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ORIGINAL ARTICLE

Association of Post Operative Infectious Complications and Length of Hospital Stay with Duration of Surgeries

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ABSTARCT

Background: Postoperative infectious complications which results in prolong hospital stay carries a significant risk to patients and burdanise health care system as well. Many risk factors are known to increase the incidence of post operative infectious complications and length of hospital stay. The aim of present study is to determine the association of time duration of surgeries with post operative infectious complications and length of hospital stay.

Methodology: This prospective observational study was conducted on 462 patients who underwent various major surgical procedures in the Department of General Surgery in PIMS Hospital, Islamabad from January 2020 to December 2021. Patients <16 years and admitted for trauma were excluded. The time duration of various surgeries from incision to closure was recorded. Post operative complications sepsis, pneumonia, wound infection, urinary tract infection and length of hospital stay was recorded as well. Data was analyzed by spss version 22 .Any Correlation between time duration of surgeries with post operative complications and length of hospital stay determined.

Results: Of the total 462 patients who underwent various surgical procedures, the post operative infectious complication rate increased linearly with operation duration at 2.5% per ½ hours ranging from 2.5% to 30.6% in 1 hour to 6 hours respectively. Infectious complications such as UTI, wound infection, pneumonia, and sepsis showed positive correlation with time duration of surgeries. The post operative infectious complications increased after one hour of surgery compared to half hour.

Conclusion: As the time duration of surgeries increase the chances of post operative infectious complications also increase, hence increasing the length of hospital stay as well.

Keywords: Post operative infectious complications, Hospital stay, Duration of surgeries.

INTRODUCTION

Post operative infectious complications following major surgeries have both short and long-term consequences. [1]. Surgical site infection, pneumonia, sepsis, intravascular catheter-related infections, and urinary tract infection are different postoperative infectious complications. Surgical site infection contributes to 38% nosocomial infections in surgical patients [2]. Most studies mainly focused on mortality caused by postoperative infection and reported that survival rates were higher in patients without infectious complications as compared to those who have no infectious complications [1, 2]. Bacteremia and sepsis are especially associated with increased mortality and reduced survival rates. Infectious complications in cardiac surgery and cancer have increased the risk of mortality [3, 4]. These complications cause significant differences in surgical outcomes [5]. Length of hospital stay, morbidity, costs, and mortality are associated with surgical site infections [2, 6].

Recently, infectious complications have substantially reduced due to better sterilization facilities and use of antibiotics [7]. Operative duration more than 02 hrs ,advanced age, malignancy, malnutrition, incision size, inappropriate antimicrobial prophylaxis, abdominal drains, wound contamination are known to increase the chances of post operative infectious complications and length of hospital stay [8,9]. In different surgical procedures such as total knee arthroplasty operative duration has been considered as an independent risk factor [10]. Lee et al [11] and li et al [12] found that surgeries with long operative duration had a higher rate of infectious complications than surgeries with smaller duration.

The objective of this study is to determine the association of surgical time operative duration with increased risk of infectious complications and length of hospital stay.

METHODOLOGY

This prospective study was conducted on 462 patients who underwent various major surgical procedures in the Department of General Surgery in PIMS Hospital, Islamabad from January 2020 to December 2021. Patients <16 years and admitted for trauma were excluded. The operative duration of various major surgical procedures from incision to closure was recorded. Post operatively patients were closely followed up till the time of discharge. Post operative infectious complications, sepsis, pneumonia, wound infection, and urinary tract infection if any were recorded along with total length of hospital stay. Infectious complication rates were compared and depicted in graphical method for increase in operative duration for half-hour. Logistic regression with adjusted risk for preoperative and operative variables were calculated. Intraoperative transfusion level, complexity, and wound class were considered as preoperative risk factors whereas half hour increase in operative duration was added taking 1 hour as a reference. SPSS version 26 was used for data analysis. Graphing and interquartile ranges were analyzed for LOS and operative duration respectively. Multivariate regression was used for analysis of LOS. Isolated laparoscopic cholecystectomy cases were examined to avoid higher variabilities in type of procedures on broad range and to have a limited analysis.

RESULTS

Of the total 462 patients 43 underwent laparotomies for various emergency procedures excluding trauma, 21 various abdominal tumor resections, 15 Mastectomies, 20 thyroidectomies, 265 laparoscopic cholecystectomies, and 93 gut resections.

Post operative infectious complication rate increased linearly with increase in time duration at 2.5% per ½ hours ranging from 2.5% to 30.6% in 1 hour to 6 hours respectively. Infectious complications such as UTI, wound infection, pneumonia, and sepsis each type confirmed linear increases but with different rates. The risk for infectious complications increased after adjustment

for half hour operation duration compared to 1 hour, in turn double the operation duration from 2-1 hours to 2.5 hours with OR 1.89; 95% CI, 1.79-2-01; p=0.001). Regarding laparoscopic cholecystectomy, infectious complication rates increased with

operation duration. During all the surgical operations, operation duration was directly associated with adjusted length of hospital stay. Different rates of each infectious complication such as pneumonia, wound, sepsis, and UTI is depicted in Figure-1. Infectious complications adjusted odd ratio for one half hour is compared with 1 hour operative duration as shown in Figure-2. Complexity, intraoperative transfusion, procedure group, and wound class were different adjusted variables. Figure-3 illustrate the infectious complications odd ratio in laparoscopic cholecystectomy (isolated) per half hour.

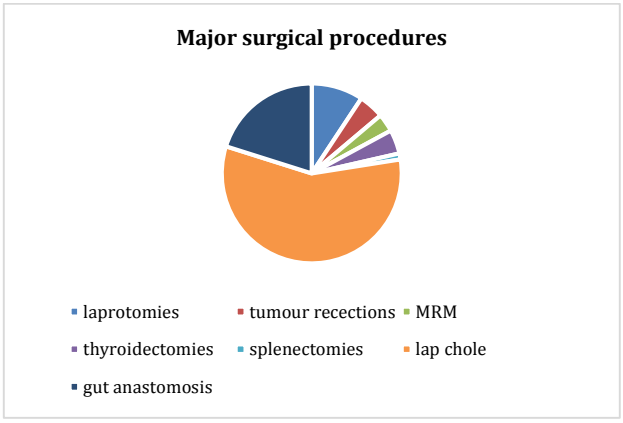

Figure 1:

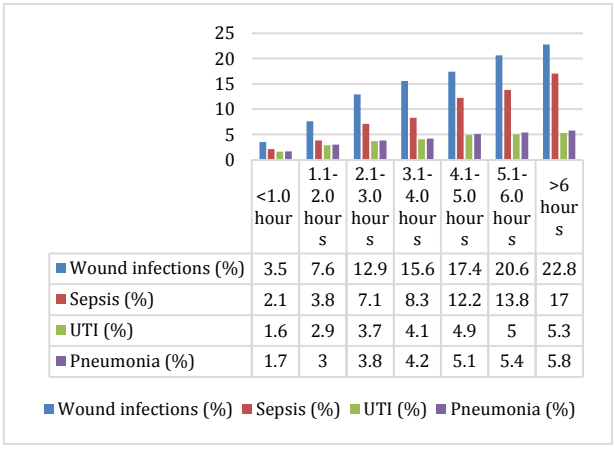

Figure-2: Different rates of each infectious complications such as pneumonia, wound, sepsis, and UTI

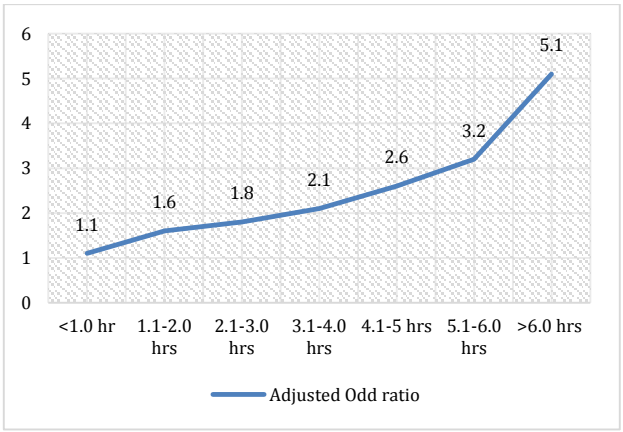

Figure-3: Complexity, intraoperative transfusion, procedure group, and wound class were different adjusted variables.

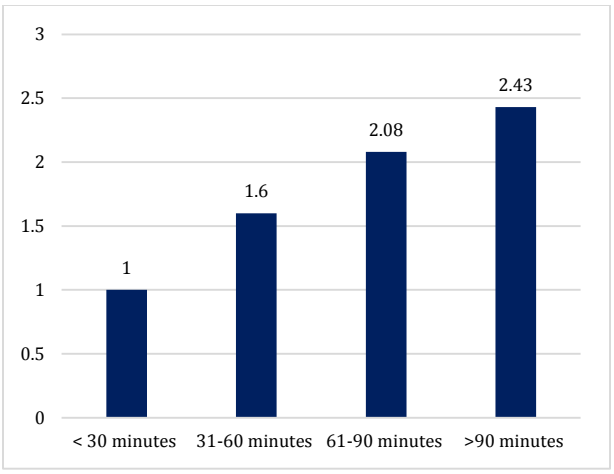

Figure-4: infectious complications odd ratio in isolated laparoscopic cholecystectomy per half hour.

DISCUSSION

The present study mainly focused on association of time duration of various surgical procedures with post operative infectious complications and length of hospital stay. We found that after controlling various confounding risk factors, operative duration is independently related to increased length of hospital stay and post operative infectious complications. Additionally, different infectious complications such pneumonia, wound infection, and UTI were related with adjusted increased risk of length of stay and operative duration. Prolonged surgeries involve prolonged anesthesia which can contribute to various post surgical complications [13]. Prolonged general anesthesia and post operative pain leading to decreased diaphragmatic movements leads to atelectasis and pneumonia [14].

Prolonged open surgeries leads to exposure of body internal environment to exterior leading to more incidence of wound infection as happened in our study in case of emergency laparotomies. Contamination from organ perforation also plays a major role [15]. Post operative surgical site infection leads to increase morbidity, prolonged hospital stay and puts pressure on health care system[16] . Repeated infections might also lead to long-term consequence as adhesive bowel obstruction is a common sequel of intraabdominal sepsis in the long run and has considerable morbidity and mortality as well. Every one of these post operative infectious complications did not only have association with time duration of surgeries as simply statistically substantial but even clinically meaningful, with extra effects when compared to surgeries with shorter duration and no complications post operatively .

Infectious complications increased in general surgical procedures as abdominal surgeries are more morbid as compared to skin and soft tissue surgeries. As in our setups surgical residents under supervision or even without supervision perform surgeries. Surgeon skills also contribute to time duration of surgeries. Experienced surgeons take less time for surgeries and with better results. Organized and enhanced supervision by senior surgeons during surgery will lead to better performance and decrease the operative duration [17].

Positive linear correlation exists between operative time and post operative infectious complicaions[18,19] hence increasing length of hospital stay. The probability of surgical site infection raised by 5% for every 30th min of time [20].

CONCLUSION

The present study found that operative duration is independently related to increased length of hospital stay and infectious complications after adjustment for patient risk factors and procedures.

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