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INCIDENCE AND RISK FACTORS FOR SURGICAL SITE INFECTION FOLLOWING EMERGENCY LAPAROTOMY AT KENYATTA NATIONAL HOSPITAL
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S. E. MIIMA, J. S. OLIECH, P. L .W. NDAGUATHA and E. N. OPOT

ABSTRACT

***Background*: The incidence of surgical site infection (SSI) following emergency abdominal operation contributes to significant morbidity. There are patient-related as well as perioperative risk factors that seem to contribute to this incidence. This study determined incidence and risk factors following emergency bowel surgery at Kenyatta National Hospital.**
***Objective*: To determine incidence and risk factors of surgical site infection following emergency laparotomy at Kenyatta National Hospital.**
***Design*: Prospective cross sectional study.**
***Subjects*: One hundred and twenty (120) Patients, 13 years and above scheduled to undergo emergency laparotomy.**
***Results*: Overall incidence of SSI was 30.8% with male patients having infection rate of 20.8%, while patients who consumed alcohol had infection rate of 5.8%. Incidence of SSI was highest in patient who had preoperative duration of 48 hours at 12% and intraoperative duration of 90 minutes at 7.5%. Dirty wounds accounted for 60% with infection rate of 26.7%. Patients with ASA score of 1 had infection rate of 23.3%, with patients who received perioperative transfusion having infection rate of 6.6%.**
***Conclusion*: Overall incidence of SSI is high, majority of patients were male who were young with ASA score of one had highest rate of infection. Prolonged preoperative and intraoperative duration, dirty wounds and perioperative transfusion was associated with increased rate of SSI. Surveillance on SSI by surgical team, public health education on alcohol and cigarettes consumption, prompt surgical intervention and judicial use of blood could reduce incidence of SSI.**

INTRODUCTION

Emergency laparotomy accounts for 67% of all abdominal surgeries at Kenyatta National Hospital (1). Incidence of surgical site infection (SSI) in abdominal surgery is estimated at 22.4 %(2). In Africa cumulative incidence of SSI is estimated at 40% (3). Endogenous as well as exogenous factors are associated with increased risk of abdominal infection (4). Exogenous factors include prolonged preoperative and intraoperative time as well as perioperative transfusion (4). Endogenous factors include co morbid conditions such as diabetes mellitus and other immunosuppressive condition as well as substance use such as alcohol and cigarettes (4). Independent predictors of SSI include wound contamination, operative time of more than 120 minutes and patients with American society of anesthesiologist (ASA) score of more than 2 (5). Patients with surgical abdomen are generally at an increased risk of SSI due endogenous suboptimal physiologic state (6).

Prevention of SSI could result in improvement in quality of surgical care. SSI surveillance by infection prevention teams with appropriate feedback to surgeons could contribute to reduction in SSI (7-11).

Literature review: Center for disease control (CDC) estimates risk of developing SSI following emergency laparotomy is estimated at 25.2-40 % .

Endogenous risk factors are patient-related but not known to be independent predictor of infection (4). Exogenous factors include prolonged preoperative and intraoperative time. Operative factors include preoperative showering, duration of hand scrubbing,

timing of preoperative shaving, methods of sterilizing equipment, use of barriers and excellent surgical techniques. These factors could reduce risk of SSI however, they are not independent predictors of SSI (4, 5). Among independent predictors of developing SSI; contaminated and dirty wound risks are 20 and 40.1% respectively. ASA score of more than 2 is associated with risk of 29.8%. Prolonged intraoperative time of more than 120 minutes has increased risk of 31.6 %(5, 6).

Prompt surgical intervention could reduce risk of infection to 11% (6). Other strategies include SSI surveillance and preoperative optimization of patients. These strategies would contribute to improvement in quality of surgical care (7-11).

MATERIAL AND METHODS

A cross sectional study at KNH in the general surgical unit reviewed 120 patients who underwent emergency laparotomy. The study commenced once it was approved by UON/KNH ethics research committee. Patients who met inclusion criteria were voluntarily recruited in the study and signed informed consent. A pretested structured questionnaire was used to obtain bio data, comorbid conditions, preoperative duration in hours, operative procedure and operative duration in minutes, wound classification ASA score and perioperative transfusion was collected.

Data was cleaned, coded and entered in SPSS version 20 for analysis. Descriptive statistics was analysed where discrete variables were summarised with frequencies and percentages. Continuous variables were summarised using mean, median, mode and standard deviation. Association between preoperative duration, operative procedure and duration, wound classification, perioperative transfusion and SSI were analysed using chi square or Fischer exact test.

RESULTS

Incidence of SSI was 30.8% (37/120), with superficial incisional SSI 2.5%, deep SSI 13.3% and organ/space SSI 15%. Male patients were 76.7% (92/120) with infection rate of 20.8%, p-value (0.116). Mean age was 35.48± 0.67 hours with range of 216 hours, peak infection rate was seen at 48 hours (8.3%), p-value (0.267). Fifty one point seven (51.7) % of patients had comorbid conditions, consumed alcohol and cigarettes, infection rate was highest in those who consumed alcohol and cigarettes (25%) at 5.8%, p-value (0.120). "Resection and anastomosis of small bowel" accounted for 50.8% of operative procedures, however infection rates were highest in those who had intraabdominal abscess drainage at 11.7%, p-value (0.000). Mean operative time was 155.29± 7.27 minutes, with range of 330 minutes, bulk of the operations lasted 90 minutes (27.5%) with infection rates of 7.5%, p-value (0.238). Clean contaminated wounds were 10.0%, contaminated 30% and dirty 60%, infection rates were 0.8%, 3.3% and 26.7% respectively, p-value (0.000). Patients with ASA score of 1 accounted for 82.5% with infection rates of 23.3%, p-value (0.146). Nine point two (9.2) % of patients had blood transfusion, however infection rates were highest in those who did not receive blood transfusion at 24.2%, p-value (0.009).

DISCUSSION

Incidence of SSI was similar to other studies (2, 4) with highest rate of infections seen in organ/space SSI. Most patients were male and young which was similar to a local study (2). Dirty wounds were the majority which was similar to local study (2), the association between wound class and SSI was significant. Alcohol and cigarettes consumption accounted for more than half of patients with co morbid and substance related factors, however, the association with infection was not significant. Preoperatively, delays of 48 hours resulted in peak infection rate even though association with infection was not significant. Intraabdominalabscess drainage resulted in significant SSI among all the operative procedures. Mean operative duration was more than 120 minutes, from other studies this was an independent predictor of SSI, However , in this study the association between operative duration and SSI was not significant (4,6). Patients with ASA score of one (1) were the majority, there were no patients with ASA score of more than 2. Most patients with ASA score ofone (1) had SSI, even though from other studies ASA score was an independent predictor of SSI, the association between ASA score and SSI in this study was not significant (4,5). Association between SSI and perioperative transfusion was significant despite being a small number of individuals who were transfused.

In conclusion, periodic surveillance is recommended, this will help study trends of SSI locally and adopt appropriate interventions. Public health education on harmful effects of alcohol and cigarettes targeting young male patients should be emphasized. Reduction in preoperative and operative duration as well as judicial use of blood use could reduce risk of SSI. Analytical studies to determine independent predictors of SSI in our set-up is recommended.

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