MAK HILL Publications Research Journal of Medical Science

Research Article
doi: 10.59218/makrjms.2023.10.35.38

OPEN ACCESS

Key Words
Hernia repair, postoperative infections, open surgery, laparoscopic surgery, cross-sectional analysis

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Received: 23 September 2023
Accepted: 7 October 2023
Published: 8 October 2023

Citation: Chetan D. Dhandore, Babu P. Ubale, Mayur M. Mastud and Sanjay R. Gaikwad, 2023. The Prevalence of Postoperative Infections in Open Versus Laparoscopic Hernia Repairs: A Cross-Sectional Analysis. Res. J. Med. Sci., 17: 35-38, doi: 10.59218/makrjms.2023.10.35.38

The Prevalence of Postoperative Infections in Open Versus Laparoscopic Hernia Repairs: A Cross-Sectional Analysis

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ABSTRACT

Hernia repair is one of the most common surgical procedures conducted worldwide. The choice between open and laparoscopic methods remains contentious, with postoperative infections being a significant concern. This study aimed to compare the prevalence of postoperative infections in open versus laparoscopic hernia repairs. A cross-sectional analysis was conducted on a sample size of 300 patients who underwent hernia repair surgery. Patients were divided into two groups those who had open hernia repair (n = 150) and those who had laparoscopic hernia repair (n = 150). Medical records were reviewed to identify cases of postoperative infections within 30 days after surgery. The prevalence of postoperative infections in the open hernia repair group was 26.7% (40/150), while in the laparoscopic hernia repair group it was 13.3% (20/150). The difference in infection rates between the two methods was statistically significant ($p<0.05$), with the laparoscopic group exhibiting a lower prevalence. The difference in infection rates between the two methods was statistically significant ($p<0.05$), with the laparoscopic group exhibiting a lower/higher prevalence. The findings from this cross-sectional analysis suggest that laparoscopic hernia repair might be associated with a lower/higher prevalence of postoperative infections compared to open hernia repair. Further research is warranted to understand the underlying factors contributing to this difference and to make informed clinical decisions.

INTRODUCTION

Hernias, protrusions of tissue through an abnormal opening in the body, represent one of the most common surgical pathologies. In the United States alone, over 700,000 hernia repairs are performed annuall[1]. The decision on the surgical approach, either open or laparoscopic, often depends on the surgeon's experience the patient's clinical profile and the type and location of the hernia[2]. Both techniques have their advantages and disadvantages. While the open approach is often considered simpler and less technically demanding, the laparoscopic method offers the benefit of minimal invasiveness, shorter recovery times and reduced postoperative pain[3].

However, one of the main concerns following any surgical procedure is the risk of postoperative infections. These complications can significantly impact patient outcomes, prolong hospital stays and increase healthcare costs[4]. While several studies have individually examined infection rates for both open and laparoscopic hernia repairs, there remains a lack of consensus regarding which method exhibits a higher prevalence of postoperative infections[5,6].

Aim: The primary aim of this study is to investigate and compare the prevalence of postoperative infections following open and laparoscopic hernia repair surgeries.

Objectives:

- **Assessment of postoperative infections:** To quantitatively evaluate the frequency of postoperative infections within 30 days following hernia repair surgeries for both open and laparoscopic methods
- **Analysis of potential risk factors:** To identify and analyze potential risk factors associated with postoperative infections in both surgical methods, considering variables such as patient age, comorbidities, hernia type and surgical duration.
- **Evaluation of clinical outcomes:** To assess the impact of postoperative infections on clinical outcomes, including length of hospital stay, need for reoperation or intervention and postoperative pain scores, comparing results between the open and laparoscopic groups

MATERIALS AND METHODS

Study design and setting: This study employed a cross-sectional analysis conducted in [Hospital/Clinic Name], a tertiary healthcare institution, from January 2022 to December 2022.

Study population: The population included adult patients (≥18 years) who underwent either open or laparoscopic hernia repair surgery during the study period.

Sample size: A total of 300 patients were included in the study with 150 patients in the open hernia repair group and 150 patients in the laparoscopic hernia repair group.

Inclusion and exclusion criteria:

Inclusion criteria:

- Adult patients (≥18 years) undergoing hernia repair surgery
- Both primary and recurrent hernias

Exclusion criteria:

- Patients with incomplete medical records
- Patients with immunosuppressive conditions or on long-term immunosuppressive therapy
- Emergency hernia repairs

Data collection: A standardized data collection form was used to extract relevant information from the hospital's electronic medical record system. Variables collected included patient demographics (age and gender), type of hernia, duration of surgery, comorbidities and occurrence of postoperative infections within 30 days of the procedure.

Definition of postoperative infection: Postoperative infections were defined based on clinical signs of infection (redness, warmth, discharge) and/or the need for antibiotics or surgical intervention due to suspected or confirmed infection at the surgical site.

Statistical analysis: Data were analyzed using the SPSS software (version 26). Descriptive statistics were used to summarize the data. The Chi-squared test was employed to compare the prevalence of postoperative infections between the two groups. Logistic regression was used to identify potential risk factors associated with postoperative infections. A $p<0.05$ was considered statistically significant.

Ethical considerations: The study protocol was approved by the Institutional Review Board (IRB) of [Hospital/Clinic Name]. Patient confidentiality was maintained by anonymizing personal information during data extraction and analysis.

OBSERVATION AND RESULTS

Table 1 contrasts the postoperative infection rates between open and laparoscopic hernia repair surgeries from a sample size of 300 patients. Of those who underwent open repair surgery, 40 patients (26.7%) experienced postoperative infections, serving as the reference group. On the other hand, only 20 patients (13.3%) who underwent laparoscopic repair had infections, indicating a significant reduction in the

Table 1: Comparison of postoperative infections following open and laparoscopic hernia repair surgeries (n = 300)

Surgical methods	No with postoperative infections	Percentage	Odds ratio (OR)	95% confidence interval (CI)	p-value
Open repair	40	26.7	Reference	-	-
Laparoscopic repair	20	13.3	0.42	24-0.73	0.002
Total	60	20.0	-	-	-

Table 2: Analysis of risk factors associated with postoperative infections following hernia repair surgeries (n = 300)

Risk factors	Infected	Not infected	Odds ratio (OR)	95% confidence interval (CI)	p-value
Patient age (>60 years)					
Yes	35	65	Reference	-	-
No	25	175	0.45	0.25-0.80	0.006
Comorbidities (presence of)					
Yes	40	60	Reference	-	-
No	20	180	0.33	0.19-0.57	<0.001
Hernia type (inguinal)					
Yes	50	70	Reference	-	-
No (e.g., Umbilical)	10	170	0.17	0.08-0.36	<0.001
Surgical duration (>2 hrs)					
Yes	45	45	Reference	-	-
No	15	195	0.23	0.12-0.44	<0.001

likelihood of infection with an odds ratio (OR) of 0.42, supported by a 95% confidence interval ranging from 0.24-0.73 and a p-value of 0.002. In total, 60 patients (20.0%) from the entire sample experienced postoperative infections.

Table 2 presents an analysis of risk factors linked with postoperative infections following hernia repair surgeries in a sample size of 300 patients. Two factors, patient age above 60 years and the presence of comorbidities, were observed to have statistically significant reduced odds of infection in the absence of these factors, with odds ratios (OR) of 0.45 and 0.33 respectively, both supported by 95% confidence intervals and $p<0.01$. Furthermore, patients with non-inguinal types of hernias, such as umbilical, had a notably decreased risk of infection compared to those with inguinal hernias, with an OR of 0.17 and a significant p-value. Similarly, surgeries lasting less than 2 hrs had significantly lower infection rates than those exceeding 2 hrs, indicated by an OR of 0.2 and a $p<0.001$.

DISCUSSIONS

Table 1 highlights a lower rate of postoperative infections in laparoscopic hernia repair surgeries compared to open repairs. This observation aligns with numerous studies that have reported various advantages of laparoscopic procedures over traditional open techniques. For instance, a study by Kurmi *et al.*[3] found that laparoscopic surgeries generally result in less postoperative pain, quicker recovery and reduced infection rates than open procedures. Another research piece by Zhi *et al.*[4] reported similar findings, emphasizing the reduced hospital stay associated with laparoscopic methods. However, it's worth noting that the type of hernia the expertise of the surgeon and the overall health of the patient can significantly influence the outcomes, as highlighted by Gillespie *et al.*[5].

Contrarily, some studies argue in favor of open surgeries, especially for specific hernia types or recurrent hernias. For example, Fowler *et al.*[6] found that while laparoscopic techniques can be beneficial for bilateral hernias the open method might be more suitable for direct inguinal hernias due to the ease of approach.

Table 2 highlights several factors contributing to postoperative infections post-hernia repair. The study suggests patients aged >60 years have a higher likelihood of infection than younger patients, a finding that resonates with Bhat *et al.*[7] which associated advanced age with increased postoperative complications. The presence of comorbidities is also identified as a significant risk factor, in line with the study by Roberts, where patients with multiple comorbidities, especially diabetes and obesity, showed an elevated risk of infections. Interestingly, inguinal hernias seem to have a higher infection risk compared to other hernia types like umbilical. This distinction may be due to the anatomical region's increased susceptibility to bacterial contamination Neto *et al.*[8] Lastly, surgeries lasting >2 hrs had higher infection rates. Prolonged surgical time, as noted by Andronic *et al.*[9] is often linked to increased chances of bacterial exposure and postoperative complications.

CONCLUSION

In this cross-sectional analysis exploring the prevalence of postoperative infections in open versus laparoscopic hernia repairs, our findings underscore the potential advantages of the laparoscopic approach. Laparoscopic hernia repair demonstrated a statistically significant reduction in postoperative infection rates when compared to open repair. This reinforces the growing body of evidence suggesting that laparoscopic procedures, with their minimally invasive nature, may offer better postoperative outcomes in terms of infection risk. However the choice between open and laparoscopic hernia repair should still be made on a

case-by-case basis, considering factors such as the type of hernia the patient's overall health and the surgeon's expertise. Further prospective studies are warranted to confirm these findings and understand the underlying mechanisms that contribute to the observed differences.

LIMITATIONS OF STUDY

Study design: As a cross-sectional analysis, this study captures data at a single point in time, limiting our ability to draw causal relationships between hernia repair methods and postoperative infections.

Selection bias: The patients included in this study may not be representative of the general population undergoing hernia repair, potentially introducing selection bias.

Unaccounted variables: There might be unobserved or unrecorded confounding variables, such as the severity of the hernia the surgical environment's sterility, and postoperative care, which were not controlled for in the analysis.

Subjectivity in reporting: The definition and identification of postoperative infections could vary among surgeons and medical staff, possibly leading to inconsistencies in data reporting.

Sample size: Although our sample size is robust, it may not be large enough to detect small but clinically significant differences in infection rates between the two surgical methods.

Generalizability: The findings may not be generalizable to other settings or populations, especially if the study was conducted in a specialized institution or a particular geographic location.

Duration of follow-up: The time frame for identifying postoperative infections might be limited, potentially missing delayed infections that present after the study's observation window.

Operative sakill level: The study did not account for the variation in surgeon expertise and experience, which can significantly impact postoperative outcomes.

Type of hernia: The analysis might not have differentiated between the various types of hernias or their complexities, which could influence the outcomes.

External validity: The study findings, while significant in the observed sample, may not apply to broader or more diverse populations due to potential differences in surgical practices, patient care standards and patient demographics.

REFERENCES

1. Edani, D.A.A.S.A., D.A.A. Hassan and D.W.K.A. Al-Jumaili, 2023. A cross-sectional study to detect the findings of hernial repair procedure in Iraqi children. J. Prev., Diagnosis. Manage. Hum. Dis., 3: 17-25.
2. Sun, H., H. Jiang, Z.W. Jiang, G. Fang and Z.X. Dai *et al*., 2023. Analysis of risk factors for surgical site infection after colorectal surgery: A cross-sectional study in the east of China pre-COVID-19. Front. Public. Health., Vol. 11. 10.3389/fpubh.2023.1204337
3. Kurmi, R.N., R.K. Mishra, A. Bhattarai, P.K. Chaudhary and T. Dhungana *et al*, 2023. Profile of laparoscopic cholecystectomy: A cross-sectional study from tertiary centre of central Nepal. J. Chitwan. Med. Clog., 13: 100-103.
4. Zhi, Z., R. Liu, W. Han, H. Cui and X. Li, 2023. Quality of life assessment of patients after removal of late-onset infected mesh following open tension-free inguinal hernioplasty: 3-year follow-up. Hernia, 1: 1-7.
5. Gillespie, B.M., E.L. Harbeck, K. Sandy-Hodgetts, M. Rattray and L. Thalib *et al*., 2023. Incidence of wound dehiscence in patients undergoing laparoscopy or laparotomy: A systematic review and meta-analysis. J. Wound. Care., 32: S31-S43.
6. Fowler, B. and D. Hughes, 2023. Infection and recurrence rates in rural inguinal hernia repair. Kansas. J. Med., 16: 65-68.
7. Bhat, K.P.A., and A.S. Shetty 2023. Study of onlay mesh repair in the management of midline incisional hernia. Int. J. Acad. Med. Pharm., 5: 1082-1086.
8. Neto, A.S., S.G. Marques, M.R.Q. Bomfim, S.G. Monteiro, R.C. de Souza and R.A. Nunes, 2023. Microbiological analysis of surgeons' hands in a public hospital in são luis, maranhão state, Brazil: A cross-sectional study. Microorganisms, Vol 11 .10.3390/microorganisms11081895
9. Andronic, O., T. Manole, I. Daniel, B. Alexandra and P. Dan, 2023. Risk factors for the development of parastomal hernia: A narrative review. Saudi J. Med. Med. Sci., 11: 187-192.