

A Comparative Study on Causative Micro-Organisms for Post-Operative Wound Infection between First and Subsequent Cases in Routine Surgical Procedure

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ABSTRACT

Introduction: Infection is the invasion of the body by the pathogenic micro-organisms with consequent local and systemic effect. For this, a sufficient number of pathogens must enter the tissues, overcome the patients' resistance and multiply. The commonest organisms are staphylococcus aureus and gram-negative intestinal bacilli. Streptococcus pyogenes are not infrequent.

Objective: The main purpose of this research is to make a comparative study on causative micro-organisms for post-operative wound infection between first and subsequent cases in routine surgical procedure.

Method: Incidence of wound infection between first and subsequent cases in routine surgical procedure was the subject matter of this study. In this study 228 cases have been studied. Of these cases, 76 were the 1st case, 76 were 2nd case, and 76 were the 3rd case in 76 routine operation days. The study duration was from September 2015 to August 2016.

Result: After numerous information and examination investigation; this study revealed that maximum wound

infection was due to Escherichia Coli.

Conclusion: The study concludes that Escherichia coli were the commonest organism isolated from infected wounds which is the inhabitant of gastrointestinal and biliary tracts.

Keywords: Micro-Organisms, Skin Trauma, Wound Infection.

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INTRODUCTION

Infection is the invasion of the body by the pathogenic micro-organisms with consequent local and systemic effect. For this, a sufficient number of pathogens must enter the tissues, overcome the patients' resistance and multiply. The development of infection in incisional wounds continues to be one of the most serious complications that can occur in surgical patients. Surgical practice primarily aims at healing of the wounds without serious complications, and infection occurring in the post-operative wound can have significant effect on the patients' morbidity and mortality as well as on the final outcome of his or her operations.

The skin varies in texture, tending to be thin in front and thick behind. Distribution of hair varies with age, sex and race. Natural lines of cleavage of the skin are very constant and are of tremendous importance to the cosmetic appearance of healed incisions. An incision along the cleavage line will heal as a hair

line scar, virtually invisible; incisions across the lines will tend to heal with either a wide or heaped up scar. The cleavage lines run almost horizontally around the body wall.^{1,2}

When the tissue is injured, inflammation results, inflammation is the reaction of the vascular and supporting elements of a tissue to injury, and results in the formation of a protein rich exudate, provided the injury has not been as severe as to destroy the area. The injured vessels bleed and then contract. Extravasated platelets bind to exposed collagen. As a result the phospholipids are released and activate both extrinsic and intrinsic coagulation mechanisms within few hours; the area is heavily infiltrated with polymorphonuclear leucocytes and lymphocytes. At this time the circulation has diminished following a transient phase of hyperemia. This is due to thrombosis. Local tissue suffers from relative ischemia. Within few days after injury the neutrophils

become less prominent and wandering tissue monocyte become the prominent white cells.³ Following the great scientific revolution generated by the discoveries of Louis Pasteur, a series of advances in our knowledge of surgical infections were there after made successively by contributions from new science of bacteriology. In this paper, the researchers attempted to make a comparative study on post-operative wound infection between first and subsequent cases in routine surgical procedure.

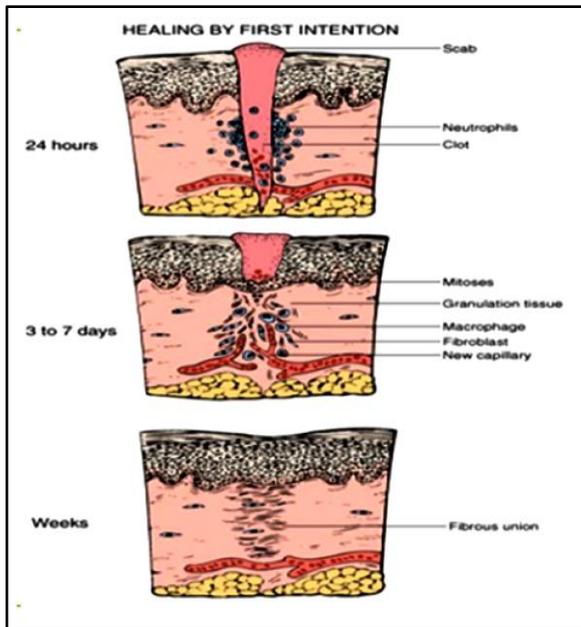


Figure 1: Steps in Wound Healing by First Intention⁴

OBJECTIVES

Main Objective

The main purpose of this research is to make a comparative study on causative micro-organisms for post-operative wound infection between first and subsequent cases in routine surgical procedure.

Specific Objectives

1. To identify the rate of infection in different operations.
2. To identify the causative micro-organisms.
3. To compare the micro-organisms in the subsequent cases.

METHODS

Incidence of wound infection between first and subsequent cases in routine surgical procedure was the subject matter of this study. In this study 228 cases have been studied. Of these cases, 76 were the 1st case, 76 were 2nd case, and 76 were the 3rd case in 76 routine operation days.

Inclusion Criteria

All the patients included in this study were admitted for elective surgery for biliary tract disease, gastrointestinal tract disease and other intrabdominal diseases.

Exclusion Criteria

The patients that did not have the biliary tract disease, gastrointestinal tract disease and other intra-abdominal diseases or voluntarily avoided the surgery for whatever reasons were excluded from the study.

Study Area

All cases belong to the surgical unit I of Mymensingh Medical College Hospital. Operation days were selected at random.

Study Procedure

- The skin was cut clearly at one stroke throughout the whole length. Superficial and deep fascial layers were incised in the same way.
- Proper haemostasis was done with diathermy coagulation. Sometimes catgut was used to ligate the bleeding vessels.
- Every effort was made to protect the wound margin from contamination.
- Standard text book technique was adopted to close different types of incisions.

Table 1: Rate of Infection of 1st Cases in Routine Surgical Procedure

Name of the disease	Name of the operation	No. of operation	No. of infection	Percentage (%) of infection
Chronic cholecystitis	Cholecystectomy	41	1	2.44
Renal calculi	Pyelolithotomy	9	1	11.11
Fibroadenoma breast	Excision of the lump	5	0	
Inguinal hernia	Herniotomy and herniorrhaphy	6	0	
Carcinoma breast	Modified radical mastectomy with axillary clearance	4	0	
Buerger's disease	Bilateral lumbar sympathectomy	1	0	
Recurrent Appendicitis	Interval appendicectomy	3	0	
Carcinoma stomach	Partial gastrectomy	1	0	
Chronic intestinal obstruction (Ileocecal TB. or malignancy)	Right hemicolectomy	1	0	
Gastric outlet obstruction	Bilateral truncal Vagotomy and gastrojejunostomy	2	0	1
Benign enlarged prostate	Retropubic prostatectomy	1	0	
Chronic calculus pancreatitis	Pancreatic lithotomy with pancreatojejunostomy rou-en-Y	2	0	
Total		76	2	2.63

Table 2: Rate of Infection of 2nd Cases in Routine Surgical Procedure

Name of the disease	Name of the operation	No. of operation	No. of infection	Percentage (%) of infection
Chronic cholecystitis	Cholecystectomy	32	1	3.13
Inguinal hernia	Herniotomy and Herniorrhaphy	8	0	
Gastric outlet Obstruction	Bilateral truncal vagotomy and Gastrojejunostomy	7	0	
Obstructive jaundice	Cholecystectomy with Cholechoolithotomy	7	1	14.29
Benign enlarged Prostrate	Prostatectomy	6	1	16.67
Kidney stone	Nephrolithotomy	5	0	
Fibroadenoma breast	Excision of the lump	2	0	
Ca-breast	Modified radical mastectomy with axillary clearance	2	0	
Ca-stomach	Partial gastrectomy	2	0	
Recurrent Appendicitis	Interval appendectomy	2	0	
Buerger's disease	Sympathectomy	1	0	
Chronic intestinal Obstruction	Right hemicolectomy	2	0	
Total		76	3	3.95

Table 3: Rate of Infection of 3rd Cases in Routine Surgical Procedure

Name of the disease	Name of the operation	No. of operation	No. of infection	Percentage (%) of infection
Chronic cholecystitis	Cholecystectomy	17	1	5.88
Buerger's disease	Bilateral lumbar sympathectomy	13	0	
Gastric outlet obstruction	Bilateral truncal vagotomy and gastrojejunostomy	14	0	
Carcinoma stomach	Partial gastrectomy	6	1	16.67
Benign enlarged prostate	Retropubic prostatectomy	7	1	14.29
Inguinal hernia	Herniotomy with herniorrhaphy	5	0	0
Renal calculi	Nephrolithotomy	4	0	0
Recurrent Appendicitis	Interval appendectomy	3	0	0
Obstructive jaundice	Cholecystectomy with choledocholithotomy	3	1	33.33
Chronic intestinal obstruction	Right hemicolectomy	2	0	0
Carcinoma breast	Modified radical mastectomy with axillary clearance	2	0	0
Total		76	4	5.26

Table 4: Character of Discharge or Pus and Organism Cultured

Character of Discharge	No. of Cases	Organisms
Serosanguinous	2	No growth
Thick creamy pus	2	Staphylococcus aureus
Muddy thin odorless	3	Escherichia coli
Blue green pus	1	Pseudomonas aeruginosa
Yellow fishy odour	1	Klebsiella

Table 5: Incidence of Post-operative wound infection and organisms of wound infection.

Total no of cases	Total no of wound infection	% of wound infection	Organisms of infections	No. of infection	% of infection according to causative organisms
228	9	3.95	E. Coli	3	1.32
			Staphylococcus aureus	2	0.88
			Pseudomonas	1	0.44
			Klebsiella	1	0.44

RESULTS

Tables 1, 2, and 3 describes the rate of infection in routine surgical procedure in a cases by cases basis as per the sample division.

Causative pathogens detected were Escherichia Coli in 3 cases, Staphylococcus aureus in 2 cases, Pseudomonas aeruginosa in 1 case and klebsiella in 1 case and negative results were found in 2 cases. (Table 4)

Escherichia coli were the most common (1.32%) pathogens cultured from the infected wounds. Staphylococcus aureus was 0.88%, Klebsiella 0.44% and pseudomonas 0.44%. (Table 5)

DISCUSSION

In this series, 76 routine operation days was selected at random to carryout 'a comparative study on post-operative wound infection between first and subsequent cases in routine surgical procedure'. 76x3= 228 cases were included, of them 76 cases were 1st case, 76 cases were 2nd case and 76 cases were 3rd case. These cases were admitted to Mymensingh Medical College Hospital for elective operation during the period of May 1997 to November, 1998. Name of operations and number of each operation were shown in the table- 1, table 2 & table 3. Wound infection rate varies according to the types of operation. In this series, 76 cases (Table-1) were operated as the 1st case, of them infection found in 2 cases, infection rate was 2.63%. 76 cases (Table-2) were operated as the 2nd case, of them infection found in 3 cases, infection rate was 3.95% and 76 cases (Table-3) were operated as the 3rd case, of them infection found in 4 cases, infection rate was 5.26%.

Clinical presentations of wound infection were also carefully noted. My findings were compared with the results of study made by Ali SL Khan ANGA⁵, Cruse PJE, Froid R⁶, Saha SC, Zaman MA, Khan MR et al⁷, published and quoted in different Journals and text books.

"A wound was defined as infected if it discharged pus."⁸ The character of post-operative wound discharge and result of culture was shown.

Negative results were found in 2 cases. This may be due to the use of antibiotics. Causative pathogens detected were Escherichia coli in 3 cases, staphylococcus aureus in 2 cases, pseudomonas aeruginosa in 1 case and Klebsiella in 1 case. This study revealed that maximum wound infection was due to Escherichia Coli.

CONCLUSION

This study revealed that E. coli was the commonest organism isolated from infected wounds which is inhabitant of gastrointestinal and biliary tracts. Prophylactic antibiotic use can minimize post-operative wound infection by E.Coli.

REFERENCES

1. Me Minn RMH: Last's Anatomy, Regional and Applied, 9th ed. Churchill- Livingstone. Edinburgh 1994; 241,295-9.
2. Williams, Peter L, Warwick R: Gray's Anatomy, 38th ed. Churchill- Livigstone. Edinburgh. 1995; 819-29.
3. Walter JB, Israel MS: General Pathology, 6th ed. Churchill-Livingstone Edinburgh. 1987; 81-90, 97-107, 117-38.
4. Jawetz E: Review of Medical Microbiology, 15th ed. Lanze Medical Publications. USA. 1982; 29, 117-154, 175-199,227-41.
5. Ali SL, Khan ANGA: Pattern of Surgical infection at Chittagong Medical College Hospital, Journal of BCPS. 1983; 1:1: 17-20.
6. Cruse PJE, Froid R: A five-year prospective study of 23.649 surgical wounds Arch Surg. 1973; 107 : 206-10.
7. Saha SC, Zaman MA, Khan MR et al: Common aerobic bacteria in postoperative wound infection and their sensitivity pattern, BMRC Bulletin, 1995; 21 (1): 32-7.
8. Cruse PJE, Froid R: The epidemiology of wound infection, Surgical clinics of North America, 1980; 60:1:27- 40.

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