaz Semmelweis in Vienna (1846) have independently concluded that puerperal sepsis was transmitted by the contaminated hands of the obstetrician. Semmelweis instructed them to wash their hands in chloride of lime before they attended women in labour. This resulted in reduction of maternal mortality from 11.4% in 1846 to 1.3% in 1848.

Joseph Lister's work in the field of antisepsis in surgery has totally revolutionized the concept of surgery. Lister's technique of carbolic acid sprays and soaking of suture material as well as cleaning of surgeon's hand in a very elaborate manner for protection against infection were not well accepted by anyone except the Germans who eventually through the work of Von Bergmann developed the technique of steam sterilization in 1886 under an elaborate antiseptic ritual in 1891.In the late 1860's several surgeon became strong proponents of Listerism, but it was not until Halsted (1879) campaigned to aspect and meticulous techniques known to him, that his techniques became widely accepted in the US. They saw that if pathogen could be tentatively eliminated from the surgeon's field of operation his chance of success would be far greater.

Definition and classification of Surgical Site Infection:

Surgical site infections are infections of the tissues, organs and spaces exposed by surgeons during performance of an invasive procedure. SSI are classified into incisional and organ / space infection and the former is further sub classified into superficial and deep incisional categories.

Fig:1 – classification of SSI



Microbial density in tissue can be determined by the staining of a weighed and homogenized biopsy sample. However information based on this method is not available before operation. Therefore if antibiotic administration is to be started preoperatively, the decision must be on clinical basis. Fortunately there is a system of classifying surgical procedures based on the probability and the degree of microbial contamination.

Superficial incisional wound infection must meet the following criteria. Infection occurs at an incision site within 30 days after operation and involves skin or subcutaneous tissue above the fascial layers and any of the following.

1. There is purulent drainage from incision or drainage located above fascial layer.
2. Organism is isolated from culture of fluid aseptically obtained from wound closed primarily.
3. Wound is open deliberately by surgeon, unless wound is culture negative.

Deep surgical wound infection must meet the following criteria. Infection occurs at operative site within 30 days after operation if no prosthesis was permanently placed or within layer if an implant was placed, and infection involves tissues or spaces at or beneath the fascial layer and any of the following

1. Wound spontaneously dehisces or is opened deliberately by surgeon when patient has fever (>38^{o} c) and / or localized pain or tenderness, unless wound is culture negative.
2. An abscess or other evidence of infection directly under the incision is seen on direct examination, during operation or by histopathological examination.
3. Surgeon declares infection.

The surgical wounds are classified based on the presumed magnitude of the bacterial load at the time of surgery as clean, clean contaminated, contaminated and dirty.

CLASSIFICATION:

Class I/Clean: Include those in which no infection is present; only skin microflora potentially contaminates the wound, and no hollow viscus that contains microbes is entered.

An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Class ID wounds are similar except that a prosthetic device (eg. Mesh or valve) is inserted.

Class II/Clean-Contaminated: Include those in which a hollow viscus with indigenous bacterial flora is opened under controlled circumstances without significant spillage of the contents.

An operative wound 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.

Class III/Contaminated: Include those open accidental wounds encountered early after injury, those with extensive introduction of bacteria into a normally sterile area of the body.

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, nonpurulent inflammation is encountered are included in this category.

Class IV/Dirty-Infected: include traumatic wounds in which a significant delay in treatment has occurred and in which necrotic tissue is present, those created in presence of overt infection.

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.

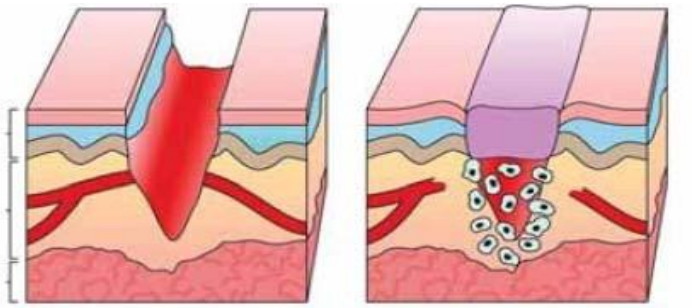
TYPES OF WOUND HEALING:

Surgical wounds may heal by primary intention, secondary intention or by tertiary intention (delayed primary).

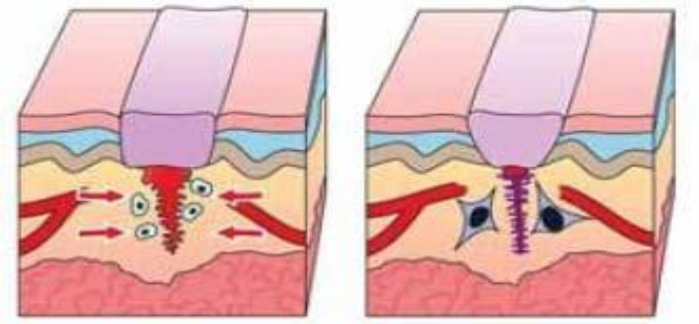
Healing by Primary intention:

Most heal by primary intention, where the wound edges are brought together (apposed) and then held in place by mechanical means (adhesive strips, staples or sutures), allowing the wound time to heal and develop enough strength to withstand stress without support. The goal of surgery is to achieve healing by such means with minimal oedema, no serous discharge or infection, without separation of the wound edges and with minimal scar formation.

Haemostasis and Inflammatory Phase :



Fibroplastic Phase :



Remodelling Phase :

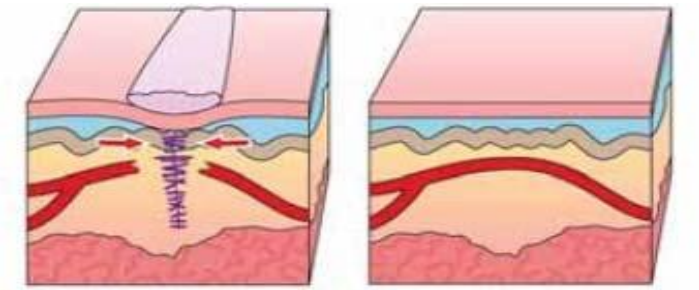


Fig 2:Phases of Wound Healing

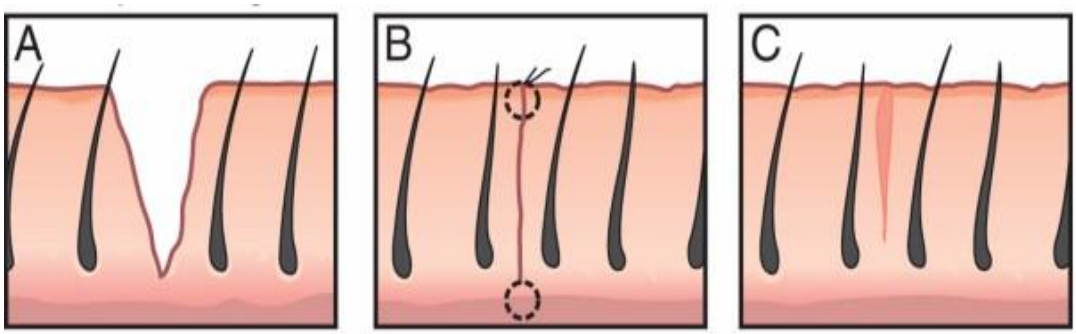
Healing by Secondary intention:

Healing by secondary intention happens when the wound is left open, because of the presence of infection, excessive trauma or skin loss, and the wound edges come together naturally by means of granulation and contraction.[21]

Healing by Tertiary intention:

On occasions surgical incisions are allowed to heal by delayed primary intention where non-viable tissue is removed and the wound is initially left open. Wound edges are brought together at about 4-6 days, before granulation tissue is visible. This method is often used after traumatic injury or dirty surgery.[22]

Healing by Primary intention:



Healing by Secondary intention:

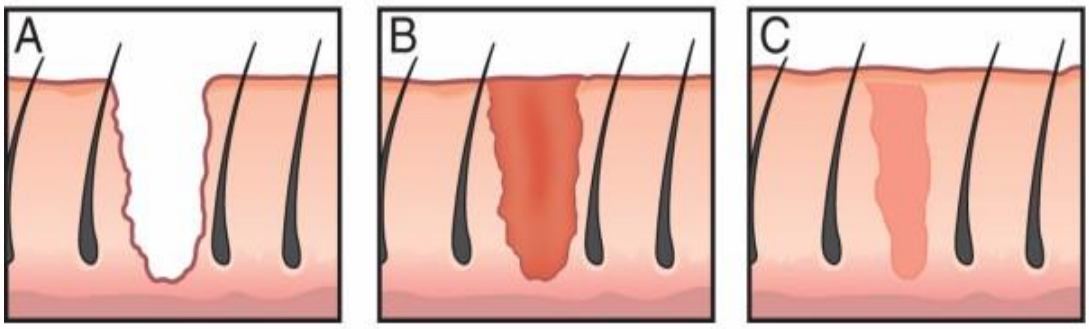


fig 3: Types of Wound Healing

Factors Affecting Wound Healing:

The factors that may adversely affect the wound healing can be conveniently considered in two categories: factors, which locally affect wound repair (local factor) and the systematic abnormalities which have remote effects on the wound (systemic factors).

Local Factors:

The local factors which have been implicated in the failure of wound healing are

1. Surgical technique.

2. Blood supply.

3. Mechanical stress.

4. Suture materials.

5. Suture technique.

6. Infection

7. Radiation

Surgical Technique:

The most important local factor in pathogenesis of wound complications is performance of the surgeon. Indeed, this is the single most important factor in the success or failure of wound healing. One might then expect that surgeons in training would experience a higher incidence of complications than qualified senior surgeons and there is some evidence to support the case.

The essentials of good surgical technique include gentle handling of the tissues, securing meticulous hemostasis, the prevention of any dead space in the wound, and the avoidance of tissue necrosis resulting from excessive use of surgical diathermy or strangulation of the tissues by the ligatures. The presence of one or more of these variables constitutes a barrier to the processes of cellular repair and they are the factors leading to propagate wound infection. Ischemic tissue, a wound hematoma,or a collection of serum in the wound is excellent media for the subsequent growth of bacteria.

The relative merits of surgical diathermy compared to suture ligation in wound hemostasis remain controversial but there is probably very little difference between the two methods as far as they affect the wound healing both may cause problems if they are used incorrectly. Diathermy should be used sparingly and precisely. Ligatures on blood vessels should not strangulate adjacent tissues. Fine suture materials can be used for most blood vessels and absorbable sutures can be used for vessels in the subcutaneous tissues.

Hematomas or collections of serum usually occur when ever dead space exists in the wound. Dead space is created in surgeries involving the reflection of skin or tissue flaps and in obese patients and it must be said that a potential dead space is virtually unavoidable in certain surgeries. However, dead space can be reduced or obliterated either by applying external mechanical pressure or by the use of wound drains. In obese patients, there is often a large potential dead space in the subcutaneous tissue and suture obliteration or drainage of this layer is advisable in these subjects.

Other local factors affecting wound healing such as blood supply of the wound and the presence or absence of mechanical tension may also be results of surgical technique and these are considered below.

Blood Supply:

A good blood supply is a basic factor in the success of wound repair; it is essential for the supply of oxygen and other nutrients required in the cellular and biochemical processes of repair and it is necessary for the removal of wound metabolites.

Disease may lead to impaired blood supply of the wound. This is most frequently encountered in the surgical treatment of atherosclerotic arterial insufficiency of the lower limb. Any factor causing mechanical tension in the wound will have adverse effects on the blood supply. Extrinsic forces cause wound tension by distracting the wound edges. In the simple example of a sutured skin wound, the elastic pull of the unwounded skin on either side of the incision exerts a lateral pull on the wound edges. In wounds of the hollow

viscera and the abdominal wall, wound tension is also derived from the pressure within the lumen of the viscus or hollow cavity; the tension occurring in the wound is directly related to this pressure and the radius of the lumen according to the law of Laplace.

The simple suture of wound therefore will inevitably result in wound tension and adverse effects on blood flow. It is difficult to state in quantitative terms the point at which such tension becomes harmful; the avoidance of tension in wound closure is a matter of surgical experience or expertise rather than a measurable parameter. Intrinsic wound tension or the buildup of pressure within the volume of the wound contents following suture. Some degree of swelling of the wound is a normal feature of the early phase of repair. It results from the inflammatory response which is a feature of the first few days in all wounds and the surgeon should allow for such changes by ensuring that his sutures are not tied too tightly. More serious problems of intrinsic wound tension occur in the presence of wound infection, hematomas and collections of serum. These factors may cause an injurious rise in tissue pressure within the relatively inelastic confines of the wound. The presence of ischemic tissue in the wound initiates a vicious circle whereby the ischemic tissue results in tissue swelling and the tissue swelling lead to a further reduction in blood supply of the wound.

Mechanical Stress:

The extrinsic forces affecting wound tension may cause wound disruption or it may be a consequence of excessive movement of the wound

edges. In the former case, the tension at the suture or wound interface created by the extrinsic forces becomes so greater that the sutures simply cut out through the wound edges, less commonly the suture material may break or the knots may slip.

General surgeons are familiar with the effects of mechanical stress on abdominal wound healing a sharp rise in intra abdominal pressure caused by coughing or gaseous distension of the intestine may result in the abdominal wound disruption.

Suture Materials:

The choice of suture material in primary wound closure may have a significant bearing on the success of the subsequent wound repair. There have been striking developments in the manufacture of sutures in recent years and there is now an extensive range of naturally occurring and synthetic sutures.

It has been suggested that the ideal suture may be defined as follows:

1. It should hold the tissues in apposition for as long as the natural forces are insufficient to resist separation or stretching of the wound edges.

2. It should handle easily and knot securely.

3. It should provoke minimal tissue reaction and it should be quickly absorbed so that the infection is not encouraged and it should not result in sinus formation.

Suture Technique:

There are general aspects of suture technique which need to be observed in the primary closure of all wounds and there are certain technical aspects

which are peculiar to particular tissues or wounds. The general aspects include the careful apposition of the wounds. The general aspects include the careful apposition of the wound edges, the avoidance of strangulation of the tissues, the selection of suture materials which are sufficiently strong to provide adequate mechanical support to the wound and secure knotting of the wound sutures. Sutures should be inserted some distance away from the wound edges. The edges of the wound are weakened by collagenolysis for several days following wound closure and suture may cut out if they are too close to the wound edges. Knot security is provided by the 'surgeon's knot' or square knot and this should always be used in preference to a 'granny knot'. Monofilament nylon and polypropylene have poor knotting characteristics and at least five 'throws' should be used to prevent knot slipping when these suture materials are used.

Radiation:

Problems of wound healing resulting from ionizing irradiation chiefly occur in the management of skin wounds in previously irradiated tissues. These problems are frequently encountered in the surgical treatment of recurrent malignant disease of the chest wall or head and neck.

Infection:

Bacterial infection is the most common complication of wound healing and it encountered in every surgical specialty. Multiple factors are involved in the pathogenesis of wound infection and the effects of infection are divers. Classical wound infection occurring in wounds closed by primary suture may

simply be a source of significant morbidity but infection in vascular operations, plastic surgery and orthopaedic surgery may have disastrous consequences.

SYSTEMIC FACTORS:

Systemic factors which may affect wound healing are

1. Age
2. Malnutrition
3. Vitamin deficiency
4. Zinc deficiency
5. Trauma, hypovolemia and hypoxia
6. Anemia
7. Uremia
8. Malignant disease
9. Jaundice
10. Corticosteroid drugs
11. Cytotoxic and antimetabolite drugs

SURGICAL MICROBIOLOGY:

Surgical infections are usually caused by bacteria, but fungal and viral infections can also occur especially as post operative infections in immune-compromised hosts.

Bacteria:

Bacteria can be classified according to staining characteristic with Gram stain (positive or negative), shape (cocci, rods, spirals) and sensitivity to

Oxygen (aerobic, facultative, anaerobic) or according to the combination of these characters.

Gram positive cocci:

Staphylococci and some streptococci species are the Gram positive cocci of interest to surgeons because of their ability to cause primary surgical infections and post operative infections. Staphylococci may be coagulase positive or coagulase negative.

Staphylococcus aureus is the most common pathogen isolated from wound infections. A major factor in its pathogenicity is coagulase productions, although the mechanism by which coagulase production increases virulence is not known. Most coagulase positive staphylococci should be resistant to penicillin and require treatment by a penicillinase resistant antibiotic. Extensive use of penicillinase resistant Beta lactam antibiotics during past 2 decades has encouraged emergence of Methicillin resistant staphylococcus aureus (MRSA). Coagulase negative staphylococci are the most common organisms recovered in nosocomial bacteremia and are frequently associated with clinically significant infections of intravascular devices.

Surgically important members of the genus streptococci include S.pyogenes, pneumoniae and the viridians group which includes S.mulleri, S.salaivarium. Streptococci are classified according to Lancefield classification and ability to cause hemolysis on blood agar, alpha hemolysis a zone of green discoloration around colonies containing intact red blood cells, beta hemolysis,

complete clearing of the area around colonies and destructions of red blood cells; and gamma hemolysis.

Group A streptococci can cause infections of almost any organ although skin, subcutaneous tissue and pharynx are the most frequently affected areas. Streptococci are important pathogens because of their ability to cause post operative infections including cellulitis, wound infection, endocarditis, urinary tract infection and bacteremia. Enterococci are commonly recovered as a part of the normal flora of the gastrointestinal tract and the vagina. Enterococcal bacteremia has a poor prognosis in combination with intra abdominal or pelvic infections and is found most often in patients who here been hospitalized for long time.

Aerobic and facultative anaerobic gram negative bacilli:

Numerous gram negative rods that can cause human disease have been identified, but only a few are of surgical importance. The genera Escherhia, Klebsiella, Proteus, Enterobacter frequently can be cultured from patients with intra abdominal and pelvic peritonitis and abscess, post operative wound infection, pneumonia and urinary tract infection.

Pseudomonas aeurginosia is the species responsible for most surgical infections. They are frequently found in immunologically compromised patients, especially if they have been hospitalized for some time. Because of its resistance to single antibiotic therapy, Pseudomonas infections are frequently treated with a combination of two antibiotics.

Anaerobic Bacteria:

Anaerobic bacteria require reduced oxygen for growth. Virtually all anaerobic infections arise endogenously. The cell wall of anaerobic bacteria is important in abscess formation. The genus Clostridium is most virulent of all anaerobes. C.Dfficile cause pseudomembranous colitis and occurs in patients on antimicrobial therapy.

Fungi:

Fungi are the most primitive eukaryote organism and are classified as protists. Because of their cell wall similarity to mammalian cells they are not sensitive to antibacterial agents, and many antifungal agents are toxic to human cells.

In surgical patients opportunists cause most infections. Candida albicans and other candida species are by far the most common. They cause infection in patients treated with broad spectrum antibiotics and steroids. These infection can be treated by stopping antimicrobial, correcting host defences and therapy with amphotericin B or one of the azole antifungal agents.

Viruses:

Viruses are obligate intracellular parasites and are distinguished by their having either DNA or RNA. CMV causes most viral infections in organ transplant recipients. Hepatitis B virus, hepatitis C virus and human immunodeficiency virus (HIV) are of importance of surgeons because of the possibility that they can become infected from patient exposure and that patients can potentially be infected from physicians who harbor the viruses.

RISK FACTORS FOR DEVELOPMENT OF SURGICAL SITE INFECTIONS:

Patient Factor:

- Older age
- Immunosuppression
- Obesity
- Diabetes Mellitus
- Chronic inflammatory process
- Malnutrition
- Anemia
- Radiation
- Chronic skin disease
- Recent operation

Local Factor:

- Poor skin preparation
- Contamination of instruments
- Inadequate antibiotic prophylaxis
- Prolonged procedure
- Local tissue necrosis
- Hypoxia
- Hypothermia

Microbial Factors:

- Prolonged hospitalization
- Toxin secretion
- Resistance

Methods used in Prevention of Surgical Site Infection:

1.Endogenous infections - Reduce bacterial content of hollow viscera.

- Prevent access of bacteria to wound
- Mechanical cleansing of wound
- Prophylactic Antibiotics

2.Exogenous infection - Aseptic technique

- Design of surgical wards
- Isolation of Infected patients
- Non- woven operating room clothing
- Laminar flow operating room
- Ventilation
- Prophylactic systemic antibiotics.

3.Host resistance - Meticulous surgical technique

- Delayed primary suture of contaminated wounds

The measures which may lead to a reduced incidence of wound infection are summarized above and to a large extent they follow naturally from the identification of the factors which cause infection.

Endogenous infection:

Contamination of the surgical wound by the host's own bacteria resulting in the endogenous infection and it is a problem which is chiefly encountered in the surgical operations on the hollow viscera. The prevention of wound infection is therefore concerned with the prevention of wound contamination or with the use of techniques which may prevent the infective sequel of wound contamination.

Wound contamination may be limited either by achieving a temporary reduction in the bacterial content of the hollow viscera and skin or by using mechanical methods which prevent bacterial access to the wound. Most of the evidence suggests that former method is more effective in practice.

Antiseptic preparation of the skin is a necessary prelude to the surgical incision and it results in a temporary reduction in the numbers of viable organisms resident in the skin; effect of skin preparation is partly due to the mechanical washing and partly due to the antimicrobial properties of the antiseptic wash. Complete sterilization of the skin is impossible but a satisfactory reduction in the skin flora is achieved with a 0.5% solution of chlorhexidine in 70% alcohol or l% iodine in 70% alcohol.

The prevention of bacterial access to the wound by mechanical methods has proved to be reliable. In a controlled clinical trial, Raahave found that disposable plastic wound drapes reduced the extent of endogenous and exogenous wound contamination. Disposable adhesive plastic skin drapes are commonly used to prevent the endogenous contamination of wound by skin organisms. The infective sequel of wound contamination may be avoided either by mechanical cleansing of the wound or by the use of antimicrobial agents. Mechanical cleansing of the wound is achieved by irrigation usually with a normal saline solution. The actual technique of irrigation may involve gravity flow, bulb syringe irrigation or a pressurized pulsating jet lavage.

Antimicrobial agents may be used locally by topical application or systematically in the prevention of infection in contaminated or potentially contaminated wounds. Topical agents may be either antiseptic solutions or antibiotics. Antiseptic solutions have generally proved to be ineffective with possible exception of povidoneiodine. Systemic antibiotics are effective in the prevention of wound infection when therapeutic blood levels are achieved during the surgical operation; treatment started as prophylactic measure after the operation is probably of little value. Systemic treatment may be used either on a short term or on a long term basis. There are two distinct disadvantages associated with the prophylactic use of antibiotics. First, it has been shown that increased use of antibiotics results in an increased incidence of antibiotic resistant organisms in the hospital environment and this is inevitable consequence of long term antibiotic therapy. However, there is no evidence

that short term therapy is associated with this risk. The second problem is the hazard of pseudomembranous colitis. The factors involved in the pathogenesis of this disease are obscure but it is associated with broad spectrum antibiotics lincomycin and clindamycin have been associated with a particularly high incidence of this disease but no broad spectrum antibiotic regimen may be exempted from this complication. Recent research has suggested that pseudomembranous colitis results from the suppression of the normal bowel flora and overgrowth of toxigenic strain of clostridium difficle.

Exogenous infection:

Cross infection may be avoided by attention to various aspects of operating room and sterilized surgical materials, disinfection of skin and use of no-touch techniques in the dressing of surgical wounds all of which are designed to prevent the transfer of bacteria to the surgical wound. The available evidence suggests that such measures are relatively effective in prevention of wound infection and air borne bacterial contamination of the surgical wound appears to be more important causes of wound infection.

It has been shown that traditional open ‘nightingale’ wards are associated with the higher incidence of wound sepsis compared with wards based on race-track principle. In the latter type of ward, clean and dirty areas are physically separated, air currents are controlled by positive pressure ventilation and patients are segregated in single rooms or in small units.

Patients who have clinical infections caused by the pathogenic bacteria

such as staphylococcus aureus, Shigella or Salmonella must be isolated and barrier nursed. Ideally the general hospital should include an infectious disease unit in which such cases can be nursed.

Cross infection or endogenous contamination of the surgical wounds may both occur postoperatively in the surgical ward. The wound is vulnerable to contamination through the suture line for 4-5 days and it should be protected during this period. Exceptions to this rule are wounds of the face or neck and perineal wounds. Wounds of the face or neck have an exceedingly rich blood supply. They heal rapidly and septic complications are rare. The anatomy of the perineum makes perineal wounds dressing a difficulty and rather pointless exercise but septic complications in wounds closed by primary suture are surprisingly uncommon. There is now an enormous range of wound dressings but the choice really depends on the type of wound and its location. Dressings should be dry and occlusive : ideally they should also be non adherent so that fibrin coagulum of the wound suture line is undisturbed if early removal of the dressing is necessary. However, wound dressings should not be disturbed until sutures are removed unless there is a valid reason for an earlier inspection.

In the operating room, cross infection is chiefly determined by the shedding or air borne dispersal of the bacteria by the operating room personnel. The staff in the operating room should be limited to an optimal number and unnecessary movement or talking should be discouraged. The use of nonporous or non-woven fabric clothing and operating gowns results in reduced bacterial dispersal compared with the woven cotton materials.

Steri-Drape Absorbent Prevention Fabric creates a barrier to inhibit fluid strike-through, reducing the need for multiple drapes and decreases chances of exogenous infection. Less draping means less time in application and removal. Fewer drapes to dispose off, therefore saving time and money.

The standard ventilation system in the operating room is a plenum system providing 15-20 air changes per hours. The air is partially filtered, humidified, heated or cooled and it is pumped into the operating room. If the air flow is turbulent; air currents do not provide special protection of the surgical wounds and bacterial particles are slowly and inefficiently removed from the operating room. Recent developments in the techniques of operating room ventilation involve the use of highly filtered air in special operating enclosure or wound isolators or laminar flow ventilation systems. In the Charnley enclosure, the surgical team operates in a clean room within the operating theater. The room is ventilated with highly filtered air and bacterial emission by the operating team is reduced, by the use of special protective clothing and breath exhaust systems. The principle of laminar air flow is to eliminate turbulent recirculation of air at the operating site or wound and this may be achieved by vertical or horizontal air streams with a rate of air change of 600-700 times per hours. Vertical and horizontal laminar flow systems are probably quite similar in efficiency but horizontal systems have advantages in the cost and ease of operation. Ventilated wound isolators are even more economical but access to the patient is restricted by these devices and they are suitable only for a limited number of operating techniques and exposures.

The possibility that intraoperative contamination of the wound may be an unimportant factor in the pathogenesis of wound infection may seem difficult to accept but cross infection is chiefly encountered in clean surgery and existing rates of wound sepsis in the surgery are very low; they are certainly much lower than the incidence of air borne contamination in clean wounds. The incidence of wound sepsis may be no more than l-2% in clean operations and surgical technique host resistance factors may play a much greater part in the pathogenesis of wound sepsis by comparison with cases of endogenous wound infection.

Host Resistance:

Local factors affecting host resistance are mainly related to surgical technique; infection is likely to occur in the presence of dead or devitalized tissue, foreign materials, wound hematomas or dead space.

Grossly ischemic or devitalized tissue is most frequently encountered in traumatic wounds or in the amputation of limbs for peripheral arterial insufficiency. In such cases, surgeon must be certain that all the dead tissues are excised and the blood supply of the final wound is adequate. Wound hematomas or collections of serum in the wound usually result from presence of dead space, and later may be consequence of unnecessary dissection or reflection of flaps comprising the skin and the subcutaneous tissue. In the presence of dead space, a closed system of suction drain is used to empty the space of blood or serum. The drains should be inserted through separate

puncture incisions rather than through the wound itself. Dead space also occurs in the subcutaneous wounds of very obese patients and closed suction drainage of such wounds may also be desirable. However, this may be unnecessary if the tissues are carefully approximated with fine sutures of absorbable suture material or monofilament polypropylene.

All sutures, prosthetic implants and wound drains behave as foreign bodies and they propagate wound infection. In most cases, the use of foreign materials is unavoidable, but the surgeon may be responsible for some cases of wound infection by the injudicious use of wound drains or certain types of suture material. There is a temptation for to surgeon to use braided materials because they are easier to handle than monofilament sutures, but braided materials have a greater tendency to propagate wound infection and monofilament sutures should be used in contaminated wounds[45]; monofilament nylon, steel, or polypropylene cause little tissue reaction and persistent sepsis or wound sinuses are rarely encountered with such sutures. The use of wound drains should have a rational base. It is acceptable practice to use drains to remove collections of blood or serum, but they are also used by some surgeons to prevent wound infection in contaminated operations. Whenever wound drainage is employed, the drains should be closed and they should emerge through incision separate from surgical wound.

Clinical Features and Treatment of Surgical Site Infection:

The clinical signs and symptoms of wound infection are varied and they

depend on several factors including the location or distance of the infected focus from the skin surface, the nature of infecting organisms and host resistance. The classical signs of infection i.e. heat, redness, swelling, pain and loss of function may or may not be present. In most of the cases the diagnoses is finally with the discharge of pus from the wound either spontaneously or by deliberate opening by surgeon[46].

The peak incidence of onset of symptoms and signs of wound infection occur 3-10 days after surgery.

Mild, moderate or severe fever is usually present but significant toxemia is unusual. In superficial wound infection limited to the skin and subcutaneous tissue, signs of infections are usually immediately apparent on examination of the wound. The surrounding skin is edematous and red. The wound is exquisitely tender on palpation and a purulent discharge may be present. The diagnosis is confirmed by gently separating the edges of the skin incision with a sinus forceps and pus is released from the subcutaneous tissue. In deep wound infection arising beneath the fascial layers, clinical signs of infection may be absent on examination of wound apart perhaps from some tenderness on palpation, presence of unexplained fever in such cases often prompts a search elsewhere for other possible foci of infection[47].

The nature of the pus discharge may provide a clue to the species of infecting organisms. Staphylococcal infection traditionally produces creamy yellow pus, pseudomonas pus has a characteristic odour and it may cause green or blue staining of the wound dressing. Proteus infections have a fishy odour

and infections following intestinal surgeries which are frequently mixed infections involving bacteroid species and aerobic coliforms produce pus which looks and smells like liquid faeces[48].

In majority of cases, the treatment of wound infection is a relatively simple matter and consists of providing adequate drainage of the infected wound. When pus is already discharging though the skin, the drainage tracts are gently stretched with a sinus forceps. The sinus forceps is pointed in various directions deep to the skin so that all foci of infection are drained. It is rarely necessary to open the wound widely or to conduct a formal wound exploration under anaesthesia, although this is occasionally necessary in cases of deep wound sepsis located beneath the facial layers.

Aggressive soft tissue infections are rare, difficult to diagnose, and require immediate surgical intervention plus administration of antimicrobial agents. Failure to do so results in an extremely high mortality rate 80 to 100%, even with rapid recognition and intervention, current mortality rates remain approximately 30 to 50%.

Role of Laboratory in Infection Diagnosis:

A variety of laboratory tests may be helpful in determining the timing of therapeutic intervention in patients with proven or suspected infection. The basic procedures usually include a naked eye examination of the specimen, microscopic examination of Gram stain, and culture on aerobic and anaerobic blood agar plates, on MacConkey's agar and in cooked meat broth.

Generally surgical infections are characterized by leukocytosis. Affected patients may have some degree of coagulopathy, glucose intolerance in septic patients, and may be seen with hypoglycemia. Ascending colangitis in infected patients with hyperbilirubinemia should be considered. From the point of view of surgical intervention, laboratory helps in defining laws of infection in isolating a specific organism or a group of organism and providing data that supports the worthiness of antimicrobial treatment in terms of insuring both the killing of organism and minimum toxicity from the dry closure. Gram stain is a simple procedure which pathogenic agents can be predicted and can guide as for empirical therapy.

Wound swab from the local site of suspected infection should be cultured and blood cultures should also be sent along. The cases in which prophylactic antibiotic is administered, timely estimation of serum level should be done. The specimen should be inoculated on to two plates of blood agar, one for incubation in 37^0C aerobically, preferably in air plus 5-l0%, Co_2, the other for incubation anaerobically in nitrogen / hydrogen pulse 5-10% Co_2. The agar plate also has antibiotic walls to identify sensitivity. The culture plates are examined after overnight incubations at 37^o C for 18-24 hours. If no growth, plate should be reincubated for another 24 hours[50]. Most surgical infectious can be managed well by using standard disc diffusion antibiotic susceptibility data and providing dosage of standard amount of antibiotics as required. Recent investigations such as accessing blood, CSF and urine by countercurrent immunoelectrophoresis or using latex agglutinations test for the presence of

antigens of pathogens such as streptococcus pneumoniae, hemophilus influenza or niesseria meningitides. Other techniques such as gas liquid chromatography are used to identify footprints that are short chain fatty acids of anaerobes.

The Pathogenic Bacteria Responsible for Surgical Infection:

Surgical infections are usually caused by bacteria but fungal and mixed infections can also occur especially as postoperative infection in immunocompromised hosts. Most bacterial infections are due to organisms that are part of the patient's endogenous flora bacteria that are normal residents of skin or gastrointestinal tract. The various selected features of bacteria in surgical infection is as shown in the table below:

Table 1 : Organisms causing surgical site infection

Organism	Frequency of organism seen in Surgical Infection	Likelihood of Single-Pathogen Surgical Infection	Type of Surgical Infection
AEROBIC BACTERIA Gram-positive Cocci Staphylococcus aureus	High	High	Skin and wound abscess, infected I.V. catheter site, bacteremia, endocarditis, infected prosthetic device, pneumonia, postneurosurgery,meningitis, osteomyelitis, infected joint
Staphylococcus epidermis	Moderate	Low	Usually mixed infection but can cause bacteremia, ventriculoperitoneal shunt infection, endocarditis, skin infection.
Streptococcus Pneumonia	Moderate	High	Pneumonia, bacteremia, infected joint.
Enterococci	High	Low	Usually mixed infection - wound and intraabdominal abscess, endocarditis,urinary tract infection (UTI).
Other Streptococcus Species	Moderate	Low	Usually mixed infection- skin and wound infection, intraabdominal abscess.

Gram – negative Cocci Neisseria gonorrhoeae	Low	Moderate	Tubo-ovarian abscess mixed infection with anaerobes, enteric bacilli and Chlamydia is Common
Neisseria meningitides	Low	High	Bacteremia, pneumonia (especially groupY)
Branhamella catarrhis	Low	Moderate	Pneumonia (usually community acquired)
Gram-positive bacilli Bacillus species (especially cereus)	Low	High	Usually contaminant;may cause bacteremia, endophthalmitis
JK-Diphtheroids	Low	High	Bacteremia
Gram-negative bacilli,Escherichia coli	High	Moderate	Bacteremia, UTI, pneumonia; often in mixed infection wound, intraabdominal and pelvic abscess
Other Enterobacteriaceae Klebsiella Enterobacter,	High	Low	Mixed infection such as wound,intra-abdominal and pelvic abscess; occasional bacteremia. UTI and pneumonia
Serratia and Providencia	Moderate	Moderate	Occasional bacteremia, pneumonla, UTI
Non-Enterobacteriaceae Pseudomonas Aeruginosa	Moderate	High	Bacteremia, pneumonia, wound infection (especially burn)

Gram-negative coccobacilli Haemophilis influenza	Low	High	Pneumonia, sinusitis
Acinobacter	Low	Moderate	Often mixed infection; may cause UTI, pneumonia, intraabdominal and wound infection, bacteremia.
ANAEROBIC BACTERIA Gram-positive Cocci Peptococcus, Peptostreptococcus, anaerobic streptococci	Moderate	Low	Mixed infection, genitourinary infections, fasciitis
Gram - Positive bacilli	High	Moderate to Low	Usually mixed infection (wound, intraabdominal) gas gangrene, occasional devastating sepsis in genitourinary Infection
Clostridium tetani	Low	High	Causes tetanus
Clostridium difficile	Low	High	Causes antibiotic associated enterocolitis
Clostridium botulinum	Low	High	Causes wound botulism
Gram-negative bacilli Bacteroides fragilis	High	Moderate	Usually mixed infection
Other Bacteroides Species	High	Low	Mixed infection
Fusobacteria	Moderate	Low	Mixed infection

ANTIBIOTICS:

Role of Antibiotics in Infection Management:

The use of antimicrobials or antibiotics in surgical infections has come in a long way in prophylactic therapeutic management. The role of antimicrobial therapy is to prevent or treat infections by reducing or eliminating pathogenic organism until the host's own defenses can get rid of the last pathogen. The basic consideration in choosing antimicrobial is efficacy, toxicity and cost effectiveness. Effective antimicrobial agent must be active against the pathogens causing the infections and must be able to reach the site of infections in adequate concentration and in particular time.

All antibiotics have potential toxicity. Toxic effects may be idiosyncratic such as allergy or the rare instance of bone marrow aplasia caused by chloramphenicol or result in damage to tissue and organs as renal toxicity or ototoxicity seen with aminoglycosides and amphotericin B. Antimicrobial agents also exert selective pressure on the microbial ecology of hospital that leads to resistant microbes lost in the final consideration in the selection of antimicrobials. Determining antimicrobial costs include more than just the cost of the drug, the drug administration charges, nursing time, intravenous fluids and lines and monitoring costs must also be added to drug costs.

Distribution of Antimicrobial Agents:

Successful treatment of localized infections with systemic antimicrobial agents requires that an adequate concentration of antibiotics be delivered to the

site of infection ideally the tissue concentration of antibiotics should exceed the minimum inhibitory concentration. Tissue penetration depends on protein binding of antibiotics. Only the unbound form of antibiotic will pass through capillary wall or act to inhibit the bacterial growth. Lipid solubility is also an important factor in tissue penetration.

Blood:

Rapidity of excretion and protein binding are two main determinants of blood concentrations of antimicrobial agents. Those that are highly protein bound are not excreted rapidly as those with a low binding affinity and thus have longer half lives. Efficacy of pencillins, Cephalosporins and other antibiotics that affect bacterial cell wall synthesis depend on the time during which serum levels are above the minimum inhibitory concentration rather than a peak serum concentration.

Urine:

Most commonly used antibiotics are excreted principally in the urine and achieves high urinary concentrations upto 50-200 times their serum concentrations. Notable exceptions are erythromycin and chloramphenicol. Since concentrating ability is severely compromised in patients with renal disease infectious of urinary tract are more difficult to treat in these patients.

Bile:

Beside urine, only bile has concentrations of antibiotics higher than found in serum. The biliary concentration of the penicillins especially

nafacillin, piperacillin and azlocillin, cephalosporins, especially cefazolin, cefamandole, cefamide, cefoperazone and cefadroxil frequently are several times that of serum.

Intestinal fluids and Tissues:

High prolonged serum concentration and low protein binding favor diffusion of antibiotics from serum into extra vascular tissue. Absolute tissue level may not accurately reflect the therapeutic potential because tissue may bind with antibiotic and thus be unavailable for binding to bacteria.

Principles of Antibiotic Therapy:

1. The organism should be sensitive to antibiotic chosen.
2. Antibiotics should be in dose that ensures adequate peak concentration and tissue penetration.
3. The Antibiotics should come in contact with the organism.
4. Frequency of administrative is based on the half life and the route of eliminations of the antibiotics
5. Choose a bactericidal antibiotic when appropriate.
6. Use synergistic therapy when appropriate
7. Avoid antagonistic combination of antibiotics
8. Choose the most appropriate and narrow spectrum antibiotic
9. Adverse effects should be evaluated and risk benefit balanced.
10. Ensure proper duration of therapy to ensure eradication of pathogenic organism.

In general if a single effective, nontoxic drug is used to prevent infection by a

specific microorganism or to eradicate an early infection, then chemoprophylaxis frequently is successful.

Prophylactic Antibiotics:

Ever since antibiotics became available they have been used to prevent infection in surgical practice. It has greatly evolved and grained much attention in the last 25 years. The objective of most antibiotic prophylaxis is to achieve a high tissue level of an appropriate choice of antibiotic and they have defined more clearly the value of techniques in reducing post operative wound infection.

Selection and Administration of Prophylactic Antibiotic:

An appropriate prophylactic antibiotic should be

1. Effective against microorganisms anticipated to cause infection.
2. Achieve adequate local tissue levels.
3. Cause minimal side effects
4. Be relatively inexpensive.

The microbial content of the wound and the hospital environment may influence the choice of antibiotic but coverage should primarily target those organisms known to cause post operative infection. In general, a first generation or third generation cephalosporin fulfills these criteria and is regarded as sufficient prophylaxis for the majority of clean and clean contaminated surgeries.

Timing of Prophylactic Antibiotic Agents:

It has been observed in laboratory that the effectiveness of antimicrobial agents in preventing infection diminishes as the time between contamination and the initial administration of the antimicrobial agent is lengthened. Timing of administration is critical. The drug should be administered within 30 minutes and certainly within 2 hours of the time of incisions. The first dose should always be given before the skin incision is performed. For longer procedures, re-administration of drug is indicated at internals of one or two times the half life of the drug. This ensures adequate tissue levels throughout the duration of the procedure. For clean procedures, only single dose with long half life in high dose is preferred. The duration of administration is extended only in special circumstances such as gross contamination secondary to ruptured viscus or trauma.

Prophylactic Agents:

The ideal prophylactic antibiotic needs to achieve a balance between safety and efficacy. Some commonly used agents are Beta - Lactam Antibiotics. The most common and largest class of antibiotics in current usage the term is derived from the presence of a unique four member beta-lactam ring in all agents in this class. These include penicillin, cephalosporins, the monobactams and the thiocyanins.

Penicillins:

These are the oldest group of beta-lactams. It was first extracted from the penicillium notatum. With molecular manipulation on the original nucleus using modern biochemical techniques a large number of enhancements and alterations to bacterial sensitivity have been achieved.

Cephalosporins:

These are the largest group of beta-lactams in common usage the natural compound is procedure by the fungus cephalosporium. Cephalosporins have developed into series of generation with each generation representing a broadening of the antibiotic spectrum and activity. The agent within a given generation possesses similar antibacterial characteristics.

First generation cephalosporins include cephalothin, cefazolin and cephalexin. These are most active against gram positive organisms like staphylococcus and streptococcus and are generally ineffective against anaerobes and many gram negative organisms.

Second generation cephalosporins include cefoxitin, ceforoxime, cefatetan and cefaclor. These possess an increased activity over gram negative organisms, although their activity against gram positive organisms is less than the first generation, they are also effective against anaerobes.

Third generation cephalosporins have been most heavily developed in recent years. These include cefotaxime, ceftizoxime, ceftriaxone etc., These are beta lactamase resistant, thus have enhanced activity against aerobic gram negative bacteria they possess little activity over anaerobes.

Fourth generation cephalosporins include cefipime and cefpirome which have broader activity and are effective against gram positive as well as gram negative organisms.

Vancomycin :

Glycopeptide is most active against Gram-positive bacteria and has proved most effect against MRSA. It is effective against C.difficile and given orally in cases of pseudomembranous colitis.

Carbapenems :

Meropenem, ertapenem and imepenem are members of this group. They are stable to beta lactamases and have useful broad spectrum anaerobic as well as Gram positive activity.

Imidazoles :

Metronidazole is most widely used member and is active against all anaerobic bacteria. Infection with anaerobic cocci and strains of Bacteroids and Clostridia can be treated or prevented by its use.

Other agents that are used are

- Tetracyclins
- Quinolones-Ciprofloxacin,Ofloxacin,etc.

MATERIALS AND METHODS

METHODOLOGY

The material for this study comprises of patients admitted in Rajiv Gandhi Govt general hospital in the institute of general surgery from june 2017 to September 2018. During this period 100 cases admitted for minor surgeries and 100 cases admitted for major surgeries were selected for study purpose.

METHODS:

This study involves all minor and major surgeries meeting up the inclusion and exclusion criteria. Minor surgery cases were labeled as group A of which those study group who receives only single dose of antibiotic prior to incision was labeled as A1 and control group who receives conventional 5 day post op course of antibiotic were labeled as A2. Similarly Major surgery cases were labeled as group B of which study group who receives 3 doses of antibiotic, one prior to incision , 2^{nd} dose 8 hrs later and 3^{rd} dose 8 hours after 2^{nd} dose were labeled as B1 and control group who receives conventional 5 days post op antibiotics were labeled as B2.

Minor surgery cases were labeled as those cases that needs admission and operated under anesthesia and surgery that lasts less than one hour, for which conventional 5 day antibiotic was given regularly in our hospital. Major surgeries are labeled as those cases that operated more than one hour.

On admission to the hospital, a detailed proforma was completed which includes the diagnosis, Pre-op investigations and meticulous Pre-operative patient preparation. All the patients were followed up to ten days post

operatively. Data was entered in the proforma. Wound swabs were sent for culture and sensitivity in the infected cases and the results were compared and studied. Patients were admitted on our out-patient days. Patients were categorized as minor or major cases depending on their complaints, clinical examination and diagnosis. Patients were informed regarding the study and consent was taken. All patients were admitted 2 days prior to surgery after getting thoroughly investigated and also some special investigations in selected cases to clinch the diagnosis was performed. Preoperative hospital stay was minimized to prevent the patient from getting the access to hospital infections.

Pre operative skin preparation was done meticulously. Patients allowed to take through scrub both after which parts were prepared with Povidone Iodine and was isolated from the surrounding by covering operative site by sterile gauze. Patients were brought to the waiting room next day morning and were given single dose of iv.Ceftriaxone 1gm under aseptic precaution half an hour before the surgery for both minor and major surgeries. All the cases were done in the morning hours. Patients were anaesthetized under aseptic precaution. Sterile gauze was removed and patient's skin was painted with povidone iodine solution and sprit. Then the surface was allowed to dry. Then it was covered with sterile towels and sheets. Surgery was performed by senior staff and postgraduates, whenever possible, cautery was minimized. Movement in the operating room was restricted. Whenever necessary closed suction drain was preferred and wound was closed with sterile dressings.

Patients were isolated in the postoperative ward for atleast 3 days. Major surgery cases were given another 2 doses of antibiotics at 8 hours interval. Wound was inspected on third day, any sign of Inflammation, Infection were noted down and findings were entered in the Proforma. Southampton scoring system was applied for infected wounds. If infected, wound swab was taken and sent for culture and sensitivity and Antibiotic was started immediately in all Infected cases .Sutures were removed immediately in all infected cases .Patients were followed up to 30^{th} post operative day. All the data was entered in the proforma. The available results and outcomes in both groups were studied and analyzed and then were compared with the available previous study and final conclusion was drawn.

INCLUSION CRITERIA:

- Routine clean minor and major cases
- Serum albumin >3.5
- Hb > 10 gm%
- Age 20- 60
- Prophylactic antibiotic administered single dose prior to incision for clean minor surgeries
- 3 dose antibiotic 1^{st} dose prior to incision , 2^{nd} dose 8 hours later, 3^{rd} dose 8 hours after 2^{nd} dose in clean major surgeries

EXCLUSION CRITERIA:

- Emergency caeses

- Serum albumin <3.5
- Hb < 10 gm%
- Age <20 , >60
- Associated comorbid conditions like hypertension,diabetes and infection in any other part of the body.

Southampton Scoring System:

GRADE	
0	Normal healing
1	Bruising and mild erythema
2	Erythema and signs of inflammation
3	Clear (or) serous discharge
4	Pus formation
5	Deep, severe wound infection

Table 2: Southampton score

OBSERVATION AND RESULTS

RESULTS

The study involves 100 minor surgery cases and 100 major surgery cases admitted in general surgical wards in Rajiv Gandhi govt general hospital. Minor surgery cases were labeled as group A of which those study group who receives only single dose of antibiotic prior to incision was labeled as A1 and control group who receives conventional 5 day post op course of antibiotic were labeled as A2. Similarly Major surgery cases were labeled as group B of which study group who receives 3 doses of antibiotic, one prior to incision , 2nd dose 8 hrs later and 3rd dose 8 hours after 2nd dose were labeled as B1 and control group who receives conventional 5 days post op antibiotics were labeled as B2.

MINOR SURGERY CASES:

AGE DISTRIBUTION:

CHARACTERISTICS		A1 (n=50) Study group		A2 (n=50) control		P value
		N	%	N	%	
AGE(in years)	20 – 29	18	36.0	7	14.0	p>0.05
	30 – 39	9	18.0	18	36.0	
	40 – 49	13	26.0	11	22.0	
	50 and above	10	20.0	14	28.0	

Table 3:Age distribution of minor cases

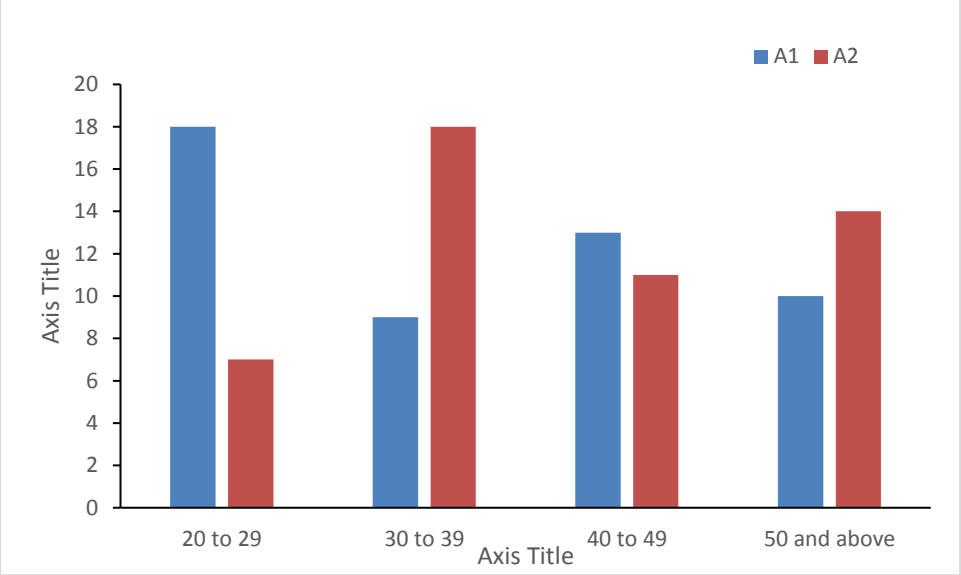


Fig 4 : **Age distribution of minor cases**

		Group A1 (study group)			Group A2 (control)		
		No of cases	infected	%	No of cases	infected	%
Age in years	20 -29	18	-	-	7	-	-
	30-39	9	-	-	18	1	5.55
	40-49	13	2	15.0	11	1	9.09
	50 &above	10	-	-	14	-	-
	Total	50	2	4.0	50	2	4.0

Table 4:Age distribution of infected cases

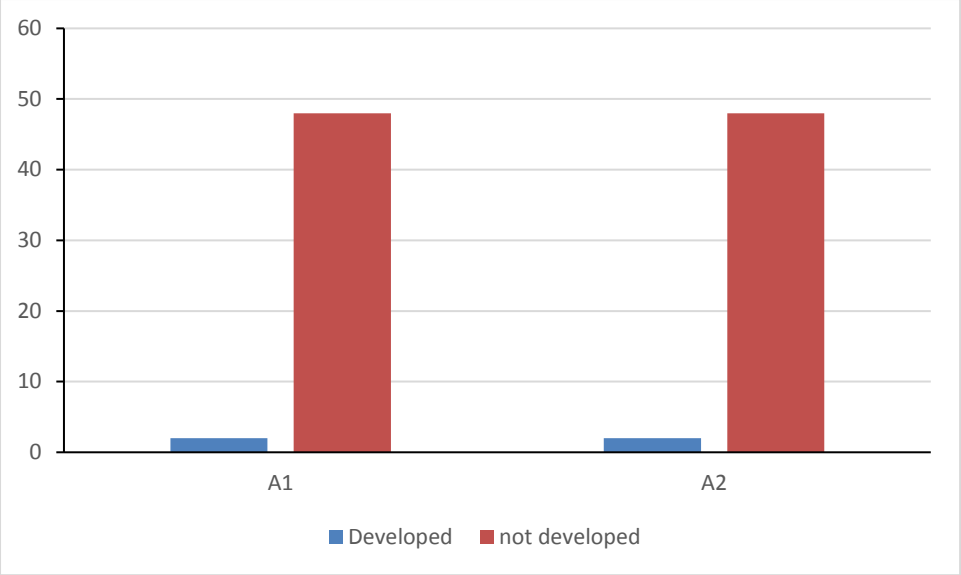


Fig 5: Incidence in minor case

Incidence rate:

	Infected	Not infected	Incidence
A1(study)	2	48	4.0%
A2(control)	2	48	4.0%

Table 5:Incidence of minor cases

Of the 50 cases in study group 2 cases were infecteted and was in age group 40-49. In control group 2 of 50 cases were infected and was in age group 30-39 and 4- 49. The incidence in study group was 4% and incidence in control group was also 4%.

	A1 study	A2 control	P value
Age	36±12.1	40±9.8	p>0.05

Table 6 : Average age distribution

Sex distribution :

Sex	A1(study group)		A2(control)		P value
	n	%	n	%	
Male	24	48.0	34	68.0	p>0.05
Female	26	52.0	16	32.0	

Table 7 : Sex distribution of minor cases

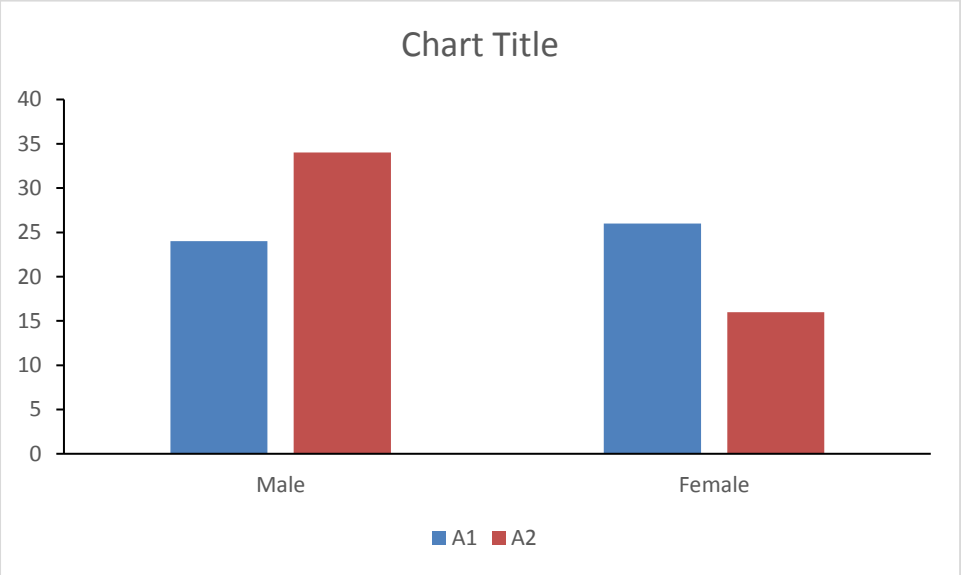


Fig 6 : Sex distribution of minor cases

In study group 48% were male and 52% were females whereas in control group 68% were males and 32% were females.

Anaesthesia:

	A1(study)		A2(control)		P value
	N	%	n	%	
General	23	46.0	5	10.0	p>0.05
Local	2	4.0	2	4.0	
Spinal	25	50.0	43	86.0	

Table 8 : Anaesthesia of minor cases

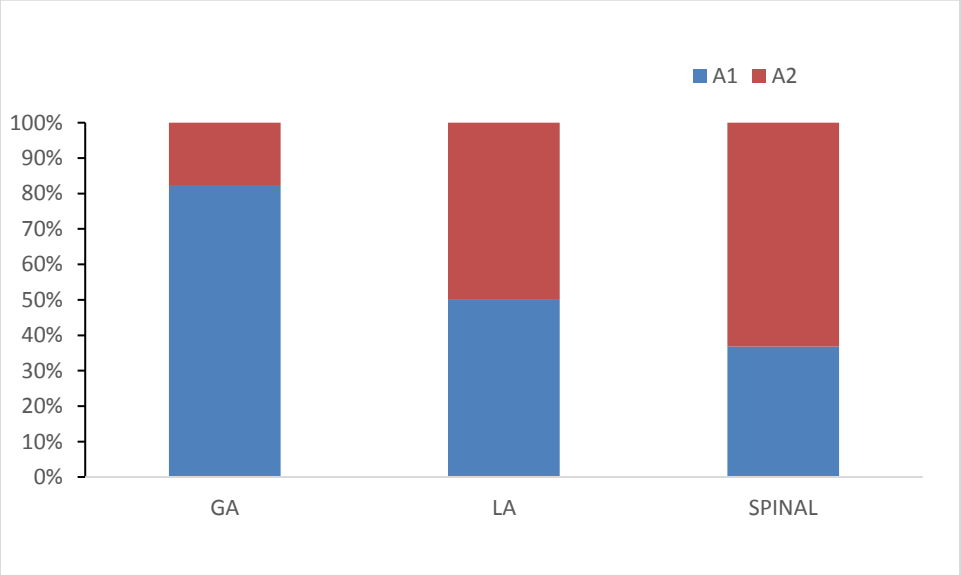


Fig 7 : Anaesthesia of minor cases

Causative organism:

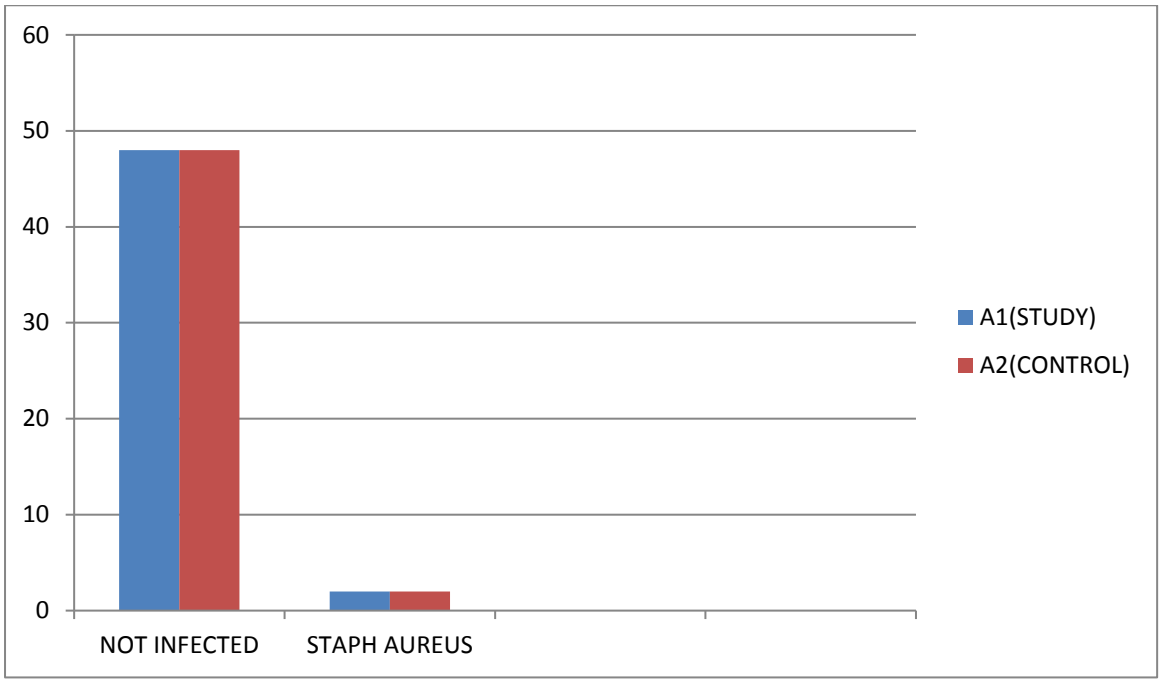


Fig 8 : CAUSATIVE ORGANISM

	A1(study)	A2(control)
Not infected	48	48
Staph aureus	2	2

Table 9 : **Causative organism**

2 cases of 50 were infected in the study group and 2 of 50 cases were infected in control group. All infected cases in both the groups was due to staphylococcus aureus.

Postop complications:

	Fever	Serous discharge	Pus discharge
A1(study)	2	2	0
A2(control)	2	2	0

	Male	**Fever +ve**	**serous Discharge**	**Pus Discharge**	**Female**	**Fever +ve**	**serous Discharge**	**Pus Discharge**
Case	**24**	**0**	**0**	**0**	**26**	**2**	**2**	**0**
Control	**34**	**1**	**1**	**0**	**16**	**1**	**1**	**0**

Table 10 : Postop complications in minor case

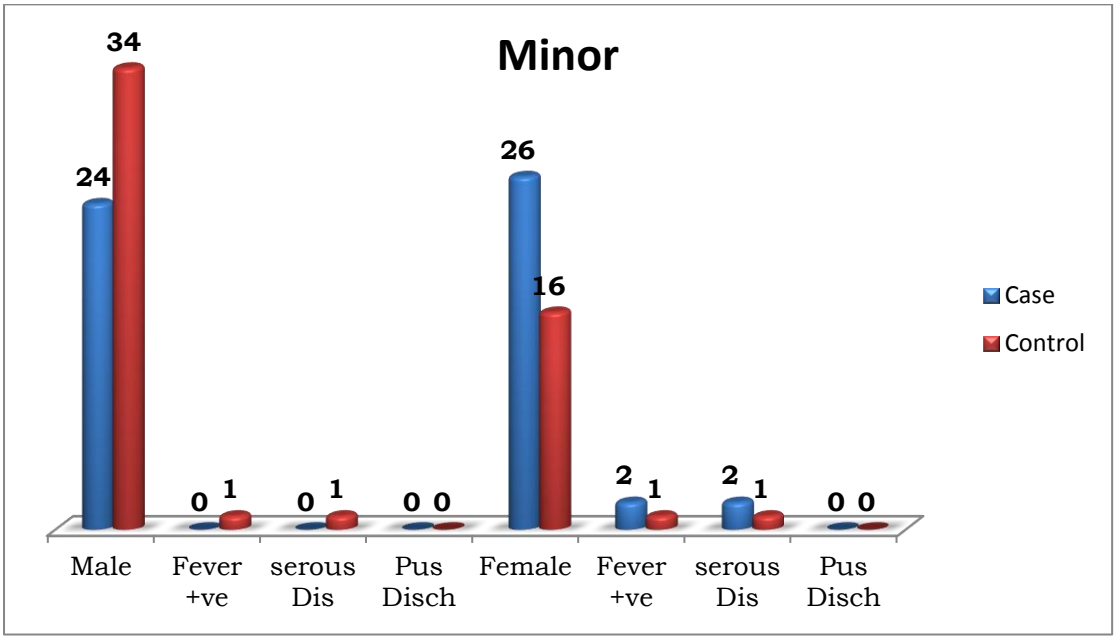


Fig 9 : Postop complications in minor cases

MAJOR SURGERY CASES:

Age distribution:

CHARACTERISTICS		B1 (n=50) Study group		B2 (n=50) control		P value
		N	%	N	%	
AGE(in years)	20 – 29	12	24.0	11	22.0	p>0.05
	30 – 39	6	12.0	17	34.0	
	40 – 49	17	34.0	10	20.0	
	50 and above	15	30.0	12	24.0	

Table 11 : Age distribution of major cases

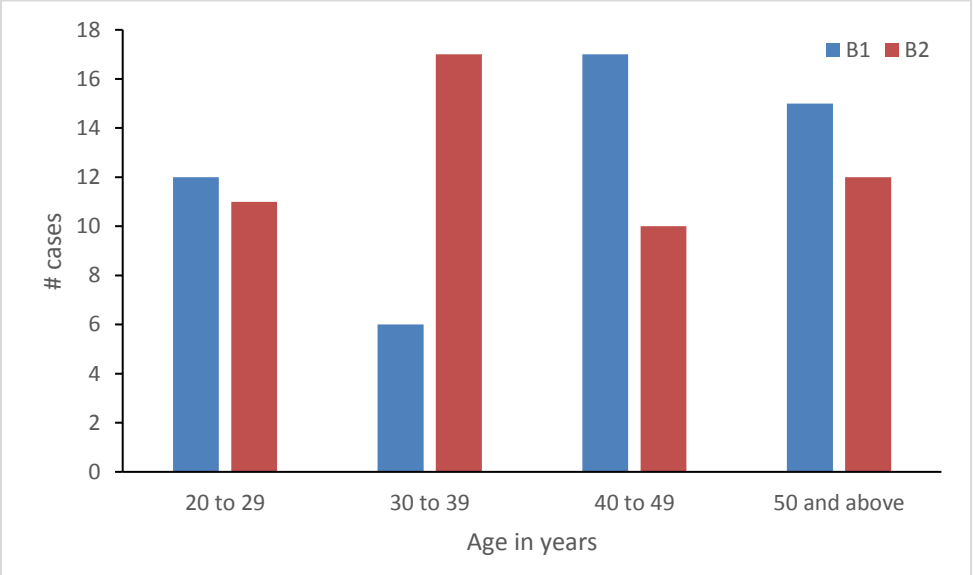


Fig 10 : Age distribution of major cases

		Group B1 (study group)			Group B2 (control)		
		No of cases	infected	%	No of cases	infected	%
Age in years	20 -29	12	-	-	11	-	-
	30-39	6	-	-	17	-	-
	40-49	17	2	11.7	10	1	10.0
	50 &above	15	1	6.66	12	1	8.33
	Total	50	3	6.0	50	2	4.0

Table 12 : INCIDENCE IN MAJOR CASES

Of the 50 cases in study group 3 cases were infecteted and 2 was in age group 40-49 and one case 50 years of age. In control group 2 of 50 cases were infected and was in age group 30-49 and above 50. The incidence in study group was 6% and incidence in control group was also 4%.

		B1(study)		B2(control)		P value
		n	%	n	%	
SSI	Infected	3	6.0	2	4.0	P>0.05
	Not infected	47	94.0	48	96.0	

Table 13 : incidence in major cases

	Infected	Not infected	Incidence
B1(study)	3	47	6.0%
B2(control)	2	48	4.0%

Table : 14 Incidence in major cases

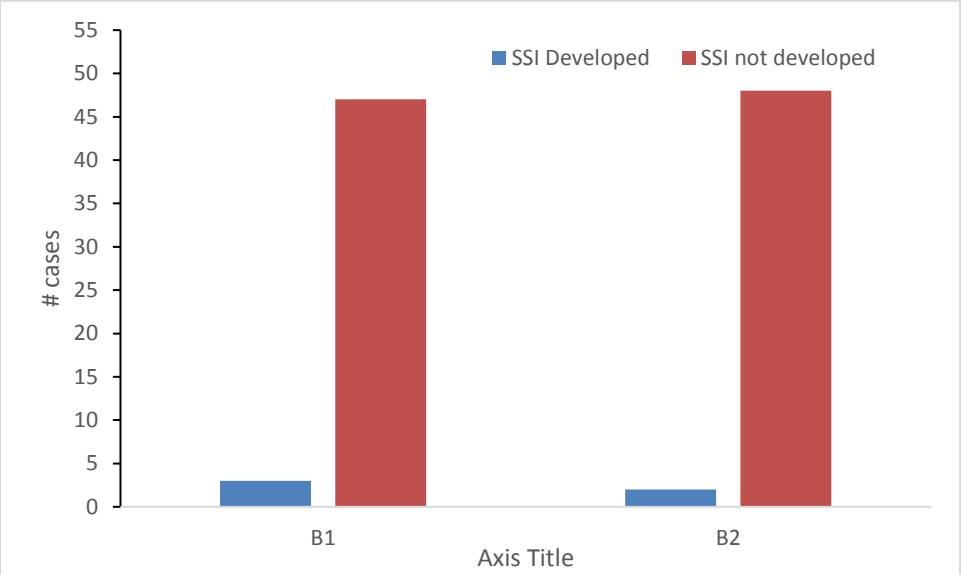


Fig 11 : Incidence in major cases

	B1 study	B2 control	P value
Age	42±10.7	38±12.6	p>0.05

Table 15 : Average age distribution in major cases

Sex distribution:

Sex	B1(study group)		B2(control)		P value
	N	%	N	%	
Male	11	22.0	16	32.0	
Female	39	78.0	34	68.0	p>0.05

Table 16 : Sex distribution major

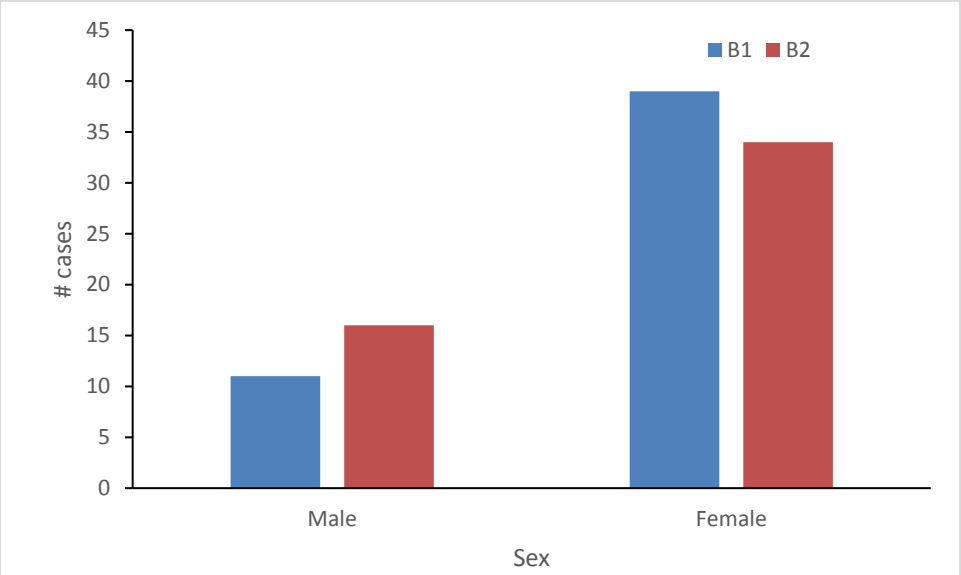


Fig 12 : Sex distribution major

In study group 22% were male and 78% were females whereas in control group 32% were males and 68% were females.

Anaesthesia in major cases:

	B1(study)		B2(control)		P value
	n	%	n	%	
General	41	82.0	49	98.0	p>0.05
Spinal	9	18.0	1	2.0	

Table 17 : Anaesthesia in major cases

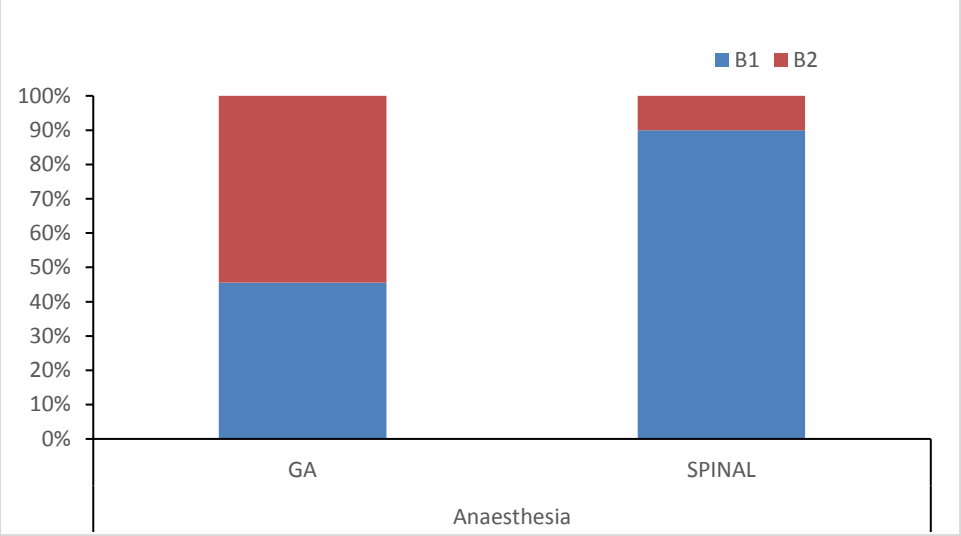


Fig 13 : Anaesthesia in major cases

Causative organism:

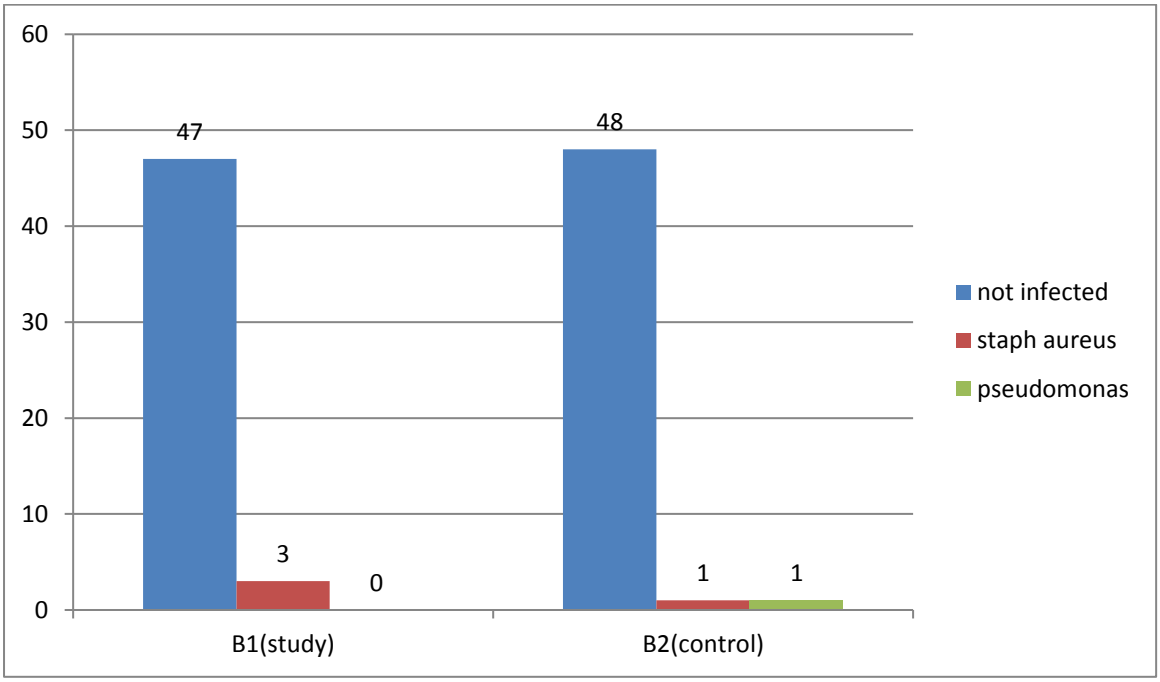


Fig 14 : Causative organisms in major cases

	B1(study)	B2(control)
Not infected	47	48
Staph aureus	3	1
pseudomonas	0	1

Table 18 : Causative organism in major cases

3 of 50 cases in study group were infected and culture of all 3 cases was staphylococcus aureus. In control group 2 of 50 cases were infected and culture report was staph aureus 1 case and pseudomonas 1 case.

Postop complications :

	Male	**Fever +ve**	**serous Discharge**	**Pus Discharge**	**Female**	**Fever +ve**	**serous Discharge**	**Pus Discharge**
Case	**11**	**0**	**0**	**0**	**39**	**3**	**3**	**0**
Control	**16**	**0**	**0**	**0**	**34**	**2**	**1**	**1**

Table 19 : Postop complications in major

	Fever	Serous discharge	Pus discharge
B1(study)	3	3	0
B2(control)	2	2	1

Table 20 : Postop complications major

DISCUSSION

DISCUSSION

Surgical site infection has been documented ever since the origin of surgery, has not been mastered. Its incidence can be reduced by strict asepsis , meticulous surgical techniques, prophylactic antibiotic have drastically reduced the incidence of SSI.

This study involves minor and major surgery cases in rajiv Gandhi govt general hospital, both were divided to study and control group with each 50 cases in it.

Study group in minor received single dose of inj.ceftriaxone 1 gm half an hour prior to incision and study group of major cases received 1gm of ceftriaxone half an hour before incision, 2^{nd} and 3^{rd} doses with 8 hours of interval. Control groups in both minor and major cases received routine 5 day course of inj . ceftriaxone 1gm bd and inj. Metronidazole 500 mg tds. Wound of all the patients were looked for signs of infection and analysis done with the data collected. For infected cases antibiotic was started immediately and swab for culture sent.

Age incidence:

Though surgical site infection affects all age group its incidence increases with age and is seen frequently in old age. In this study incidence of infection occurs mostly above 40 years of age in both minor and major surgeries.

In this study in minor surgeries incidence of infection is higher in age group between 38-50 . in major surgeries incidence of infection is more in age

group 40-55. Hence this study also shows that incidence of infection increases with age.

Sex distribution:

There is more number of female cases in this study than male. In minor surgeries 3 male cases and 1 female case is infected out of 100 cases. In major surgeries all 5 infected cases were females. There is no evidence that supporting the fact that females are most infected than males.

		Not Infected	Infected
Case	**Male**	**11**	**0**
	Female	**39**	**3**
Control	**Male**	**16**	**0**
	Female	**34**	**2**

Table 21 : Major cases sex distribution with infection

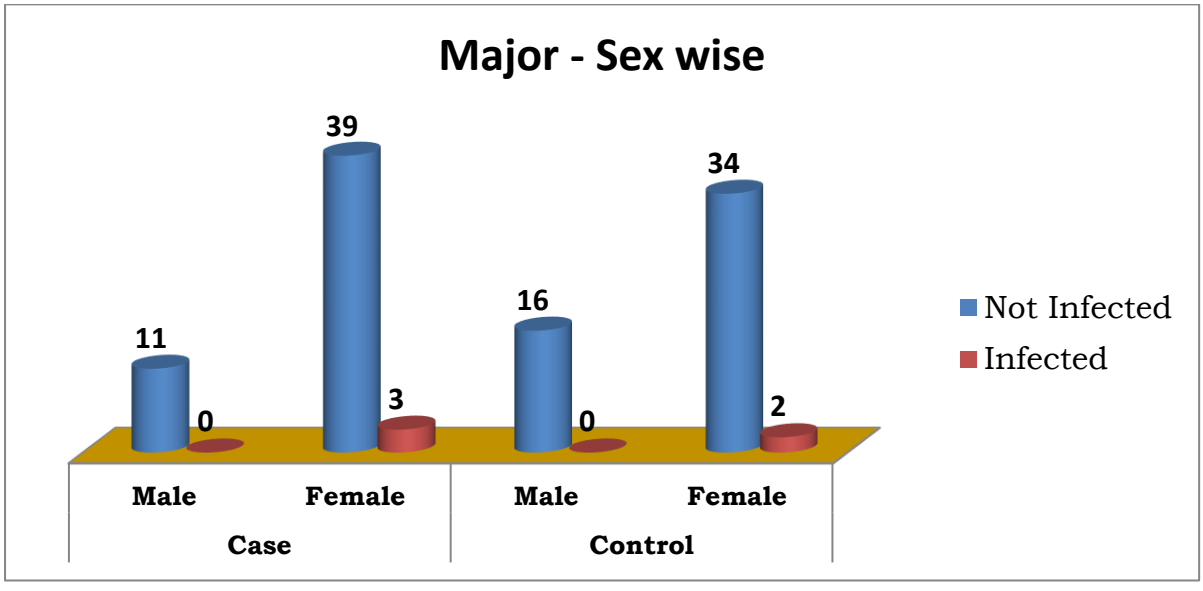


Fig 15 : Major case sex distribution

		Not Infected	Infected
Case	Male	24	2
	Female	26	0
Control	Male	34	1
	Female	16	1

Table 22 : Minor case sex distribution

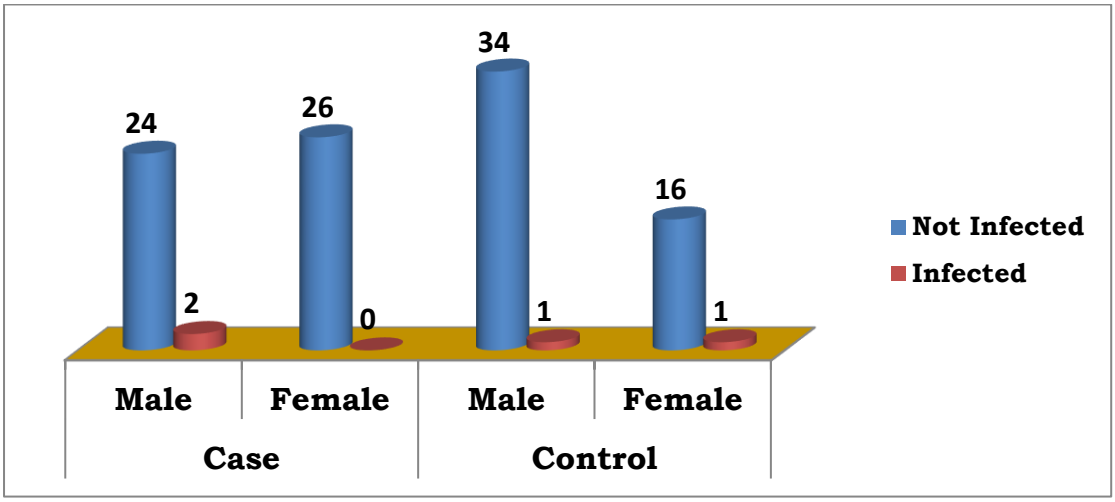


Fig 16 : Minor case sex distribution

Culture:

Culture was sent for all infected cases. All 4 infected cases in minor surgeries were positive for staphylococcus aureus . out of 5 infected cases in major surgeries 4 were infected by staphylococcus aureus , 1 was infected by pseudomonas. Both of the organisms are hospital strains and staph was sensitive to cephalosporins and ciprofloxacin . pseudomonas was sensitive to levofloxacin and piperacillin.

Incidence:

4% minor cases in study group were infected and 4% of control group was infected. In major surgeries 6% of cases were infected in study group and 4% of cases in control groups were infected. There is no much significant difference in incidence between study group and control group in both major and minor surgeries.

CONCLUSION

CONCLUSION

This study is one of the most important facets in general surgery. The study on single dose and triple dose antibiotic in minor and major surgeries has led me to this conclusion.

- Surgical site infection is the condition that may increase the morbidity and hospital stay of the patient. In severe cases may lead to loss of hospital resources, emergence of resistant bacteria, or may even lead to death of the patient due to sepsis.
- Its incidence increases with increasing age group, old age patients are the most affected.
- Risk factors for development of SSI should be identified and patient factors like anemia, DM are to be corrected prior to surgery.
- Local factors and microbial factors should be kept in mind and necessary steps to be taken to avoid them.
- When SSI is identified, wound swab to be sent to culture and appropriate antibiotics should be started early.
- Adequate drainage of pus should be done in case of severe infection by removing one or two sutures and secondary suturing to be done after infection control.
- SSI with hospital acquired infection should be reduced by proper nursing care and proper maintenance of surgical wards.

- For minor surgeries administration of single dose of antibiotic prior to surgery is enough rather than five days of antibiotic as there is much difference in incidence of infection.
- For major surgeries 3 doses of antibiotic 1st dose starting just prior to surgery and other 2 doses with 8 hours of interval is sufficient that 5 days of antibiotic as there is no significant difference in incidence of infection.
- Misuse of antibiotics should be reduced as it leads to increased cost, depletion of hospital resources , increased resistance and side effects of drugs.

SUMMARY

SUMMARY

- This study was done to compare the outcome of single dose of antibiotic vs routine 5 days antibiotic in preventing SSI in minor surgeries. And compare outcome of 3 dose antibiotic vs 5 day antibiotic in major surgeries.
- 100 minor surgery cases were selected and grouped in to a study group and control group with 50 cases each. Similarly 100 major surgery cases was selected and grouped into study and control group with 50 cases each.
- In minor surgery cases study group was administered single dose of iv inj.ceftriaxone 1 gm prior to surgery prophylactically.
- In major surgery study group was administered with 1gm iv ceftriaxone 1st dose prior to surgery and other 2 doses with 8 hours of interval.
- Control groups in both the cases were administered with 5 days of postop antibiotic with inj.ceftriaxone 1gm bd and inj.metronidazole 500mg tds. As this antibiotic protocol is routinely administered in our institution.
- In minor surgery 4 cases got infected and swab for culture sent and was positive with staph aureus
- In major surgeries 5 cases were infected , 4 were infected with staph aureus and one with pseudomonas. Both these organisms are nosocomial organisms.
- Infected cases were started immediately with appropriate antibiotics.
- Age is a variable for surgical site infection where incidence increases with age.
- For minor cases infection rate in study group was 4% and in control group is 4% and hence there is no much significant difference.

- For major surgery infection rate in study group is 6% and in control group is 4%.
- To prevent surgical infection logical investigation of the underlying source of infection , anticipation and adherence to sound principles governing antibiotic prophylaxis and treatment should be employed.
- To summarize from the present study on analysis

- Single dose of preoperative antibiotic in minor surgeries and 3 dose of antibiotic in major surgeries is a sufficient powerful tool to fight against postop surgical site infection.
- It should be stressed that careful surgical techniques, which include gentleness in tissue handling, preservation of vascularity, ideal hemostasis , removal of devitalised tissue and foreign particles is a must in every surgery.

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ANNEXURES

PROFORMA

"COMPARITIVE STUDY OF EFFICACY OF SINGLE DOSE ANTIBIOTIC IN MINOR , TRIPLE DOSE ANTIBIOTIC IN MAJOR SURGERIES VS ROUTINE POST OPERATIVE ANTIBIOTIC THERAPHY IN CLEAN MINOR AND MAJOR SURGERIES"

Name of the patient:

Age:

Sex:

Religion:

Address:

Occupation:

DOA:

DOD:

Hospital stay:

Brief Clinical History:

Past History:H/O DM/HTN/UTI/URI/TB/Jaundice:

Personal History: Veg/Non-Veg

Smoker/Non-Smoker:

Socio-Economic Status: Poor / Lower Middle class / Upper Middle Class/Rich

GENERAL PHYSICAL EXAMINATION:

Poorly built / Moderately built / Well built

Pulse rate: BP: RR:

Systemic Examination: PA:

CVS:

RS:

CNS:

Loco Regional Examination:

Per Rectal Examination:

Diagnosis:

Proposed Surgical procedure and date:

INVESTIGATIONS:

Hb	RBS	USG Abdomen
TC	DC	FNAC
BT	Urea	CXR
CT	Creatinine	Urine Routine
ESR	LFT	HIV/HBSAg

Risk Factors for Surgical site infection: Present / Absent

If Present:

Single Dose Pre-operative Antibiotic: Given / not given

Pre-operative Skin preparation: Done / Not Done

Drain: Kept / Not kept

Duartion of Surgery:

Immediate Post-operative period: Eventful / Uneventful

Hemorrhage / Fever / Cough / URTI / UTI / Others

Removal of Drain:

Nature of Wound: On 3rd day –

On 8th day –

Suture Removed:

IF infected, wound swab sent for culture & Sensitivity: YES / NO

Organism Cultured:

PATIENT CONSENT FORM

STUDY TITLE:

“COMPARITIVE STUDY OF EFFICACY OF SINGLE DOSE ANTIBIOTIC IN MINOR , TRIPLE DOSE ANTIBIOTIC IN MAJOR SURGERIES VS ROUTINE POST OPERATIVE ANTIBIOTIC THERAPHY IN CLEAN MINOR AND MAJOR SURGERIES“

STUDY CENTRE:

Rajiv Gandhi Government General Hospital and Madras Medical College.

Participant Name: Age: Sex: IP no:

I confirm that I have understood the puropose of interventional procedure for the above study.I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I have been explained about the possible complications that may occur during the Interventional procedure.I understand that my participation in the study is voluntary and free to withdraw at any time without giving any reason.

I understand that the Investigator, Regulatory Authorities and the Ethics Committee will not need my permission to look at my Health Records both in respect to the current study and any further research that may be conducted in relation to it, even if I withdraw from the study.

I understand that my Identity will not be revealed to any any third parties or published, unless as required under the law. I agree not to restrict the use of any data or Results that arise from the study.

I hereby consent to participate in this study of the “COMPARITIVE STUDY OF EFFICACY OF SINGLE DOSE ANTIBIOTIC IN MINOR , TRIPLE DOSE ANTIBIOTIC IN MAJOR SURGERIES VS ROUTINE POST OPERATIVE ANTIBIOTIC THERAPHY IN CLEAN MINOR AND MAJOR SURGERIES“.

Signature/Thumb Impression of the patient.

Date:

Place:

Patient’s Name:

Signature of the Investigator:

Name of the Investigator:

INFORMATION SHEET

We are conducting a study on **"COMPARITIVE STUDY OF EFFICACY OF SINGLE DOSE ANTIBIOTIC IN MINOR , TRIPLE DOSE ANTIBIOTIC IN MAJOR SURGERIES VS ROUTINE POST OPERATIVE ANTIBIOTIC THERAPHY IN CLEAN MINOR AND MAJOR SURGERIES"** among patients attending Rajiv Gandhi Government General Hospital, Chennai and for that your Information is valuable for us.

The purpose of the study is to assess the efficacy of single dose and triple dose Antibiotic with routine Antibiotic therapy. We are selecting certain cases and if you are found eligible we may be using your information which in anyway don't affect your final report or management.

The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

Taking part in the study is voluntary. You are free to decide whether to participate in the study or to withdraw at any time.

Your decision will not result in any loss of benefits to which you are otherwise entitled. The results of the special study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature / Thumb Impression of the patient:

Signature of the Investigator:

Date:

Place:

MASTER SHEET – Major Cases.

S.NO	NAME	AGE	SEX	IP NUMBER	DIAGNOSIS	GROUP	PROCEDURE	ANAESTHESIA	INFECTION STATUS	CULTURE	SOUTHAMPTON SCORE	FEVER	SEROUS DISCHARGE	PUS DISCHARGE
1	VENDA	41	F	866	SOLITARY NODULE THYROID	B1	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
2	LAKSHMI	50	F	134 235	CHOLELITHIASIS	B1	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2
3	HEMAMALINI	27	F	2423	SUBACUTE APPENDICITIS	B1	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
4	VIVEK LAKSHMI KANTH	47	M	138 903	VENTRAL HERNIA	B1	MESH REPAIR	GA	2	nil	0	2	2	2
5	THURAIVI KALAN	55	M	132 975	SOFT TISSUE SARCOMA RT BACK	B1	LOCAL EXCISION WITH RECONSTRUCTION	GA	2	nil	0	2	2	2
6	JAYATHI	42	F	124 576	CHOLEDOCHOLITHIASIS WITH CHOLELITHIASIS	B1	OPEN CHOLECYSTECTOMY WITH OPEN CBD EXPLORATION	GA	2	nil	0	2	2	2
7	INDRANI	54	F	309 24	PLEOMORPHIC ADENOMA	B1	SUPERFICIAL PAROTIDECTOMY	GA	2	nil	0	2	2	2
8	DHARANI	50	F	390 19	CHOLEDOCHOLITHIASIS WITH CHOLELITHIASIS	B1	OPEN CHOLECYSTECTOMY WITH OPEN CBD EXPLORATION	GA	2	nil	0	2	2	2
9	VINAYAGAM	40	M	408 92	RETROPERITONEAL TUMOR	B1	EXCISION	GA	2	nil	0	2	2	2
10	MANJULA	42	F	452 52	CA BREAST	B1	MRM	GA	2	nil	0	2	2	2
11	SUDHA	30	F	473 06	CHOLELITHIASIS	B1	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2
12	VELVIZHI	21	F	474 47	SUBACUTE APPENDICITIS	B1	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
13	VINCENT	49	M	446 20	SOLITARY NODULE THYROID	B1	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
14	DHIVYA	26	F	521 22	CA THYROID	B1	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
15	SELVAMANI	40	F	525 44	MNG THYROID	B1	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
16	NITHYA	29	F	511 07	CHRONIC APPENDICITIS	B1	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
17	SHANTHI	40	F	501 16	CA BREAST	B1	MRM	GA	1	STAPH AUREUS	3	1	1	2
18	DHANALAKSHMI	52	F	447 19	INCISIONAL HERNIA	B1	MESH REPAIR	SPINAL	2	nil	0	2	2	2
19	RAJA	25	M	597 22	INCISIONAL HERNIA	B1	MESH REPAIR	SPINAL	2	nil	0	2	2	2
20	ANANDHALAKSHMI	50	F	665 67	CA BREAST	B1	MRM	GA	2	nil	0	2	2	2
21	VALLIYAMMAL	56	F	609 63	INCISIONAL HERNIA	B1	MESH REPAIR	SPINAL	2	nil	0	2	2	2
22	NATARAJ	55	M	568 67	PLEOMORPHIC ADENOMA	B1	SUPERFICIAL PAROTIDECTOMY	GA	2	nil	0	2	2	2
23	AMMU	29	F	597 67	CA BREAST	B1	MRM	GA	2	nil	0	2	2	2
24	KAMALA	45	F	530 20	CA THYROID	B1	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
25	MANISHAMMAL	40	F	617 13	SOLITARY NODULE THYROID	B1	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2

26	VIJAYA	52	F	64403	CHOLELITHIASIS	B1	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2
27	DURGADEVI	42	F	64281	INCISIONAL HERNIA	B1	MESH REPAIR	SPINAL	1	STAPHAUREUS	3	1	1	2
28	THULASIAMMAL	50	F	61347	CA BREAST	B1	MRM	GA	2	nil	0	2	2	2
29	DEVI	36	F	64567	INCISIONAL HERNIA	B1	MESH REPAIR	SPINAL	2	nil	0	2	2	2
30	KOUSHIKA BEGAM	45	F	62831	INCISIONAL HERNIA	B1	MESH REPAIR	SPINAL	2	nil	0	2	2	2
31	MENAKA	40	F	66941	SUBACUTE APPENDICITIS	B1	OPEN APPENDICECTOMY	SPINAL	2	nil	0	2	2	2
32	ANANDHALAKSHMI	50	F	66567	CA BREAST	B1	MRM	LA	1	STAPHAUREUS	3	1	1	2
33	JAYAMMA	25	F	65325	CA BREAST	B1	MRM	GA	2	nil	0	2	2	2
34	MEGALA	30	F	73508	SUBACUTE APPENDICITIS	B1	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
35	JAYALAKSHMI	44	F	71283	INCISIONAL HERNIA	B1	MESH REPAIR	GA	2	nil	0	2	2	2
36	INDIRA GANDHI	53	F	72726	INCISIONAL HERNIA	B1	MESH REPAIR	GA	2	nil	0	2	2	2
37	KANDAVEL	37	F	70993	CHOLEDOCHOLITHIASIS	B1	CBD EXPLORATION/HEPATICOJEJUNOSTOMY	GA	2	nil	0	2	2	2
38	DHANALAKSHMI	29	F	74703	SOLITARY NODULE THYROID	B1	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
39	FAIZAL	25	M	78741	CHOLELITHIASIS	B1	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2
40	VIGNESH	28	M	78941	SUBACUTE APPENDICITIS	B1	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
41	VENKATESAN	45	M	70763	SOFT TISSUE SARCOMA RIGHT FOREARM	B1	WIDE LOCAL EXCISION/SSG/FLAP RIGHT AXILLARY NODE DISSECTION	GA	2	nil	0	2	2	2
42	SHALINI	20	F	81652	SUBACUTE APPENDICITIS	B1	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
43	SUNDAR	50	F	78830	INCISIONAL HERNIA	B1	MESH REPAIR	GA	2	nil	0	2	2	2
44	GOVINTHAMMAL	55	F	78066	CHOLEDOCHOLITHIASIS WITH CHOLELITHIASIS	B1	OPEN CHOLECYSTECTOMY WITH OPEN CBD EXPLORATION	GA	2	nil	0	2	2	2
45	GOWRI	37	F	79841	VENTRAL HERNIA	B1	MESH REPAIR	GA	2	nil	0	2	2	2
46	GIRIJA	38	F	77052	SCC IN SCALP	B1	WLE+ FLAP COVER + RIGHT POSTERD LAT.NECK DISSECTION	GA	2	nil	0	2	2	2
47	VIJAYAKUMAR	48	M	82706	RIGHT SOFT TISSUE SARCOMA	B1	REEXICISION	GA	2	nil	0	2	2	2
48	ASHOKAN	53	M	79944	INCISIONAL HERNIA	B1	MESH REPAIR	GA	2	nil	0	2	2	2
49	CHITRA	20	F	85098	PSEUDO PAPILLARY CYSTIC NEOPLASM OF NEOPLASM OF PANCREAS	B1	DISTAL PANCREATOMY WITH SPLEENECTOMY	GA	2	nil	0	2	2	2
50	VEERAMMAL	45	F	88562	INCISIONAL HERNIA	B1	MESH REPAIR	SPINAL	2	nil	0	2	2	2
1	SIVAGAMI	35	F	94281	CHOLELITHIASIS	B2	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2
2	PRAMAIAH	34	M	97580	CHOLELITHIASIS	B2	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2

3	MAHESH KUMAR	27	M	98960	SUBACUTE APPENDICITIS	B2	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
4	IYYANAR	55	M	96741	VENTRAL HERNIA	B2	MESH REPAIR	GA	2	nil	0	2	2	2
5	JAMUNA	30	F	97073	INCISIONAL HERNIA	B2	MESH REPAIR	GA	2	nil	0	2	2	2
6	RANI	45	F	94649	EPIGASTRIC HERNIA/LEFT INGUINAL HERNIA	B2	IPOM + TAPP	GA	2	nil	0	2	2	2
7	RAJASEKARAN	58	M	96902	MNG THYROID	B2	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
8	KANIMOZHI	30	F	104160	MNG THYROID	B2	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
9	RAJALAKSHMI	34	F	102634	CHOLELITHIASIS	B2	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2
10	KAMARAJ	31	M	103115	COMPLETE RECTAL PROLAPSE	B2	ABDOMINAL RECTOPEXY	GA	2	nil	0	2	2	2
11	LAKSHMI	53	F	103643	MNG THYROID	B2	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
12	SANGEETHA	36	F	105170	SOLITARY NODULE THYROID	B2	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
13	LAKSHMI	53	F	103643	MNG THYROID	B2	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
14	JEGAN	22	M	110644	SUBACUTE APPENDICITIS	B2	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
15	LAKSHMI	40	F	3039	INCISIONAL HERNIA	B2	MESH REPAIR	GA	2	nil	0	2	2	2
16	BALAMURUGAN	26	M	2945	SUBACUTE APPENDICITIS	B2	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
17	MANIKAVALLI	54	F	1187	CHOLELITHIASIS	B2	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2
18	VASANTHI	40	F	137773	CA BREAST	B2	MRM	GA	1	STAPH AUREUS	3	1	1	2
19	KRISTAMMAL	38	F	17586	CA BREAST	B2	MRM	GA	2	nil	0	2	2	2
20	DEEPA	25	F	20617	CHOLELITHIASIS	B2	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2
21	RAVALIDEVI	36	F	21661	CHOLELITHIASIS	B2	LAP CHOLECYSTECTOMY	GA	2	nil	0	2	2	2
22	RATHINAMMAL	40	F	16650	CA BREAST	B2	MRM	GA	2	nil	0	2	2	2
23	MANGALAM	58	F	25195	INCISIONAL HERNIA	B2	MESH REPAIR	GA	2	nil	0	2	2	2
24	LAKSHMI	36	F	19800	SUBACUTE APPENDICITIS	B2	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
25	PADMAVATHY	42	F	91900	INCISIONAL HERNIA	B2	MESH REPAIR	GA	2	nil	0	2	2	2
26	PUITHAVALLI	23	F	25815	SUBACUTE APPENDICITIS	B2	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
27	VIJAYA	38	F	28083	PLEOMORPHIC ADENOMA	B2	SUPERFICIAL PAROTIDECTOMY	GA	2	nil	0	2	2	2
28	VIJAY	25	F	36889	SUBACUTE APPENDICITIS	B2	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
29	GOVINDAMMAL	55	F	31979	RIGHT FOOT MALIGNANT MELANOMA	B2	WLE + FLAP COVER+ RIGHT ILIO INGUINAL BLOCK DISSECTIONWITH TENSOR FASCIA RECONSTRUCTION	GA	1	PSEUDOMONAS +VE	4	1	2	1
30	KIRAN KUMAR	20	M	37414	SUBACUTE APPENDICITIS	B2	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2

31	SATHYA	39	F	37311	SUBACUTE APPENDICITIS	B2	OPEN APPENDICECTOMY	SPINAL	2	nil	0	2	2	2
32	RAJI	41	F	33089	CA BREAST	B2	MRM	GA	2	nil	0	2	2	2
33	PADMAVATHY	25	F	40162	SUBACUTE APPENDICITIS	B2	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
34	VARADHAN	49	M	34072	INCISIONAL HERNIA	B2	MESH REPAIR	GA	2	nil	0	2	2	2
35	KUPPULINGAM	52	M	14501	ABDOMINAL WALL SARCOMA	B2	WIDE LOCAL EXCISION + FREE ALT FLAP	GA	2	nil	0	2	2	2
36	PRABAKARAN	32	M	55907	CHOLEDOCHOLITHIASIS WITH CHOLELITHIASIS	B2	OPEN CHOLECYSTECTOMY WITH OPEN CBD EXPLORATION	GA	2	nil	0	2	2	2
37	ZAMRUTH BEGUM	51	F	54016	CA BREAST	B2	MRM	GA	2	nil	0	2	2	2
38	PONNAMMAL	24	F	57439	SUBACUTE APPENDICITIS	B2	LAP APPENDICECTOMY	GA	2	nil	0	2	2	2
39	RAMANIAH	39	M	50666	INCISIONAL HERNIA WITH RIGHT INUGINAL HERNIA WITH HYDROCELE	B2	MESH PLASTY/HERNIOPLASTY/EVERSION OF SAC	GA	2	nil	0	2	2	2
40	PRABAKARAN	32	M	55907	CHOLEDOCHOLITHIASIS WITH CHOLELITHIASIS	B2	OPEN CHOLECYSTECTOMY WITH OPEN CBD EXPLORATION	GA	2	nil	0	2	2	2
41	THAIYALNAGI	46	F	59014	CA BREAST	B2	MRM	GA	2	nil	0	2	2	2
42	VASANTHA	26	F	60385	MNG THYROID	B2	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
43	RADHA	32	F	60202	VENTRAL HERNIA	B2	MESH REPAIR	GA	2	nil	0	2	2	2
44	MEENA	53	F	56859	CA BREAST	B2	MRM	GA	2	nil	0	2	2	2
45	PARTHASARATHY	47	M	60313	CHOLEDOCHOLITHIASIS WITH CHOLELITHIASIS	B2	OPEN CHOLECYSTECTOMY WITH OPEN CBD EXPLORATION	GA	2	nil	0	2	2	2
46	RADHA	32	F	60202	VENTRAL HERNIA	B2	MESH REPAIR	GA	2	nil	0	2	2	2
47	VASANTHA	26	F	60385	MNG THYROID	B2	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
48	PREMAVATHY	58	F	62139	MNG THYROID	B2	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2
49	ABDUL JABBAN	48	M	59526	INCISIONAL HERNIA	B2	MESH REPAIR	GA	2	nil	0	2	2	2
50	NARSAYAIH	75	M	95426	MNG THYROID	B2	TOTAL THYROIDECTOMY	GA	2	nil	0	2	2	2

Master Sheet – Minor cases

S.NO	NAME	AGE	SEX	IP NUMBER	DIAGNOSIS	GROUP	PROCEDURE	ANAESTHESIA	INFECTION STATUS	CULTURE SENSITIVITY	SOUTHAMPTON SCORE	FEVER	SEROUS DISCHARGE	PUS DISCHARGE
1	KALAIVANI	51	F	3239	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
2	SHANTHI	53	F	2657	RT BREAST LUMP	A1	LUMPECTOMY	GA	2	2	0	2	2	2
3	GAVASKAR	35	M	11323	VARICOSE VEIN	A1	TRENDLENBERG PROCEDURE	SPINAL	2	2	0	2	2	2
4	NADHIYA	23	F	37846	RIGHT CERVICAL LYMPHADENOPATHY	A1	EXCISION	GA	2	2	0	2	2	2
5	VINOTH	23	M	151399	POST TRAUMATIC RAW AREA RIGHT FOOT	A1	SSG	SPINAL	2	2	0	2	2	2
6	RAMESH	43	M	32750	PARAUMBILICAL HERNIA	A1	MESH REPAIR	SPINAL	2	2	0	2	2	2
7	RAMESH	43	M	32750	PARAUMBILICAL HERNIA	A1	MESH REPAIR	SPINAL	2	2	0	2	2	2
8	ANUPAMA	45	F	43515	PARAUMBILICAL HERNIA	A1	MESH REPAIR	SPINAL	2	2	0	2	2	2
9	NAVYA	23	F	43452	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
10	MAHARAJAN	34	M	43501	PILONIDAL SINUS	A1	BOSCOM'S PROCEDURE	SPINAL	2	2	0	2	2	2
11	THULASI	25	F	47233	PHYLLOIDES TUMOUR	A1	WIDE LOCAL EXCISION	SPINAL	2	2	0	2	2	2
12	SURESH KUMAR	55	M	46309	B/L HYDROCELE	A1	B/L EVERSION OF SAC	SPINAL	2	2	0	2	2	2
13	AISHWARYA	26	F	52322	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
14	MARIYAPPAN	40	M	52195	UMBILICAL HERNIA	A1	MESH REPAIR	SPINAL	1	STAPHAUREUS	3	1	1	2
15	KALIAPPAN	44	M	41100	RAW AREA BACK	A1	SSG	GA	2	2	0	2	2	2
16	NESRIN FATHIMA	22	F	54086	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
17	SAKUNTHALA	25	F	52483	PHYLLOIDES TUMOUR	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
18	AJAY	21	M	57789	B/L HYDROCELE	A1	B/L EVERSION OF SAC	SPINAL	2	2	0	2	2	2
19	RAJASEKAR	40	M	60226	LEFT VARICOSE VEIN	A1	TRENDLENBERG PROCEDURE	GA	2	2	0	2	2	2
20	SANDHIYA	27	F	62256	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
21	MUNIRAJ	22	M	62619	LEFT UNDESCENDED TESTIS	A1	ORCHIDECTOMY	GA	2	2	0	2	2	2
22	REETA	25	F	65889	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2

23	SHANKAR KUMAR	57	M	66255	VARICOSE VEIN	A1	TREDELENBERG PROCEDURE	RA	2	2	0	2	2	2
24	DIVYA	28	F	68725	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
25	NANDHINI	25	F	71345	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
26	DEVIKA	23	F	71403	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
27	KALIYAPPAN	37	M	68274	RAW AREA BACK	A1	SSG	GA	2	2	0	2	2	2
28	KUMAR	57	M	70696	B/L VARICOSE VEIN	A1	TRENDELENBERG PROCEDURE	SPINAL	2	2	0	2	2	2
29	THIYAGARAJAN	55	M	74084	PARAUMBILICAL HERNIA	A1	MESH REPAIR	SPINAL	2	2	0	2	2	2
30	SELVARAJ	48	M	73933	INGUINAL HERNIA	A1	HERNIOPLASTY	SPINAL	2	2	0	2	2	2
31	PITCHANDI	32	M	74108	INGUINAL HERNIA	A1	HERNIOPLASTY	SPINAL	2	2	0	2	2	2
32	PRABHU	26	M	74043	VARICOSE VEINS	A1	TRENDELENBERG PROCEDURE	SPINAL	2	2	0	2	2	2
33	SENBAGAM	35	F	73615	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
34	ESAKKIAMMAL	54	F	76979	LEFT CERVICAL LYMPHADENOPATHY	A1	EXCISION BIOPSY	GA	2	2	0	2	2	2
35	ARUL	42	M	77165	LEFT HYDROCELE	A1	EVERSION OF SAC	SPINAL	1	STAPHAUREUS	3	1	1	2
36	UMAYA PARVATHY	35	F	78859	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
37	VAJUMONISHA	24	F	79527	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
38	KENNADY	49	M	78453	LEFT HYDROCELE	A1	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
39	KOSALA	30	F	82436	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
40	SANDYA	24	F	82333	FIBROADENOMA	A1	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
41	BAKRUDEEN BABU	57	M	81918	RIGHT HYDROCELE	A1	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
42	SATHYA	45	F	318647	PHYLLODES TUMOUR	A1	WIDE LOCAL EXCISION	SPINAL	2	2	0	2	2	2
43	MALAR	45	F	82597	PARAUMBILICAL HERNIA	A1	MESH PLASTY	SPINAL	2	2	0	2	2	2
44	BAKATHAVATHSALAM	57	M	84996	B/L VARICOSE VEINS	A1	LEFT TRENDELENBERG PROCEDURE	SPINAL	2	2	0	2	2	2
45	PRABU	32	M	87858	LEFT HEMATOCELE	A1	LEFT ORCHIDECTOMY EVACUATION	SPINAL	2	2	0	2	2	2
46	DEVI	26	F	100675	UMBILICAL HERNIA	A1	LAP/OPEN MESH PLASTY	GA	2	2	0	2	2	2
47	RAJESWARI	47	F	385447	GAINT CELL TUMOUR RIGHT INDEX FINGER	A1	EXCISION BIOPSY	RA	2	2	0	2	2	2
48	BALAN	47	M	98024	PILONIDAL SINUS	A1	LIMBERG FLAP	SPINAL	2	2	0	2	2	2

49	MUNIYAMMAL	37	F	106624	B/L VARICOSE VEINS	A1	RIGHT TRENDELENBERG PROCEDURE	SPINAL	2	2	0	2	2	2
50	JAYA	55	F	100764	PARAUMBILICAL HERNIA	A1	MESH REPAIR	SPINAL	2	2	0	2	2	2
1	ANBU	38	M	105447	LEFT VARICOSE VEINS	A2	LEFT TRENDELENBERG PROCEDURE	SPINAL	2	2	0	2	2	2
2	SURESH	38	M	108009	LEFT HYDROCELE	A2	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
3	VINOTH KUMAR	29	M	108668	UMBILICAL HERNIA	A2	MESH REPAIR	SPINAL	2	2	0	2	2	2
4	DEVI	43	F	108793	FIBROADENOMA	A2	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
5	LAKSHMI	30	F	110619	RECURRENT SCAR ENDOMETRIOMA	A2	EXCISION BIOPSY	SPINAL	2	2	0	2	2	2
6	KRISHNAN	55	M	500	LFT LL SOFT TISSUE SARCOMA	A2	EXCISION BIOPSY	SPINAL	2	2	0	2	2	2
7	PACHIAPPAN	57	M	977	LEFT HYDROCELE	A2	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
8	NAGAVALLI	37	F	28800	BREAST ANTIBIOMA	A2	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2
9	SUBBULU	55	F	22848	RAW AREA RIGHT LEG	A2	SPLIT SKIN GRAFTING	SPINAL	2	2	0	2	2	2
10	MANIKKAVEL	35	M	29771	PARAUMBILICAL HERNIA	A2	MESH PLASTY	SPINAL	2	2	0	2	2	2
11	SUGUMAR	35	M	32628	LEFT INGUINAL HERNIA	A2	HERNIOPLASTY	SPINAL	2	2	0	2	2	2
12	PATTAMMAL	58	F	27609	RECTAL PROLAPSE	A2	THIERSCH WIRING	SPINAL	2	2	0	2	2	2
13	BALARAMAN	52	M	38206	UMBLICAL SINUS	A2	RIGHT MESH REPAIR	SPINAL	2	2	0	2	2	2
14	YASUDOSS	58	M	38368	RIGHT HYDROCELE	A2	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
15	DEVARAJ	29	M	38911	LEFT FOOT SCC	A2	LEFT 3RD TOE RAY AMPUTATION/SUPERFICIAL INGUINAL NODE EXICISION BIOPSY	SPINAL	2	2	0	2	2	2
16	DURAIVEL	38	M	43707	RIGHT HYDROCELE	A2	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
17	GIRIJA RANI	30	F	158814	RIGHT PAROTID LN	A2	ENUCLEATION	SPINAL	2	2	0	2	2	2
18	KRISHNASAMY	33	M	48784	RIGHT HYDROCELE	A2	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
19	RAJI	42	M	48795	LEFT HYDROCELE WITH SPERMATOCELE	A2	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
20	RAMAN	25	M	49260	RIGHT HYDROCELE	A2	HERNIOTOMY	SPINAL	2	2	0	2	2	2
21	SATHYA	27	F	51378	PILONIDOL SINUS	A2	Z-PLASTY	SPINAL	2	2	0	2	2	2
22	ANITHA	31	F	54496	FIBROADENOMA	A2	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2

23	RAMAN	43	M	42970	SQUAMOUS CELL CARCINOMA RIGHT FOOT	A2	RIGHT FOREFOOT AMPUTATION	SPINAL	2	2	0	2	2	2
24	SARASU	51	F	52565	LEFT LOWER LIMB VARICOSE VEINS	A2	TRENDELANBERG PROCEDURE	SPINAL	2	2	0	2	2	2
25	RAJENDRAN	46	M	51788	RIGHT INDIRECT INGUINAL HERNIA	A2	RIGHT HERNIOPLASTY	SPINAL	1	STAPHAUREUS	3	1	1	2
26	KRISHNAMOORTHY	38	M	52619	B/L HYDROCELE	A2	EVERSION OF SAC	SA	2	2	0	2	2	2
27	VEERAPPAN	51	M	55947	LEFT VARICOCELE WITH RIGHT ISCHEMIC ORCHITIS	A2	LEFT VARICOCELECTOMY	SPINAL	2	2	0	2	2	2
28	RAMASAMY	50	M	60153	LEFT HYDROCELE	A2	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
29	SEKAR	44	M	61079	RIGHT INDIRECT INGUINAL HERNIA	A2	RIGHT HERNIOPLASTY	SPINAL	2	2	0	2	2	2
30	SASIKUMAR	37	M	58427	LEFT VARICOSE VEINS	A2	LEFT TRENDELENBERG PROCEDURE	SPINAL	2	2	0	2	2	2
31	SWETHA	29	F	62324	PILONIDAL SINUS	A2	LIMBERG RHOMBOID FLAP	SPINAL	2	2	0	2	2	2
32	VELMANI	52	M	58957	UMBILICAL HERNIA	A2	MESH PLASTY	SPINAL	2	2	0	2	2	2
33	SRINIVASAN	48	M	63596	RIGHT HYDROCELE	A2	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
34	THASLI	26	F	63601	PARAUMBILICAL HERNIA	A2	LAP/OPEN MEDH PLASTY	SPINAL	2	2	0	2	2	2
35	SHYAMAN	45	M	64614	LEFT VARICOSE VEINS	A2	LEFT TRENDELENBERG PROCEDURE	SPINAL	2	2	0	2	2	2
36	SIVAGAMI	38	F	48640	RAWAREA LEFT FOOT	A2	SPLIT SKIN GRAFTING	SPINAL	2	2	0	2	2	2
37	SATHYAVANI	38	F	69193	PHYLLOIDES TUMOUR	A2	WIDE LOCAL EXCISION	GA	1	STAPHAUREUS	3	1	1	2
38	MANJULA	38	F	79169	LEFT PAROTID LYMPHOMA	A2	EXCISION/INCISION BIOPSY	SPINAL	2	2	0	2	2	2
39	SHANKAR	42	M	79065	LEFT VARICOSE VEIN	A2	LEFT TRENDELENBERG PROCEDURE	SPINAL	2	2	0	2	2	2
40	RAVIKUMAR	45	M	77445	B/L HYDROCELE	A2	EVERSION OF SAC	SPINAL	2	2	0	2	2	2
41	CHANDRAN	37	M	73770	RAW AREA LEFT LOWER LIMB	A2	SPILIT SKIN GRAFT	SPINAL	2	2	0	2	2	2
42	SIVALINGAM	52	M	92543	B/L HYROCELE WITH BXO	A2	EVERSION OF SAC WITH CIRCUMCISION	SPINAL	2	2	0	2	2	2
43	ANITHA	23	F	92837	FIBROADENOMA	A2	WIDE LOCAL EXCISION	GA	2	2	0	2	2	2

44	PALANI	30	M	101164	LEFT POPLITEAL FOSSA SWELLING WITH PERIPHERAL NERVE SHEATH TUMOR	A2	EXCISION BIOPSY +/- NERVE GRAFTING (PLASTIC SURGERY)TEAM	SPINAL	2	2	0	2	2	2
45	RAJENDRAN	55	M	103779	RIGHT INDIRECT INGUINAL HERNIA	A2	RIGHT HERNIOPLASTY	SPINAL	2	2	0	2	2	2
46	YUSAP	55	M	101112	RIGHT HYDROCELE	A2	RIGHT EVERSION OF SAC	SA	2	2	0	2	2	2
47	RAVI	45	M	10213	RIGHT INDIRECT INGUINAL	A2	RIGHT HERNIOPLASTY	SPINAL	2	2	0	2	2	2
48	RAJKUMAR	35	M	103221	RIGHT INDIRECT INGUINAL HERNIA	A2	RIGHT HERNIOPLASTY	SPINAL	2	2	0	2	2	2
49	GANESAN	42	M	26643	LEFT HYDROCELE	A2	LEFT EVERSION OF SAC	SPINAL	2	2	0	2	2	2
50	AMBUJAM	55	F	25805	LEFT VARICOSE VEIN	A2	LEFT TRENDELENBERG PROCEDURE	SPINAL	2	2	0	2	2	2