



Incidence of Wound Infection in Abdominal Surgeries- A Clinical Study

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Abstract

Objectives: To study the incidence, type of infective organisms, possible risk factor and sources of infectious in relation to emergency and elective abdominal surgery.

Methodology: During two years study period of postoperative wound infection admitted in Basaveshwar Teaching & General Hospital attached to Mahadevappa Rampure Medical College, Gulbarga, 80 operations including elective and emergency surgical procedures, done in major OT were studied. As a routine patients were investigated to rule out preexisting comorbidities.

Results: A total number of 80 cases during 2 years period were studied. The various factors responsible for wound infection and their response to antibiotics were studied, the results were analyzed and discussed. The post operative wound infection in relation to age (highest incidence in above 60 years age group – 62.5%), sex (male sex), nutritional status (poor status of the patient – 36.36%), anaemia (severe-33.33%).

Conclusion: Thus from the above findings the incidence of wound infection, simple attention to technical details.

Introduction

Wound infections in abdominal surgeries, also known as surgical site infections (SSIs) complicate the recovery of many patients. Microbes have come to occupy a very important place with day to day service of surgeon. Bacterial infection at a surgical incision may have results that ranges from inconvenience to disaster, from small stitch abscess to massive destruction, septicaemia, and death. Between these extremes there are many forms of sepsis that cause patient discomfort, delay the return to health or leave permanent disability.

Surgical site infection is defined as wound infection which occurs at an incision site within

30 days after operation & involves skin or subcutaneous tissue above the fascial layer¹.

Bacteria can gain entrance to the wound from endogenous or exogenous sources. Surgical infection is an infection which requires surgical treatment and has developed before or a complication of surgical treatment. Thus, post operative wound infection is also a specific nosocomial infection.

Although the majority of SSIs are uncomplicated, others may be severe and more challenging to manage.

Microbes are as old as man. There is no satisfactory explanation as to their origin. Whatever may be the origin they are causing

problems. Since the discovery and demonstration of microbes in the early part of 19th century which plunged the mankind to expose the mysterious new world at the same time inviting man into the war with the microbes, later favoured man to gain an upper hand over the microbes, especially over a group of bacteria with the help of antibiotics and chemotherapeutics.

Aims

1. To study the incidence of wound infection, following major abdominal surgeries.
2. To study the incidence in emergency and elective surgeries.

Methodology

This study is undertaken in surgical units of Basaveshwar Teaching & General Hospital and Government General Hospital, attached to Mahadevappa Rampure Medical College, Gulbarga over the period of February 2010 to February 2012 that is two years. A total number of 80 patients, operations including elective and

emergency surgical procedures done in major Operation Theatres were studied. Out of 80 patients 54 were emergency cases and 26 were elective cases. Patients were admitted 2-3 days earlier to surgery, excepting some of them admitted week earlier, those required special investigations and preparation (pre-operative). As a routine, patients were investigated to rule out pre-existing infection.

Results

Majority of operations, include Cholecystectomy, Appendicectomies and Gastrojejunostomy with Vagotomy in elective cases and also include Malignancy of large Bowel etc., In emergency group, Hollow viscus perforation, Appendicitis, Intestinal obstruction and also Abdominal Trauma etc.,

Type of Surgery

A total number of 80 cases were studied in this series, 54 emergency and 26 elective cases among which infected cases were 18 and 2 respectively.

Table-1: Cases Studied

| Cases Studied | No. of Cases | No. of Cases Infected | Percentage |
|----------------------------|--------------|-----------------------|------------|
| Total No. of cases studied | 80 | 20 | 25% |
| No. of emergency cases | 54 | 18 | 33.33% |
| No. of elective cases | 26 | 2 | 7.69% |

Sex Incidence

Sex incidence in this series is 12(24.48%) and 8 (25.80%) in 49 male and 31 females respectively.

Table-2: Sex Wise Distribution of Cases

| Sex | No. of Cases | Percentage |
|---------|--------------|------------|
| Male | 12 | 24.48% |
| Females | 8 | 25.80% |

Age Incidence

In 0-20 years groups only one (5.26%) case was infected on the contrary in the above 60 years group 5(62.5%) out of 8 cases were infected.

Table-3: Age Incidence

| Age of Patient (Years) | No. of Cases | No. of Cases Infected | Percentage |
|------------------------|--------------|-----------------------|------------|
| 0 – 20 years | 19 | 1 | 5.26% |
| 21 – 40 years | 33 | 5 | 15.15% |
| 41 – 60 years | 20 | 9 | 45% |
| Above 60 years | 8 | 5 | 62.5% |

Nutritional Status

Among poor nutritional status group 4 (36.36%) out of 11 were infected.

Table-4: Nutritional Status

| Nutritional Status | No. of Cases | No. of Cases Infected | Percentage |
|--------------------|--------------|-----------------------|------------|
| Well | 13 | 2 | 15.38% |
| Moderate | 56 | 14 | 25% |
| Poor | 11 | 4 | 36.36% |

Anaemia

Among 6 patients of severe anaemia group below the level of 7 gm% 2 (33.3%) developed post

operative wound infection, where as 3 (15%) patients out of 20 were infected in no anaemia group.

Table-5: Anaemia

| Anaemia | No. of Cases | No. of Cases Infected | Percentage |
|----------|--------------|-----------------------|------------|
| No | 20 | 3 | 15 |
| Mild | 35 | 9 | 25.71 |
| Moderate | 19 | 6 | 31.57 |
| Severe | 6 | 2 | 33.33 |

Operator: (Sr. Consultant/Jr. Consultant/P.G.)

Three (15%) out of 20 cases operated by Sr. Consultants got infected where as the percentage

of infected cases in Jr. Consultant and P.G. group are 23.52% and 55.55% respectively.

Table-6: Operator

| Operator | No. of Cases | No. of Cases Infected | Percentage |
|-------------------|--------------|-----------------------|------------|
| Senior surgeon | 20 | 3 | 15 |
| Assistant Surgeon | 51 | 12 | 23.52 |
| Post graduate | 09 | 5 | 55.55 |

Risk Factors: (Involvement of more than two Organ Systems)

6 (40%) out of 15 cases infected in diabetes group.

Table-7: Risk Factors

| Risk factors | No. of Cases | No. of Cases Infected | Percentage |
|--------------|--------------|-----------------------|------------|
| R.T.I. | 6 | 1 | 16.66 |
| U.T.I. | 9 | 3 | 33.33 |
| Obesity | 13 | 7 | 53.85 |
| Diabetes | 15 | 6 | 40 |

Wound Class

In this series, in clean wound group 4 (14.81%) out of 27 were infected in contrast to

contaminated wound group in which 10 out of 23 were infected with a percentage of 43.47.

Table-8: Traditional Wound Class

| Wound Class | No. of Cases | No. of Cases Infected | Percentage |
|--------------------|--------------|-----------------------|------------|
| Clean | 27 | 4 | 14.81 |
| Clean contaminated | 30 | 6 | 20 |
| Contaminated | 23 | 10 | 43.47 |

Organisms Involved

Among 20 infected cases, in 10 E. Coli was found to be the causative organism with a percentage of

50%, pseudomonas 11.54% and coagulase positive staphylococci.

Duration of Surgery

The time taken 1 hour or less 17 cases were included in which no case was infected, where as

24 cases with 2-3 hours duration 9 (37.5%) were infected.

Table-9: Duration of Surgery

| Time taken for surgery | No. of Cases | No. of Cases Infected | Percentage |
|------------------------|--------------|-----------------------|------------|
| 1 hour or less | 17 | -- | -- |
| 1 – 2 hours | 59 | 17 | 28.81 |
| 2 – 3 hours | 24 | 9 | 37.50 |

Post Operative Complications

10 cases developed post operative respiratory track infection, 6 U.T.I., 8 post op hypotension. Mortality was 3%.

Table-10: Postoperative Complications

| Postoperative complications | No. of Cases |
|-----------------------------|--------------|
| RTI | 10 |
| UTI | 6 |
| Hypotension | 8 |
| Septicemia and death | 3 |

Discussion

A total number of 80 cases studied in this series, 54 emergency and 26 elective cases.

Bacteriological studies were done in 42 cases out of 80 cases. There were 20 cases of postoperative wound infection. In general the incidence of infection was 25%.

Results of other Workers

| Name of workers | Year | % of infection rate |
|--------------------------------|------|---------------------|
| Meleny ² | 1835 | 4.80 |
| Agarwal ³ | 1972 | 20.0 |
| Rao & Harsha ⁴ | 1975 | 25.00 |
| Venkatraman et al ⁵ | 1978 | 22.3 |
| Shaw et al ⁸ | 1973 | 16.90 |
| Srivastava ⁹ | 1962 | 10.19 |
| Cruse and Ford ¹⁰ | 1980 | 48.00 |
| Kowli et al ¹¹ | 1985 | 17.40 |
| Anvikar et al ¹² | 1959 | 5.00 |
| Barner ¹³ | 1961 | 10.15 |
| Present study | 2012 | 25 |

The incidence of wound infection in present study is comparable with previous studies. Considering the incidence of wound infection reported in the world literature the present incidence 25% is quite acceptable.

| Total No. of Cases | Cases | Cases Infected | Percentage |
|------------------------|-------|----------------|------------|
| No. of cases studied | 80 | 20 | 25% |
| No. of elective cases | 26 | 02 | 7.69% |
| No. of emergency cases | 54 | 18 | 33.33% |

The high infection rate in emergency case may be due to more G.I. perforation cases included in this study, these patients present late to the hospital where in they fall in contaminated wound class¹⁴ and also subsequent lengthy incisions¹⁴ and use of drains¹⁵ predispose to wound infection.

Incidence in Relation to Sex

This report is almost in the same range. The incidence of wound infection in relation to sex, where males show almost twice the numbers of cases compared to the females. The risk infection is more in males (Subramanian et al 1973).

It is evident from the present study that, there is a gradual increase in the incidence of the infection as the age advances. Above 60 years the incidence of wound infection is very high. This is almost confirmed by other workers.

The infection rate increased with increasing age, being maximum in the 51-70 years group. The infection rate in male and female was almost similar, male 19.1% in the former and 17.64% later.

Age and Sex Incidence

| Author | Age group | Percentage |
|-------------------------|---------------|------------|
| Sharma S ¹⁴ | > 60 years | 16.16% |
| Agarwal SL ³ | 51 – 70 years | 35.02% |
| Present study | >60years | 62.5% |

Sharma Series¹⁴

| Age group in years | Cases studied | Cases infected | Percentage | Present series % |
|--------------------|---------------|----------------|------------|------------------|
| 0-19 | 33 | 2 | 6.0 | 5.26% |
| 20-39 | 188 | 35 | 18.6 | 15.15% |
| 40-59 | 185 | 29 | 16.6 | 45% |
| >60 | 74 | 13 | 17.5 | 62.5% |

Incidence in Relation to Nutritional Status

It's known that the nutritional status and anaemia have a direct bearing on the incidence of wound infection¹⁷.

Wound infection is directly proportional to the nutritional status of the patient. In present study infection rate of 36.36%% was observed in patients poor nutritional status. And as shown above there is high incidence of infection 33.33%% in patients with severe anaemia¹⁷ and 31.57% in moderate anaemia.

Poor nutritional status and anaemia are strong predisposing factors for increase in incidence of wound infection. Cruse and Foord¹⁰ found overall rate of 17% among patients considered malnourished versus 4.8% for all patients combined. Shukla et al (1985) formed a poor nutritional status was associated with a wound infection rate of 17% versus 8.3% with good nutritional state. This discrepancy from present series may be because of more no of patients studied in the referred series.

Various associated factors detected preoperatively were diabetes present in 15 cases, obesity in 13

cases, Respiratory tract infection was present in 6 cases.

All these factors have increased in incidence, especially with diabetes where in half of the patient were found to have post operative wound infection. This proves that a vigorous control of diabetes status and respiratory tract infection are essential in brining down the incidence of wound infection. Obesity is also essential factor in causing post operative wound infection as evident from study^{18,19}.

The cases in whom respiratory tract infection and urinary tract infection was detected, were given antibiotics like Ciprofloxacin 500mg, 12th hourly and mainly on empirical basis²⁰.

Incidence in Relation to Duration of Surgery

60 minutes and below, surgery have lowest incidence that in absolutely no case was infected and which is directly proportional to the duration of surgery. Probably this is a point in favour of quick surgery reduces the chances of infection. This is confirmed by other authors.

Sharma's Series (1972)¹⁴

| Duration Studied | No. of cases | Cases Infected | Percentage | Present Series % |
|------------------|--------------|----------------|------------|------------------|
| 0-60 min. | 31 | 2 | 6.40 | 0.00 |
| 60-120min. | 387 | 63 | 16.20 | 24.80 |
| 120-180min. | 53 | 11 | 20.70 | 36.50 |
| > 180min. | 9 | 3 | 33.30 | |

This increased incidence with long in duration of surgery in the present series is probably due to several factors, which increases the changes of contamination of the tissues. The source is mainly from the surgical team, other factors include laxity in aseptic technique and sterilization methods, while operation is in progress.

Conclusion

A prospective study of wound infection in 80 operated cases were undertaken in this study. It has been noted that the risk factors for wound infection are mainly the type of surgery namely the emergency surgery. The incidence of wound infection remained low in elective cases. The reason for wound infection in emergency cases could be multifactorial, this could be advanced

age poor nutritional status, delay in reporting the associated comorbid conditions. These who report late for consultation in this hospital might have already waste precious time when the disease could have been tackled with less morbidity, most of this group of patients might have been suffering from systemic inflammatory response syndrome with impending organ failure also with all their attendant ill effects.

Hence, a plea is made for early referral of cases from the peripheral centres, which it is hoped could effective change the scenarior of wound infection in emergency cases. The incidence of wound infection could be improved by simple attention to technical details.

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