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**Original Article**

# Role of Surgeon in the Causation of Surgical Wound Infection in Non-traumatic Emergency Laparotomy

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**Abstract**

**Background: S**urgeon has a vital role during operation related with wound infection. **Objective:** The purpose of the present study was to see the role of wound infection of non-traumatic emergency laparotomy surgeries. **Methodology:** This descriptive cohort study was carried out in the Department of Surgery at Dhaka Medical College, Dhaka from July 1997 to June 1998 for a period of 1(one) year. Pre-operative patients were carefully assessed for any host factors related to wound infection. Different per-operative factors that influence the rate of postoperative wound infection were also analyzed. Swabs were taken from the suspected postoperative wound and sent for bacteriological examination. The details related to the surgeon were recorded according to their experience. **Result:** In this series, 100 cases of emergency laparotomies (non-traumatic) were analyzed. Wound infection rate of specific type of operation were 12.5%, 20.0%, 6.6%, 40.0%, 40.0%, 33.3%, 50.0%, 50.0%, and 100.0% in duodenal ulcer perforation, pre-pyloric and gastric ulcer perforation, acute appendicitis, burst appendix, ileal perforation, small intestinal obstruction due to bands and adhesions, volvulus of sigmoid colon, obstructed inguinal hernia, generalized peritonitis due to puerperal sepsis respectively. Surgical site infections are more commonly occur in the operation performed by inexperience younger surgeon (44.4%). **Conclusion:** The rate of wound infection of non-traumatic emergency laparotomy cases are frequently found in the operation performed by inexperience younger surgeon. [*Journal of Science Foundation 2016;14(2):52-55*]

**Keywords:** Wound Infection; non-traumatic; emergency laparotomy

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## Introduction

Wound infection continues to be a major source of morbidity in surgical patients (Tang et al., 2001). Wound infection may be responsible for the failure of an operation to achieve its purpose. It also results in tremendous loss of time and money due to prolonged period of healing (Malone et al., 2002). The main determinants of infection are the micro-organisms, the environment and the host defense mechanisms. There

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is a continuous interaction between these three factors. Infection rates are known to be higher in emergency surgery (Cheadle et al., 2006). However it has not been clearly defined whether this is because patients undergoing emergency procedures have a higher intra-operative wound contamination. Other factors involved include the presence of obesity, malnutrition, COPD, diabetes mellitus or pre- operative use of steroids, duration of surgery and age and sex of the patients (Cima et al., 2013). Wound infections usually appear between 5$^{th}$ and 10$^{th}$ day after surgery but they may appear as early as the 1$^{st}$ postoperative day or even years later (deLissovoy et al., 2009). The first sign of wound infection is usually fever. The patient may complain of wound pain. Postoperative fever requires inspection of the wound and if wound is infected, appropriate management needs to be initiated. The purpose of the present study was to see the role of wound infection of non-traumatic emergency laparotomy surgeries.

## Methodology

This descriptive cohort study was carried out in the Department of Surgery at Dhaka Medical College, Dhaka from July 1997 to June 1998 for a period of 1(one) year. In this study, 100 patients selected at random from different surgical units of Dhaka Medical College Hospital were included. All the patients studied were admitted for emergency surgery for acute appendicitis, perforated peptic ulcer, ileal perforation, acute intestinal obstruction and generalized peritonitis due to puerperal sepsis. Specimens were collected for bacteriological study aseptically by cotton wool swab stick enclosed in sterile tube. The specimens were sent to the laboratory after proper labeling. Swabs were taken from the discharge in the postoperative wound. Swabs were plated on blood agar media and MacConkey‘s media. The plates were incubated aerobically at 37°C for 24 hours. After 24 hours culture plates were examined and some were subculture for next 24 hours aerobically. Antibiotic sensitivity test was carried out by impregnated disc techniques. Detailed history was taken and clinical examination done on every patient immediately after admission. But if needed, immediate resuscitative measures were instituted first. Particular attention was paid to the diabetic status, drug use especially steroids or any immunosuppressive drugs and presence of concurrent disease. The clinical examination stressed particular vital parameters, general physical build, nutritional status, anaemia, jaundice and any septic focus. Relevant diagnostic investigations as far as possible were done and recorded. During shaving ordinary soap was used. In the operation theatre, after anaesthesia skin was cleaned with povidone iodine USP 5% w/w and then Spirit (70% methylated spirit in water). In some cases only povidone iodine was used. Every effort was made to protect the wound margin from contamination when entering into the gastro-duodenal perforation or dealing with any other peritoneal source of contamination. Standard textbook technique was adopted to close different types of incisions. All types of suture materials were used during closure (peritoneum was closed either with chromic catgut or as a part of mass closure with prolene). In fatty abdomen subcutaneous fat was opposed with chromic catgut 2-O. Interrupted silk stitches were used to close skin. A saline set drain was used whenever it was indicated. The tubes were brought out mainly through a separate wound. Drain tubes were attached to evacuated saline bag. At the end of operation abdomen was cleaned with dilute Cetrimide (3% w/v) and spirit soaked sterile swab. In some cases sterile gauze pieces were used to cover the wound which were kept in position with the help of elastoplast. In others, wound was covered with sterile surgical dressing. Dressings were left undisturbed unless it was felt necessary. Unusual pain in and around the wound was considered to be an indication of infection. As soon as the dressing was found to have soaked the wound was examined. A swab was taken from any discharge and was sent for bacteriological examination. Up to 100°F temperature within first three days after operation was considered as normal. Any persistent fever after that period was carefully and thoroughly investigated. Every patient got antibiotics postoperatively. The drainage tube was removed after cessation of discharge from 2$^{nd}$ to 5$^{th}$ postoperative day. An open wound was covered with EUSOL soaked gauze, sterile cotton and dry sterile gauze and was kept in position with hypoallergenic tape.

## Result

Out of 100 patients with non-traumatic emergency laparotomy in this series, 40 cases were duodenal ulcer perforation, 5 cases were pre-pyloric and gastric ulcer perforation, 30 cases were acute appendicitis, 5 cases were burst appendix, 10 cases were ileal perforation, 3 cases were small intestinal obstruction due to bands and adhesions, 2 cases were volvulus of sigmoid colon, 4 cases were obstructed inguinal hernia, 1 case was generalized peritonitis due to puerperal sepsis. Wound infection rate of specific type of operation were 12.5%, 20.0%, 6.6%, 40.0%, 40.0%, 33.3%, 50.0%, 50.0%, and 100.0% respectively. The overall surgical wound infection rate was 19.0% (Table 1).

**Table 1: Rate of Wound Infection According to Disease**

| Name of Disease | Infection | | Total |
|---|---|---|---|
| | Present | Absent | |
| DU perforation | 5(12.5%) | 35(87.5%) | 40(100.0%) |
| Pre-pyloric and GU perforation | 1(20.0%) | 4(80.0%) | 5(100.0%) |
| Acute appendicitis | 2(6.7%) | 28(93.3%) | 30(100.0%) |
| Burst appendix | 2(40.0%) | 3(60.0%) | 5(100.0%) |
| Ileal perforation | 4(40.0%) | 6(60.0%) | 10(100.0%) |
| Small intestinal obstruction | 1(33.3%) | 2(66.7%) | 3(100.0%) |
| Volvulus of sigmoid Colon | 1(50.0%) | 1(50.0%) | 2(100.0%) |
| Obstructed inguinal hernia | 2(50.0%) | 2(50.0%) | 4(100.0%) |
| Generalized peritonitis | 1(100.0%) | 0(0.0%) | 1(100.0%) |
| **Total** | **19(19.0%)** | **81(81.0%)** | **100(100.0%)** |

Infection rate is higher (44.44%) where the operation was done by house surgeon and lower rate (16.48%) of registrar and assistant registrar (Table 2).

**Table 2: Surgeon and infection**

| Types of Surgeon | Infection | | Total |
|---|---|---|---|
| | Present | Absent | |
| Registrar/ Asst. Registrar | 15(16.5%) | 76(83.5%) | 91(100.0%) |
| House surgeon/ internee | 4(44.4%) | 5(55.6%) | 9(100.0%) |
| **Total** | **19(19.0%)** | **81(81.0%)** | **100(100.0%)** |

**Discussion**

Surgical infection as was studied by Lewis Pasteur and Joseph Lister, hundreds of years ago is still a subject of controversy and a problem all over the world. Different workers in this field have given their own thoughts and ideas for the control of infection (deLissovoy et al., 2009).

In this series 100 cases are included consecutively which are selected from all walks of life. They were admitted to Dhaka Medical College Hospital for emergency operations during the period January 1998 to July 1998. Operative treatment was carried out for different acute non-traumatic abdominal conditions as duodenal ulcer perforation, pre-pyloric and gastric ulcer perforation, ileal perforation, intestinal obstruction due to bands and adhesions, volvulus of the sigmoid colon, obstructive inguinal hernia and generalized peritonitis.

Postoperative wound infection is still one of the major problems in the hospitals of Bangladesh and also continues to be a source of morbidity in the surgical patients (Ashraf 1973). Patients were examined thoroughly to establish the diagnosis and resuscitated whenever necessary. The patients' age, physical build, general nutritional status, anaemia, jaundice and any septic focus were observed. Patients were asked for diabetic status, chronic pulmonary disease, concurrent diseases and use of steroids of immunosuppressive drugs. In relation to surgical wound infection, all of the above factors are very important.

All patients were shaved and cleaned before operation by the nursing staffs. In the operation on a hair bearing area, the hair is usually shaved; however, rough shaving produces abrasions. Simple bathing in soap and water or detergent is usually carried out. Any form of abrasion during shaving must be avoided as it may cause colonization of bacteria which results in higher wound infection rate. The abdomen should be swabbed from the proposed line of incision to the periphery. Swabbing can not eradicate the whole bacterial population. The transient bacteria, which are on the surface, are killed by skin antiseptics; however, it cannot destroy the deep resident bacteria. In this series, most of the patients were washed by povidone iodine or spirit. Therefore, postoperative wound infection was not significantly higher. Povidone iodine is a safe and effective means of reducing wound sepsis following gastrointestinal surgery (Motin 1982).

While dealing with a septic focus or a potential source of infection the wound must be carefully covered with a mop to avoid contamination of surrounding tissues (Aman 1982). Many surgeons wash hands and instruments after an intestinal anastomosis. They use new mops, gloves and sheets. Others not only wash their hands they also discard the used instruments and use new set for abdominal wound closure.

In this series wound infection is higher where the operation is done by house surgeon (44.44%) in comparison to the Registrar and Assistant Registrar (16.48%) though the registrar and assistant Registrar dealt with most of the contaminated cases. The probable causes of disparity are the less experienced surgeon does not handle tissues gently. Gentle and meticulous technique with absence of haematoma formation in the operative area achieved low infection rate, inadequate and improper haemostasis. Instead of catching a bleeding point with the tip of the haemostat or a dissecting forceps the learners catches the bleeding point along with the surrounding soft tissues and then burn the area (Rahman et al., 1985). This results in large amount of dead tissue. It is preferable to coagulate the vessels alone without a mass of surrounding tissue to ensure correct haemostasis and avoid unnecessary tissue damage (Schein et al., 1994). In any season every surgeon and assistant sweats enough to soak the gown, especially in the axilla. The axilla harbors *Staphylococci* and it can easily permeate through wet clothing.

## Conclusion

In conclusion more surgical site infection occurs after handling by inexperience surgeon; however, proper hands-on-training and meticulous work should be carried out to avoid this situation.

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