

## ORIGINAL RESEARCH

# Evaluation of Various Risk Factors for Post Operative Infections Following Abdominal Surgical Procedures Done at Malla Reddy Institute of Medical Sciences, Hyderabad, Telangana

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### ABSTRACT

**Background:**Infectious complications represent a primary contributor to postoperative morbidity following abdominal surgical procedures. Several patient-related factors significantly contribute to the risk of postoperative infection. Hence; the present study was conducted for evaluating risk factors for post operative infections following abdominal surgical procedures.**Materials &Methods:** A total of 500 patients undergoing non-traumatic exploratory surgical cases were enrolled. A diagnosis of wound infection was established if any of the following criteria were met: serous or non-purulent discharge from the wound, purulent discharge, serous or non-purulent discharge accompanied by signs of inflammation, or if the wound was intentionally opened by the surgeon due to localized fluid accumulation. Results were analyzed using SPSS-22.**Results:**Postoperative infection was seen in 11.2 percent of the patients. Geriatric age, presence of dyslipidemia, comorbidities, obesity, positive chronic smoking habit history and Duration of surgery > 2 hours were found to be significant risk factors for occurrence of postoperative infections.**Conclusion:** Adequate knowledge of various risk factors associated with occurrence of postoperative infections could help in reducing their incidence among patients undergoing surgical procedures.

**Key words:**Post-Operative; Infections; Surgical procedures.

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### INTRODUCTION

Infectious complications represent a primary contributor to postoperative morbidity following abdominal surgical procedures. These complications not only incur substantial financial burdens but also lead to considerable patient morbidity. To mitigate the occurrence of such complications, it is crucial to identify the risk factors that elevate their incidence through the application of multivariate analysis.<sup>1- 3</sup> While this topic has been explored in the context of colorectal surgery, it remains inadequately investigated in noncolorectal abdominal surgeries. Despite the established efficacy of antibiotic prophylaxis in minimizing postoperative infectious complications, as evidenced by prior prospective randomized studies, there remains ongoing debate

regarding the selection of specific antibiotic agents for optimal outcomes.<sup>4,5</sup>

Several patient-related factors significantly contribute to the risk of postoperative infection. These factors encompass the presence of pre-existing infections, low serum albumin levels, advanced age, obesity, tobacco use, diabetes mellitus, and ischemia resulting from vascular disease or radiation exposure. Additionally, surgical risk factors such as extended duration of surgical procedures and deficiencies in the surgical scrub or skin antiseptic preparation are critical considerations.<sup>6</sup> Physiological conditions that elevate the likelihood of postoperative infection include trauma, shock, blood transfusions, hypothermia, hypoxia, and hyperglycemia. Furthermore, certain parameters that may

independently correlate with an increased risk of postoperative infection and serve as predictors include undergoing abdominal surgery, the occurrence of a contaminated or dirty surgical procedure, and having more than three diagnoses at the time of patient discharge.<sup>7, 8</sup> Hence; the present study was conducted for evaluating risk factors for post operative infections following abdominal surgical procedures.

## MATERIALS & METHODS

The present study was conducted for evaluating risk factors for post operative infections following abdominal surgical procedures. A total of 500 patients undergoing non-traumatic exploratory surgical cases were enrolled. Inclusion criteria included patients of 18-75 years age underwent non-traumatic exploratory surgical procedure and willing to participate in present study. The study documented various socio-demographic factors, the presence of co-morbid conditions such as diabetes, hypertension, bronchial asthma, thyroid disorders, renal disease, and any immunosuppressive disorders. Additionally, clinical details were recorded, including the use of prophylactic antibiotics, blood transfusions, duration of preoperative hospital stay, ASA score, type of surgery, anaesthesia employed, surgical duration, intraoperative observations, postoperative recovery, current examination findings, and routine laboratory investigations (CBC, blood glucose levels, wound

swab culture and sensitivity, liver function tests, renal function tests). A diagnosis of wound infection was established if any of the following criteria were met: serous or non-purulent discharge from the wound, purulent discharge, serous or non-purulent discharge accompanied by signs of inflammation, or if the wound was intentionally opened by the surgeon due to localized fluid accumulation. A wound swab was sent to the microbiology department for culture and sensitivity analysis, and subsequent to the availability of the culture and sensitivity report, antibiotic therapy was adjusted as necessary. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

## RESULTS

A total of 500 patients were evaluated. The mean age of the patients was 46.9 years. Majority proportion of patients were males. Appendicectomy, Adhesiolysis, Peritoneal lavage, Hernia repair and Ileostomy were performed in 37.8 percent, 26.6 percent, 13.8 percent, 12 percent, 5.8 percent and 4 percent of the patients respectively. Postoperative infection was seen in 11.2 percent of the patients. Geriatric age, presence of dyslipidemia, comorbidities, obesity, positive chronic smoking habit history and Duration of surgery > 2 hours were found to be significant risk factors for occurrence of postoperative infections.

**Table 1: Type of surgery**

Type of surgery	Number	Percentage
Appendicectomy	189	37.8
Adhesiolysis	133	26.6
Peritoneal lavage	69	13.8
Hernia repair	60	12
Ileostomy	29	5.8
Others	20	4
Total	500	100

**Table 2: Incidence of postoperative infection**

Postoperative infection	Number	Percentage
Present	56	11.2
Absent	444	88.8
Total	500	100

**Table 3: Risk factors of postoperative infection**

Risk factors	r-value	p-value
Geriatric age	2.115	0.001*
Dyslipidemia	1.923	0.000*
Obesity	1.446	0.004*
Co-morbidities	2.934	0.002*
Chronic smoking habit history	1.751	0.001*
Duration of surgery > 2 hours	1.316	0.001*

\*: Significant

## DISCUSSION

Annually, over 310 million surgical procedures are performed globally. While estimates regarding

postoperative morbidity and mortality differ, it is believed that around seven million patients experience complications following surgery each year. The

presence of postoperative infections significantly contributes to increased morbidity and mortality rates, as well as extended durations of intensive care and hospital admissions. These infections are frequently implicated in postoperative fatalities, although the reported incidence rates can vary considerably. For instance, mortality rates associated with organ space infections range from 4% to 9%, while those who develop septic shock may face mortality rates between 28% and 46%. Nevertheless, it is important to note that many postoperative infections do not lead to severe sepsis or septic shock, leaving the specific causes of death in these cases often ambiguous. The existing literature does not provide a clear consensus on the overall incidence of postoperative infections and their subsequent effects on patient outcomes.<sup>9-12</sup> Hence; the present study was conducted for evaluating risk factors for post operative infections following abdominal surgical procedures.

A total of 500 patients were evaluated. The mean age of the patients was 46.9 years. Majority proportion of patients were males. Appendectomy, Adhesiolysis, Peritoneal lavage, Hernia repair and Ileostomy were performed in 37.8 percent, 26.6 percent, 13.8 percent, 12 percent, 5.8 percent and 4 percent of the patients respectively. Postoperative infection was seen in 11.2 percent of the patients. Tripathi et al. conducted a comprehensive investigation into the risk factors associated with surgical site infections (SSIs) at a tertiary care hospital. Out of 1,332 laparotomy procedures analyzed, 81 patients developed SSIs, resulting in an incidence rate of 6.08%. The majority of the affected individuals were within the 41-50 years age bracket (28.4%) and predominantly male (64.2%). Notable comorbidities included diabetes (43.21%), a body mass index (BMI) ranging from 25 to 30 kg/m<sup>2</sup> (41.98%), dyslipidaemia (33.33%), smoking (28.4%), and hypertension (25.03%). A significant portion of the patients presented with an American Society of Anesthesiologists (ASA) score of 2 (50.62%), and over half of the surgeries lasted more than two hours (53.09%). The highest incidence of SSIs was observed in exploratory laparotomy procedures involving appendectomy and peritoneal lavage (28.4%), followed by open appendectomy (14.81%) and adhesiolysis/resection anastomosis with peritoneal lavage (11.11% each). The majority of surgical wounds were classified as clean (45.68%), with clean contaminated (29.63%), contaminated (16.05%), and dirty or infected (8.64%) wounds following. In this study, superficial SSIs were the most prevalent (65.43%), succeeded by deep SSIs (28.4%) and organ space SSIs (6.17%). The most frequently isolated organism was *Escherichia coli* (19.75%), followed by *Pseudomonas* (16.05%) and *Streptococcus* (13.58%). Notably, no microbial growth was detected in 33 cases (40.74%). The findings underscore that surgical site infections are largely preventable, with identified high-risk factors including a BMI greater than 25, the presence of

comorbidities such as diabetes, smoking, dyslipidaemia, surgeries exceeding two hours, and the performance of appendectomy.<sup>13</sup>

In the present study, geriatric age, presence of dyslipidemia, comorbidities, obesity, positive chronic smoking habit history and Duration of surgery > 2 hours were found to be significant risk factors for occurrence of postoperative infections. de Carvalho RLM et al estimated the incidence of surgical site infection in general surgeries at a large Brazilian hospital while identifying risk factors and prevalent microorganisms. Non-concurrent cohort study with 16,882 information of patients undergoing general surgery. The incidence of surgical site infection was 3.4%. The risk factors associated with surgical site infection were length of preoperative hospital stay more than 24 hours; duration of surgery in hours; wound class clean-contaminated, contaminated and dirty/infected; and ASA index classified into ASA II, III and IV/V. *Staphylococcus aureus* and *Escherichia coli* were identified. The incidence was lower than that found in the national studies on general surgeries. These risk factors corroborate those presented by the National Nosocomial Infection Surveillance System Risk Index, by the addition of the length of preoperative hospital stay. The identification of the actual incidence of surgical site infection in general surgeries and associated risk factors may support the actions of the health team in order to minimize the complications caused by surgical site infection.<sup>14</sup>

## CONCLUSION

Adequate knowledge of various risk factors associated with occurrence of postoperative infections could help in reducing their incidence among patients undergoing surgical procedures.

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