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Review Article

Readmission rates and risk factors associated with emergency surgeries

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ABSTRACT

Emergency surgery requires complex and diversified skills and talents to execute procedures from several fields of surgery within 24 hours. The prevalence of emergency surgery is also increasing in recent times and the cohort for emergency general surgery is particularly at risk for readmission. Readmission is considered as one of the predictors of the quality of healthcare. Readmission following emergency surgery is frequent and varies greatly based on patient characteristics and diagnostic types. Readmission is associated with the significant morbidity and mortality, also adds to the increased hospital burden. Various risk factors account for the readmission. The purpose of this research is to review the available information about the readmission rates and risk factors associated with emergency surgeries. About half of patients undergoing emergency surgeries will experience a postoperative complication, and postoperative complications have a strong correlation with hospital readmission. Postoperative complications and readmission have a significant negative influence on patient quality of life and healthcare resources. Different studies have reported an increased prevalence of readmissions after emergency surgeries. Surgical site infection, increased length of hospital stays, readmission at the non-index hospital, comorbidities are some of the commonly reported risk factors of readmission. Establishment and implementation of the preventive strategies for the control of risk factors of readmission can help in reducing the readmission burden.

Keywords: Readmission, Risk Factor, Surgery, Emergency, Hospital

INTRODUCTION

Emergency general surgery is the main component of acute care surgery and has lately gained recognition as a prospective surgical specialty. Emergency procedures have been handled over the years by a wide range of surgical subspecialties, despite historically being seen to be within the skill set of general trained surgeons. Multiple individuals and a wide range of medical specializations are required by call rosters across institutions to provide coverage for patients who present with emergency general surgery symptoms. Even while emergency general surgery

procedures make up a sizable amount of surgical caseload when taken separately, they are routinely tacked on to elective surgery lists, adding to the workload of general and trauma surgical teams.[1] Surgery required to treat acute threat to life, organ, limb, or tissue resulting from external trauma, an acute disease process, an acute exacerbation of a chronic disease process, or a complication of a surgical or other interventional operation is referred to as emergency surgery. Emergency surgery requires complicated and diversified skills and talents to perform procedures from many fields of surgery including abdominal, urologic, thoracic, vascular, soft tissue, and skeletal within 24 hours.[2]

Emergency surgery places a significant financial strain on the health systems worldwide, especially those publicly funded. Emergency surgery accounts for about 750,000 yearly admissions, and surgical procedures account for roughly 10% of the national health service's annual budget in England alone. Around three million hospital admissions in the United States are due to emergency surgery, with an anticipated cost of $28 billion and an increase to roughly $41 billion by 2060.[3] Patients undergoing emergency general surgery are a special population at high risk for surgical errors and postoperative complications. A postoperative complication will occur in about 50% of patients receiving emergency surgery, and postoperative complications have been strongly associated with hospital readmission. This unbalanced load of complications is critical since it would appear to put the emergency surgery patient at a higher risk for readmission. In addition, patients' race or ethnicity and indicators of socioeconomic level, like insurance payor status, differ from those undergoing elective surgeries.[4]

Unplanned readmission to the hospital following major surgery is frequent, and hospitals and surgeons continue to prioritize preventing it as they are increasingly held responsible for post-discharge outcomes by payers and policymakers. For some high-risk surgical operations, readmission to a hospital other than the one where the index operation was completed involves a 48% greater risk of mortality. More than 7% of all inpatient hospitalizations are for emergency general surgery, which encompasses a wide spectrum of acute surgical diseases that combined pose a significant public health burden due to their disproportionately high morbidity and mortality rates.[5] Compared to medical patients, the readmission problem is fundamentally different for surgical patients. The majority, almost 70.5% of readmissions following surgery are brought on by a medical issue. Similar to medical patients, surgical patients also have underlying co-morbidities; however, what sets surgical patients apart is the fact that they undergo a specific operation, which has a readmission risk associated with it. Few studies have looked specifically at readmission rates among surgical patients. The majority of the research that do exist concentrate on readmission rates specific to procedures and to patient categories.[6] The purpose of this research is to review the available information about the readmission rates and risk factors associated with emergency surgeries.

METHODOLOGY

This study is based on a comprehensive literature search conducted on 04 August 2022, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed the information about the readmission rates and risk factors associated with emergency surgeries. There were no restrictions on date, language, participant age, or type of publication.

DISCUSSION

The proportion of surgery performed worldwide is increasing, and patients who may not have been candidates for surgery in the past due to age or comorbidity are increasingly being offered surgical procedures in recent times. Patient quality of life and healthcare resources are severely impacted by postoperative complications and hospital readmission. Post-operative complications have an impact on long-term survival and quality of life. Hospitals have documented varying results for patients who experience complications, indicating that variations in the treatment delivery process may directly affect patients' outcomes. A longer hospital length of stay, a higher cost, and an increase in long-term mortality are all linked to hospital readmission after surgery.[7] There are constraints to the use of 30-day readmission rates as a quality indicator for hospital care. Although there are some aspects that cannot be changed, there are still some factors that can influence patient readmission and hospital use. Patient race, gender, socioeconomic level, and comorbidities are among these factors.[8]

Prevalence and risk factors of readmission after emergency surgery

Havens reported in his study findings that the 30-day readmission rate cumulatively was 5.91%. The rates of readmission ranged from 4.1% for upper gastrointestinal to 16.8% for cardiothoracic, 16.8% of patients were readmitted in different hospital setting. Charlson comorbidity index score of 2 or higher (adjusted chances ratio: 2.26 [95% confidence interval (CI): 2.14-2.39]), leaving against medical advice (adjusted odds ratio: 2.24 [95% CI: 1.89-2.66], and public insurance were predictors of readmission (adjusted odds ratio: 1.55 [95% CI, 1.47-1.64]). Surgical site infections (16.9%), gastrointestinal issues (11.3%), and pulmonary complications were the most frequent causes of readmission (3.6%).[4] Rossi reported in his study findings that a 8.1% readmission rate was observed among total of 383,726 patients within 30

days of their first operation. Patients who were underweight had a higher risk of readmission (odds ratio=1.15, p=0.05), length of stay, any inpatient pulmonary problem or complication, and discharge to any facility or rehabilitation were all high-risk hospital features (all p<0.05). Nearly 25% of readmissions are due to surgical site infections. The procedure with the highest likelihood of readmission is colorectal surgery, which accounts for 22% of all emergency's general surgery readmissions.[9]

Results of a retrospective study in 2021 showed that 13% of 4,171,983 patients had an unexpected readmission after 30 days. Of those, 21% were admitted to a hospital that was not on the index. By 90 days, 22% of patients had an unplanned readmission, with a non-index hospital accounting for 23% of those. Infection was the most typical reason for readmission. Leaving against medical advice, a longer stay, a Charlson comorbidity index of 2 or higher, emergency surgery patients who were in the other surgical category, and nonroutine discharges were all readmission predictors at 30 days. At 90 days, the same risk factors for readmission persisted.[10] Results of another retrospective study in 2020 showed that 5050 readmissions occurred in 30 days, while 7896 occurred in 90 days. The number of comorbidities, discharge status, and length of stay were significant risk factors for 30-day readmission. The same characteristics, together emergency admission, insurance status, and additional comorbidities, were significant predictors of 90-day readmission and 90-day readmission rates were especially high for discharges to rehabilitation, skilled nursing facilities, or home healthcare.[11]

Muthuvel stated in his study findings that emergency surgery patients had a higher readmission rate (11.1% versus 15.2%, p=0.004) than non-emergency surgery patients. The surgical Apgar score and the combined American society of anaesthesiologists physical status classification and length of stay variables were linked to a higher risk of readmission in patients undergoing emergency general surgery.[12] Jacob reported in his study findings that 5.21% of readmissions occurred within 30 days. Age (p<0.005) and emergency admission (odds ratio 1.91, 95% CI 0.61 to 3.21, p<0.0001) were substantially linked to an elevated risk of readmission, although the length of stay during the index hospitalization was not. The majority of postoperative readmissions were caused by uncomplicated wound infections, operating site discomfort, and operative site seroma.[13]

Glans stated that patients with several comorbidities as well as those with specific medical diseases such congestive heart failure, pneumonia, and chronic obstructive pulmonary disease had a higher incidence of readmission to the hospital within 30 days of discharge. The number of previous discharges, male sex, the number of medications used, age, and length of stay at initial hospital visit have all been linked to an increase in frequency of readmission. Patients with poor health, who frequently use ten or more prescriptions, live in the community with home care, are more likely to require hospital readmission within 30 days of discharge.[14] Unexpected readmissions not only raise the price of providing healthcare, but they also lead to a lack of beds and an ineffective use of healthcare resources. The regular routines of readmitted children's families or caregivers are likewise abruptly interrupted. Children who require admission through emergency departments or paediatric patients waiting for a hospital bed for elective operations may as a result encounter cancellation and/or a protracted waiting period before being admitted as inpatients. Reduced unplanned readmissions will be helped by better care transitions for high risk patients after discharge.[15]

Spatz stated that the likelihood of readmission for a patient might be influenced by a number of community parameters. Acute rehabilitation centres and skilled nursing facilities that are easily accessible and are of the highest quality may directly support or impede recovery, which may increase patients' risk of readmission. Other community factors to consider include the accessibility of primary care providers, the availability of transportation, wholesome foods and places to exercise, the density of non-profit organizations, and the availability of healthy foods and foods to eat. The economic and social environment, which is characterized by elements like unemployment, poverty, and crime, may also have an indirect impact because these social evils may lead to a lack of resources and conflicting priorities for health. For the health system and community-based initiatives to reduce readmission rates, assessments of the impact of these and other community factors to hospital readmissions are critical.[16]

Sultan described in his findings that the insertion of feeding tubes was linked to the maximum readmission rate. These readmissions occur for two reasons. The majority of these cancer patients had chemotherapy planned for them, and some of them were older patients with numerous comorbid conditions that needed readmission owing to their health. After significant abdominal procedures like the Whipples procedure and Ivor Lewis Esophagectomy, every fifth and seventh patient is readmitted. Another intriguing revelation was that the patients who underwent lower gastrointestinal surgery and had stomas had readmission rates that were 2.5 times higher than those of patients without stomas. When stoma reversal surgery was performed, the readmission rate for patients with stomas increased by 10.5%.[17] Results of a retrospective analysis revealed that 15.8% of the patients got admitted to the non-index hospital and were at high risk of 90-day mortality compared with the index admission (6.3% versus 4.1%, p<0.001). Non-index readmission, disease severity, and patient transfer were the independent risk factor for 90- day mortality.[18] Readmission rate is of utmost importance in healthcare as lower readmission rates are predictors of good quality care also readmission is associated with significant morbidity and mortality, despite this the available literature is quite scarce and limited. Certain risk

factors of readmission can however be prevented further clinical research can be beneficial in developing preventing strategies for such risk factors leading to overall decrease in the readmission rates.

CONCLUSION

Readmission after the surgery is a cause of concern and distress not only for the patient but hospital as well hence development of quality-improvement strategies that effectively address the real issue, it is essential to comprehend the underlying causes and risk factors of readmission. Further research can aid in designing and implementing strategies to control and prevent the risk factors of readmission.

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REFERENCES

1. Shah AA, Haider AH, Zogg CK, Schwartz DA, Haut ER, Zafar SN, Schneider EB, Velopulos CG, Shafi S, Zafar H, Efron DT. National estimates of predictors of outcomes for emergency general surgery. J Trauma Acute Care Surg. 2015;78(3):482-90.
2. Surlin V. Emergency and Trauma Surgery. Chirurgia (Bucharest, Romania: 1990). 2021;116(6):643-4.
3. Hutchings A, Moler Zapata S, O'Neill S, Smart N, Cromwell D, Hinchliffe R, et al. Variation in the rates of emergency surgery amongst emergency admissions to hospital for common acute conditions. BJS Open. 2021;5(6).
4. Havens JM, Olufajo OA, Cooper ZR, Haider AH, Shah AA, Salim A. Defining Rates and Risk Factors for Readmissions Following Emergency General Surgery. JAMA Surg. 2016;151(4):330-6.
5. McCrum ML, Cannon AR, Allen CM, Presson AP, Huang LC, Brooke BS. Contributors to Increased Mortality Associated With Care Fragmentation After Emergency General Surgery. JAMA Surg. 2020;155(9):841-8.
6. Kassin MT, Owen RM, Perez SD, Leeds I, Cox JC, Schnier K, Sadiraj V, Sweeney JF. Risk factors for 30-day hospital readmission among general surgery patients. J Am Coll Surg. 2012;215(3):322-30.
7. Gillies MA, Ghaffar S, Harrison E, Haddow C, Smyth L, Walsh TS, Pearse RM, Lone NI. The association between ICU admission and emergency hospital readmission following emergency general surgery. J Intensive Care Soc. 2019;20(4):316-6.
8. Wu V, Hall SF. Rates and causes of 30-day readmission and emergency room utilization following head and neck surgery. J Otolaryngol Head Neck Surg. 2018;47(1):36.
9. Rossi IR, Ross SW, May AK, Reinke CE. Readmission After Emergency General Surgery: NSQIP Review of Risk, Cause and Ideal Follow-Up. J Surg Res. 2021;260:359-68.
10. Urrechaga EM, Cioci AC, Parreco JP, Gilna GP, Saberi RA, Yeh DD, et al. The hidden burden of unplanned readmission after emergency general surgery. J Trauma Acute Care Surg. 2021;91(5):891-7.
11. Kelley KM, Collins J, Britt LD, Taylor DDH, Britt R. Readmission after emergency general surgery. Am J Surg. 2020;220(3):731-5.
12. Muthuvel G, Tevis S, Liepert A, Agarwal S, Kennedy G. A composite index for predicting readmission following emergency general surgery. J Trauma Acute Care Surg. 2014;76:1467-72.
13. Jacobs B, Hadjittofi C, Taylor F, Davies J, Machesney M. Rethinking surgical readmissions. Bull Royal Coll Surgeons Engl. 2018;100:104-8.
14. Glans M, Kragh Ekstam A, Jakobsson U, Bondesson Å, Midlöv P. Risk factors for hospital readmission in older adults within 30 days of discharge – a comparative retrospective study. BMC Geriatrics. 2020;20(1):467.
15. Zhou H, Della PR, Porter P, Roberts PA. Risk factors associated with 30-day all-cause unplanned hospital readmissions at a tertiary children's hospital in Western Australia. J Paediatrics Child Health. 2020;56(1):68-75.
16. Spatz ES, Bernheim SM, Horwitz LI, Herrin J. Community factors and hospital wide readmission rates: Does context matter? PloS One. 2020;15(10):e0240222.
17. Sultan R, Abdullah UH, Chawla T. 30-Day Readmission Rate and its Causes in General Surgical Patients. J Coll Physicians Surgeons-Pakistan. 2018;28(4):314-6.
18. Cannon AR, Kingsbury MR, Allen CM, Presson AP, Huang LC, McCrum ML. Excess Mortality after Emergency General Surgery Readmission at Non-Index Hospitals: Patient and System Contributors. J Am Coll Surgeons. 2019;229(4).

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