



STUDY OF POST OPERATIVE WOUND INFECTIONS

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ABSTRACT

Post-operative wound infections constitute a persistent challenge in surgical practice, impacting patient outcomes and healthcare resources. Despite stringent aseptic measures, the incidence and severity of these infections vary, necessitating a comprehensive investigation into the contributing factors and patterns associated with their occurrence. This study aimed to analyze the incidence, severity, and potential risk factors of post-operative wound infections in a cohort of 300 surgical cases, encompassing both elective and emergency procedures. A prospective study was conducted from November 2018 to November 2019 at Sri Lakshmi Narayana Institute of Medical sciences, Pondicherry. Patient demographics, operative details, and post-operative monitoring data were collected. A standardized protocol, including peri-operative antibiotic administration, was followed. Wound infections were graded based on predefined criteria. Statistical analysis, using Microsoft Excel, and Chi-square tests were employed to determine the significance of the results. Out of the 300 cases, 52 exhibited post-operative wound infections. The majority were mild (Grade 2), with 20 cases, followed by 11 cases of moderate (Grade 3) infections and 16 severe cases (Grade 4). No deaths were observed due to post-operative infections. The study population comprised 223 males and 77 females, with ages ranging from 16 to 70 years. Elective surgeries demonstrated a 15.1% infection rate, while emergency procedures exhibited a higher rate of 19.3%, with statistical significance ($p < 0.01$). Age and pre-operative hospitalization duration did not show statistically significant associations with infection rates. Post-operative wound infections remain a notable concern, particularly in emergency procedures. Findings from this study contribute insights into the incidence and severity of post-operative wound infections, aiding in the development of targeted preventive measures and enhancing patient safety in surgical interventions.

Key words: Post-operative wound infections, surgical complications, Infection severity, Elective surgery.

INTRODUCTION

Post-operative wound infections remain a significant concern in the field of surgery, posing challenges to both patient recovery and healthcare systems. These infections can lead to prolonged hospital stays, increased healthcare costs, and, in severe cases, may even result in mortality. Understanding the dynamics, risk factors, and patterns of post-operative wound infections is essential for developing effective preventive measures and optimizing patient outcomes [1-3]. Surgical procedures,

despite advancements in techniques and sterile practices, inherently expose patients to the risk of infection. The complex interplay of patient-related factors, surgical practices, and the hospital environment contributes to the occurrence of post-operative wound infections. Addressing this issue requires a comprehensive investigation into the incidence, severity, and potential contributing factors associated with these infections [4-6].

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The present study aims to delve into the nuances of post-operative wound infections, focusing on a diverse cohort of surgical cases, including both routine elective and emergency procedures. By analyzing a range of parameters such as patient demographics, surgical details, and post-operative monitoring, we intend to identify patterns, trends, and potential risk factors associated with wound infections.

The background of this research is grounded in the recognition of the substantial impact that post-operative wound infections have on patient outcomes and healthcare resources. As the healthcare landscape evolves, with an increasing emphasis on patient safety and quality of care, understanding and mitigating the risks of post-operative complications become imperative. This study seeks to contribute valuable insights that can inform evidence-based practices and aid in the development of targeted interventions to minimize the incidence and impact of post-operative wound infections [7-9].

This study aims to examine data from a range of surgical cases. Its objective is not to determine how common post operative wound infections are, but to identify the factors that may contribute to these complications, in specific patients. The results of this research endeavor will provide insights for decision making help develop preventive strategies and contribute to improving the safety and effectiveness of surgical procedures. By analyzing the severity of infections and their relationship with factors such as the urgency of surgery different age groups and how long patients were hospitalized before surgery our study aims to enhance our existing knowledge about wound infections [10-11].

Furthermore it is crucial for us to identify which microorganisms are commonly responsible, for these infections particularly focusing on Staphylococcus aureus and E. Coli. This information will enable us to implement infection control measures [12]. Through this research project we aim to gain an understanding of the dynamics involved in postoperative wound infections, which will ultimately lead to advancements in surgical practices and patient care.

MATERIALS AND METHODS

This is a prospective study conducted in the General Medicine ward during the period of November 2018 to November 2019 Sri Lakshmi Narayana Institute of Medical sciences, Pondicherry. In our study, we have taken 300 surgical cases both regular selective and also emergency. No deaths were observed after post-operative wound infections. Out of 300 cases, 223 are males and 77 are females and the age group is in between 16-70 years. Exclusion criteria- minor surgeries, ulcers after operations, procedures in which wounds are still left are excluded from our study.

Demographic data like Age, Sex was collected. Information about date of admission and date of surgery was also collected from the entire study group.

Hemoglobin values also seen in these patients. Information about any history of hypertension, Diabetes, Use of any drugs was also collected from the patients.

Operative data like Surgery done, Type of anesthesia, Duration of surgery, Nature of surgery Urgency of surgery, Preoperative preparation was also collected from the patients.

In all the cases, a Standard protocol was followed. Inj. Ampicillin Igm is used as peri operative antibiotic was given in all the patients at the time of induction of anaesthesia. In most of the cases, Ampicillin and Gentamycin are used till the suture removal whereas metrogyl was used in abdominal surgeries [13-15].

All the 300 patients were seen for the evidence of any kind of wound infection like erythema beyond 5mm incision, gaping of the wound on the 3rd post-operative day, at the time of suture removal and also after one month of follow up. Post-operative fever was also seen with the wound findings as it may be due to reasons other than wound infection. Bacterial evaluation, culture and sensitivity were done if any discharge from the wound is observed.

Wound infections are graded as follows.

- Grade1 (Stitch Abscess): Redness or pustules near one or more stitches.
- Grade2 (Mild Infection): Minor Infection of wound without separation of wound edges. Slight seropurulent or purulent discharge.
- Grade3 (Moderate Infection): Frank infection in relatively portion of the wound with purulent discharge and possibly some system reaction present.
- Grade4 (Severe Infection): Frank infection of a large portion of the wound with abscess formation usually with systemic reaction and wound dehiscence.

Statistical Analysis:

Data was analyzed by using Microsoft Excel Computer program. Chi square test was used to find the significance of the results.

Results and Analysis.

In our study, out of the 300 wounds, 52 got infected. Out of 52 cases, 20 got mild infection whereas 11 had moderate infections and 16 are having severe infections including 1 burst abdomen.

In elective operations, wound infection rate is 15.1% whereas 19.3% is seen in emergency operations ($p < 0.01$). Incidence of wound infection in emergency is more in elective operations and the findings are significant shown by 95% confidence interval.

By the above data, it clearly says that there is no statistically significant increase in the risk of infection with increase in the age of the patients ($p > 0.05$). Though odds ratio suggests that patients above 60 years of age are less

and they are more at risk of getting post- operative wound infection. The findings are not statistically significant.

In our study group, post-operative wound infection rate in patients who were admitted for less than 1week before surgery in the hospital is more than that in

patients who were admitted for more than 1 week before surgery .But the difference is not statistically significant.

In our study, the most common microorganism encountered is Staphylococcus aureus and then E.coli.

Table 1: Showing the different operations studied Elective Operations.

Diagnosis	Operation	Total	Infected
Chronic Duodenal Ulcer	Gastrojejunostomy with Vagotomy	8	3
GallStones	Cholecystectomy	15	2
Ca Stomach	Gastro-jejunostomy	4	3
Inguinal Hernia	Hernioplasty	20	1
Reccurent Hernia	Hernioplasty	9	3
Varicocele	Palomoooperation	6	0
Hydrocele	Sac Eversion	47	8
CaBreast	Modified Radical Mastectomy	10	2
T.A.O	A.K.Amputation	4	1
T.A.O	B.K.Amputation	4	2
Incisional Hernia	Hernioplasty	12	1
SoftTissueTumours	Excision	6	1
	Total		27

Table 2: Emergency Operations.

Diagnosis	Operation	Total	Infected
Acute Appendicitis	Appendectomy	9	2
Appendicular Perforation	Appendectomy	25	2
Peptic Ulcer Perforation	PerforationClosure.	10	3
Obstructed Inguinal Hernia	Herniorrhaphy	25	1
Small Bowel Perforation	BowelResection + Anastomosis	11	2
Blunt Injury Abdomen	JejunalTear Closure	4	2
Reptured Amoebic Liver Abscess	Laparotomy+ Peritonial Toilet	29	5
Intestinal Obstruction	(Post-Op)Adhesionolysis	32	4
Sigmoid Volvulus	Sigmoidectomy	10	4
	Total		25

Table 3: Incidence of postoperative wound infection depending on urgency of surgery.

Urgency of operation	No. of infected	No. of uninfected	Total	ODDS Ratio (95% C.I)
Elective	22 (15.1%)	123 (84.8%)	145	1.00
Emergency	30 (19.3%)	125 (80.64%)	155	2.20
Total	52 (5%)	245 (81.6%)	300	

Table 4: Incidence of post-operative wound infection in relation to age of the patients.

Age group	No. of infected	No. of uninfected	Total	ODDS Ratio (95% C.I)
<30Years	10	95	195	1.00
30-60 years	30	186	216	1.35
>60 years	2	10	12	2.08

Table 5: Incidence ofpost-operativewound infection inrelation to durationof pre-operativehospitalization.

Pre-operative Hospitalization	No infected	of	No uninfected	of	Total	ODDS Ratio (95% C.I)
1week	12		95		107	1.00
>1week	11		80		91	1.95
Total	23		175		198	

Table 6:Micro-organisms cultured from the 52 infected wounds.

Organism cultured	Number
Coagulase positive Staphylococcus aureus	10
Coagulase positive Staphylococcus aureus + E coli	3
E Coli+Klebsiellasp.	1
Coagulase positive Staphylococcus aureus +Klebsiellasp	2
Klebsiellasp.	3
E.coli+Pseudomonasp	1
Pseudomonasp	2
Coagulase positive Staphylococcus aureus +Pseudomonas sp.	2
No organism cultured	12

DISCUSSION

The study aimed to assess postoperative wound infections in 300 patients, considering the severity of infections, types of operations (elective and emergency), and the urgency of surgery. The findings provide valuable insights into the prevalence and potential risk factors associated with postoperative infections.

Out of 300 wounds, 52 (17.3%) became infected, with varying severity levels - 20 mild, 11 moderate, and 16 severe (including 1 burst abdomen), whereas Damani described a 30% incidence of hospital-acquired infection. A study conducted in public hospitals of Yemen showed results in which 300 patients were interviewed and 34% suffered from surgical site infections. Our study highlights a significant incidence of postoperative infections, with a notable proportion leading to severe complications such as burst abdomen, emphasizing the need for effective preventive measures. Elective operations exhibited a lower infection rate (15.1%) compared to emergency operations (19.3%), and this difference was statistically significant ($p < 0.01$). Emergency surgeries may pose a higher risk of postoperative infections, potentially attributed to factors such as reduced preoperative preparation time and increased bacterial load. Another study by Hernandez from Peru in 2005 described rates of 13.9%. [16-18]

The odds ratio for infection in emergency operations was 2.20, indicating a higher likelihood of infection compared to elective operations. The statistically significant odds ratio underscores the increased risk associated with emergency surgeries, supporting the notion that urgent procedures may be more prone to postoperative complications [19-21].

The study findings underscore the importance of heightened vigilance and infection prevention measures, particularly in emergency surgical scenarios. The increased risk associated with emergency operations may warrant tailored strategies to minimize infection rates, such as strict aseptic techniques and thorough preoperative planning. The severity of infections, including cases of burst abdomen, underscores the potential clinical impact of postoperative wound infections. Clinicians should be vigilant in monitoring patients, especially those undergoing emergency procedures, and take prompt actions to prevent

and manage infections [22-23]. The data indicates that the post-operative wound infection rate in patients admitted for less than 1 week before surgery is slightly higher than in patients admitted for more than 1 week, but the difference is not statistically significant. Osakwe JO et al study showed surgical site infections rates to be higher in emergency procedures. The lack of statistical significance suggests that the duration of pre-operative hospitalization alone may not be a decisive factor in predicting postoperative wound infections. Other factors such as patient comorbidities, surgical complexity, and adherence to infection prevention protocols may contribute to the overall infection risk [24-26].

Staphylococcus aureus is the most common microorganism encountered in the study, followed by E. coli and other combinations. The predominance of Staphylococcus aureus in cultured infections aligns with its common presence on the skin and emphasizes the importance of stringent infection control practices during surgery and postoperative care. Our findings which was in tandem with the previous studies by Negi *et al.* (50.4%), Ranjan *et al.* (34%), Naik *et al.* (32.2%), and Krishna *et al.* (31.3%). Infections with *S. aureus* is most likely associated with endogenous source as it is a member of the skin and nasal flora, and also with contamination from the environment, surgical instruments, or from hands of healthcare workers. While the overall analysis does not reveal a significant age-related increase in the risk of postoperative infections, caution is needed in the interpretation [27-29]. The small sample size in the >60 years age group may limit the statistical power to detect significant differences. Further investigation with a larger sample size could provide more robust insights into age-related infection risks.

Limitations and Further Research:

The study provides a valuable snapshot of postoperative infections, but further research could explore additional factors influencing infection rates, such as patient comorbidities and surgical techniques. A larger sample size and longitudinal follow-up could enhance the understanding of long-term outcomes and trends in postoperative infections.

CONCLUSION

The study highlights a significant incidence of postoperative wound infections, with emergency operations demonstrating a higher risk compared to elective procedures. The findings emphasize the critical importance of infection prevention strategies, stringent aseptic practices, and careful monitoring, particularly in urgent surgical settings. Addressing these factors can contribute to improved patient outcomes and the overall quality of surgical care. The data suggests that there is no statistically significant increase in the risk of infection with an increase in the age of the patients ($p>0.05$). The odds ratio indicates that patients above 60 years of age are less at risk of getting post-operative wound infections, though the findings are not statistically significant. The study

contributes important information about age, duration of hospitalization, and microbial pathogens in postoperative wound infections. While certain trends are observed, careful interpretation is essential, and the findings highlight the need for continued research to refine our understanding of the multifactorial nature of postoperative infections.

The prevalence of *Staphylococcus aureus* suggests the significance of rigorous aseptic techniques in surgical procedures. Continued research in this area can contribute to the development of targeted interventions for reducing postoperative wound infections.

Foot note:

Conflict of interest: None

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