

Evaluation of Risk Factors for Post Operative Infections Following General Surgical Procedures: An Institutional Based Study

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ABSTRACT

Background: Complications in surgery are an important cause of morbidity and mortality and may result in an increased length of stay in hospital, repeat surgery, additional medical treatment, legal issues and increased costs. Hence; the present study was conducted for assessing risk factors for post operative infections following general surgical procedures.

Materials & Methods: A total of 100 patients scheduled to undergo major surgical procedures under general anesthesia were enrolled. Complete demographic and clinical details of all the patients were obtained. A Performa was made and preoperative hematological, biochemical and medical details of all the patients were recorded separately. All the patients were classified as obese and non-obese. All the surgical procedures were carried out under the hands of skilled surgeons under general anesthesia. Incidence of postoperative complications was recorded separately. Risk factors of postoperative complications were evaluated. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software.

Results: Postoperative infection was seen in 36 percent of the patients. Elderly age (more than 60 years), hypovolemia,

obesity, steroid use and diabetes were found to be significant risk factors for postoperative infection following general surgical procedures.

Conclusion: Careful assessment of potential risk factors preoperatively should be done to reduce to incidence of postoperative infections.


Keywords: Surgical Procedures, Postoperative, Infections.

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INTRODUCTION

Complications in surgery are an important cause of morbidity and mortality and may result in an increased length of stay in hospital, repeat surgery, additional medical treatment, legal issues and increased costs. Apart from mortality, complications are among the most frequently measured and reported outcomes used to evaluate surgical treatment. They are used as an indicator of quality, and their continuous evaluation can identify possible flaws in the process of care. Although efforts are being made to improve quality of care by means of uniform registration of adverse events and mortality, unfortunately, in many countries, comparison of outcomes among health care providers is hampered by the lack of a clear definition of complications.¹⁻³

The significant financial cost linked to postoperative complications should be considered. Healthcare systems worldwide struggle with the cost consequences of extended hospital stays, readmissions, and the extra resources needed to handle post-surgical problems. The importance of postoperative complications in general surgery is complex, as they impact patient morbidity,

mortality, and the overall quality of healthcare provision. In addition to directly harming individual patients, these consequences have ripple effects on the healthcare system, influencing how resources are allocated, healthcare costs, and the overall surgical environment.⁴⁻⁶ Postoperative complications significantly jeopardize patient outcomes, potentially leading to extended hospitalization, heightened reliance on healthcare resources, and an elevated likelihood of morbidity and mortality.⁷ Hence; the present study was conducted for assessing risk factors for post operative infections following general surgical procedures.

MATERIALS & METHODS

The present study was conducted in the Department of General Surgery, Maheshwara Medical College & Hospital, Sangareddy, Telangana (India) for assessing risk factors for post operative infections following general surgical procedures. A total of 100 patients scheduled to undergo major surgical procedures under general anesthesia were enrolled. Complete demographic and

clinical details of all the patients were obtained. A Performa was made and preoperative hematological, biochemical and medical details of all the patients were recorded separately. All the patients were classified as obese and non-obese. All the surgical procedures were carried out under the hands of skilled surgeons under general anesthesia. Incidence of postoperative complications was recorded separately. Risk factors of postoperative complications were evaluated. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software.

RESULTS

Mean age of the patients was 48.3 years. Out of 100 patients, 53 percent were males while the remaining were females. 49 percent of the patients were diabetic while 33 percent were hypertensive. 23 percent were obese. History of steroid use was seen in 26 percent of the patients. Postoperative infection was seen in 36 percent of the patients. Elderly age (more than 60 years), hypovolemia, obesity, steroid use and diabetes were found to be significant risk factors for postoperative infection following general surgical procedures.

Table 1: Demographic and clinical data

Variable	Number	Percentage
Mean age (years)		48.3
Males	53	53
Females	47	47
Diabetic	49	49
Hypertensive	33	33
Obese	23	23
History of steroid use	26	26

Table 2: Risk factors for postoperative infection following general surgical procedures

Risk factors	Odds Ratio	p-value
Elderly age	-1.774	0.001 (Significant)
Hypovolemia	2.934	0.000 (Significant)
Obesity	-1.098	0.003 (Significant)
Steroid use	0.992	0.029 (Significant)
Diabetes	-0.837	0.042 (Significant)
Hypertension	0.521	0.712
Smoking habit	0.229	0.298

DISCUSSION

Enhancing the standard of surgical care is crucial in reducing postoperative complications. This entails following evidence-based methods, implementing standardized surgical protocols, and providing continuous education and training for healthcare workers. Improved communication and coordination among diverse teams of surgeons, anesthesiologists, nurses, and other allied health professionals offer a complete approach to patient care. Implementing perioperative care pathways and enhanced recovery after surgery procedures have demonstrated the potential to decrease the occurrence of problems. These paths consist of evidence-based therapies to optimize care before, during, and after surgery. Enhanced recovery principles prioritize the reduction of postoperative stress, the encouragement of early mobilization, and the decrease in opioid usage, which ultimately leads to improved patient outcomes.⁷⁻¹⁰ Hence; the present study was conducted for assessing risk factors for post operative infections following general surgical procedures.

Mean age of the patients was 48.3 years. Out of 100 patients, 53 percent were males while the remaining were females. 49 percent of the patients were diabetic while 33 percent were hypertensive. 23 percent were obese. History of steroid use was seen in 26 percent of the patients. Postoperative infection was seen in 36 percent of the patients. Elderly age (more than 60 years), hypovolemia, obesity, steroid use and diabetes were found to be significant risk factors for postoperative infection following general

surgical procedures. Carvalho RLR et al estimated the incidence of surgical site infection in general surgeries at a large Brazilian hospital while identifying risk factors and prevalent microorganisms. 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.¹⁰ Pessaux P et al studied the dependent variables included surgical site infection (SSI) (divided into parietal and deep infectious complications with or without fistulas) and global infectious complications (SSI and extraparietal and abdominal infectious complications). The rate of global infectious complications was 13.3%; SSI, 4.05%; parietal infectious complications, 2.2%; deep infectious complications with fistulas, 2.18%; and deep infectious complications without fistulas, 1.38%. In multivariate analysis, the following 7 independent risk factors for global infectious complications have been identified:

age (60-74 years, OR, 1.64; ≥ 75 years, OR, 1.45); being underweight (OR, 1.51); having cirrhosis (OR, 2.45), having a vertical abdominal incision (OR, 1.66); having a suture placed or an anastomosis of the bowel (OR, 1.48) in the digestive tract; having a prolonged operative time (61-120 minutes, OR, 1.66; 121 minutes, OR, 2.72); and being categorized as having a class 4 surgical site (ie, obese patients or having a risk factor of a healing defect) (OR, 1.66). Ceftriaxone sodium therapy was identified as a protective factor (OR, 0.43). In multivariate analysis, the following 5 independent risk factors for SSI have been identified: the existence of a preoperative cutaneous abscess or cutaneous necrosis (OR, 4.75), having a suture placed or an anastomosis of the bowel (OR, 1.82) in the digestive tract, having postoperative abdominal drainage (OR, 2.15), undergoing a surgical procedure for the treatment of cancer (OR, 1.74), and receiving curative anticoagulant therapy (OR, 3.33) postoperatively. Their data showed that risk factors for SSI and for global infectious complications are disparate.¹¹ Ansari S et al estimated the incidence of surgical site infections in general surgeries at a tertiary care hospital and identify the predisposing risk factors. The was a retrospective analysis that included all surgical records. 882 records were included. The incidence of SSI and predisposing risk factors were noted. Data were entered and analyzed using SPSS v. 22.0 (IBM Corp, Armonk, NY, US). The incidence of SSI was 8.84% (n=78). SSIs were more common in older participants (11.4% vs. 6.4%; $p=0.009$), in patients with more than 24 hour of preoperative hospital stay (11.2% vs. 64%; $p=0.013$), in procedures of longer duration (1.53 ± 0.35 vs 2.57 ± 0.17 ; $p<0.0001$), and in emergency surgeries (19.2% vs. 7.5%; $p=0.0001$). The combined incidence of SSIs in American Society of Anesthesiologists (ASA) index III and above was 37 (47.4%) and that in I and II was 41 (52.6%) ($p<0.00001$). This study has revealed a very high incidence of surgical site infections. These infections are more common in elderly patients, patients undergoing emergency surgeries, those with longer preoperative hospital stay and longer surgical duration, and patients with a high ASA index.¹²

CONCLUSION

Careful assessment of potential risk factors preoperatively should be done to reduce to incidence of postoperative infections.

REFERENCES

- Collins TC, Daley J, Henderson WH, et al. Risk factors for prolonged length of stay after major elective surgery. *Ann Surg.* 1999;230:251–9.
- Lall RR, Wong AP, Lall RR, Lawton CD, Smith ZA, Dahdaleh NS. Evidence-based management of deep wound infection after spinal instrumentation. *J Clin Neurosci.* 2015 Feb;22(2):238-42
- Coello R, Charlett A, Wilson J, et al. Adverse impact of surgical site infections in English hospitals. *J Hosp Infect.* 2005;60:93–103.

- Roukema JA, van der WC, Leenen LP. Registration of postoperative complications to improve the results of surgery. *Ned Tijdschr Geneesk.* 1996;140:781–4.
- Young PY, Khadaroo RG. Surgical site infections. *Surg Clin North Am.* 2014 Dec;94(6):1245-64.
- Oliveira AC, Gama CS. Evaluation of surgical glove integrity during surgery in a Brazilian teaching hospital. *Am J Infect Control.* 2014;42:1093–1096
- Spagnolo AM, Ottria G, Amicizia D, Perdelli F, Cristina ML. Operating theatre quality and prevention of surgical site infections. *J Prev Med Hyg.* 2013 Sep;54(3):131-7
- Kamel C, McGahan L, Mierzewski-Urban M, Embil J. Preoperative Skin Antiseptic Preparations and Application Techniques for Preventing Surgical Site Infections: A Systematic Review of the Clinical Evidence and Guidelines [Internet]. Canadian Agency for Drugs and Technologies in Health; Ottawa (ON): Jun, 2011.
- Zhan C, Miller MR. Excess length of stay, charges, and mortality attributable to medical injuries during hospitalization. *JAMA.* 2003;290:1868–74.
- Carvalho RLR, Campos CC, Franco LMC, Rocha AM, Ercole FF. Incidence and risk factors for surgical site infection in general surgeries. *Rev Lat Am Enfermagem.* 2017;25:e2848. Published 2017 Dec 4. doi:10.1590/1518-8345.1502.2848
- Pessaux P et al. Risk Factors for Postoperative Infectious Complications in Noncolorectal Abdominal Surgery. A Multivariate Analysis Based on a Prospective Multicenter Study of 4718 Patients. *Arch Surg.* 2003;138(3):314-324.
- Ansari S, Hassan M, Barry HD, et al. Risk Factors Associated with Surgical Site Infections: A Retrospective Report from a Developing Country. *Cureus.* 2019;11(6):e4801. Published 2019 Jun 2. doi:10.7759/cureus.4801

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