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RESEARCH ARTICLE

MOST COMMON SURGICAL SITE INFECTION AFTER APPENDECTOMY AND ASSOCIATED RISK FACTORS IN SAUDI ARABIA: A SYSTEMATIC REVIEW

Masoud Ahmad Al-Ghamdi[1], Hoda Jehad Abousada[2], Mohammed Osama Malibari[3], Eman Talia Alasmri[4], Ruba Abualqasim Kudam[5], Marwan Ghurmullah Alzahrani[6], Lamia Mohammed Alrefaei[7], Waheeb Fahd Alfadani[8],Mohammed Sulaiman Alraddadi[9], Raghad Ali Akfi[10],Abdulrahman Saleh Alrashide[11], Fahad Khalid Alabdulkarim[12], Danah M Altewairgi[13], Mawaddah Mohammed Alrhily[14] and Nouf Mohammed Alreshidi[15]

1. Consultanat General, Laproscopic and Colorectal Surgery At The Surgery Department in King Fahad general hospital, Jeddah, KSA.
2. Obstetrics and Gynaecology, KFSHRC, KSA.
3. MBBS, Service Doctor , King Fahad Hospital, Al Hofuf, KSA.
4. MBBS, Service Doctor, Asir health cluster, Abha, KSA.
5. MBBS, Service Doctor, Abu arish general hospital, Abu Arish, Gazan, KSA.
6. MBBS, Service Doctor , security forces hospital, Dammam, KSA.
7. MBBS, Service Doctor, Umluj General Hospital, Umluj , KSA.
8. MBBS, Medical intern, Umm Al-Qura University, Mecca, KSA.
9. MBBS, Medical Intern, Taibah University, Medina, KSA.
10. MBBS, Medical intern, ISNC, Jeddah, KSA.
11. MBBS, Medical intern, Umm Al-Qura University, Mecca, KSA
12. MBBS, Medical intern, King Saud university, Riyadh KSA
13.MBBS, Medical Intern, King Saud Bin Abdulaziz University, Jeddah, KSA
14. PhrmD , UQU, Mecca, JSA.
15. Nursing Specialist, Alsafa Medical Complex, Hail, KSA

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Abstract

Background: Surgical site infection (SSI) is a major postoperative complication following appendectomy and is associated with increased morbidity, prolonged hospitalization, and healthcare costs.
Objective: To identify the most common types of SSI after appendecto my and evaluate associated risk factors in Saudi Arabia.
Methods: A systematic review was conducted according to PRISMA guidelines. PubMed, Scopus, Web of Science, and Google Scholar were searched for studies published between 2000 and 2025 reporting SSI after appendectomy in Saudi Arabia.
Results: Thirty-two studies involving more than 12,000 patients were included. Superficial incisional SSI was the most frequently reported infection. Risk factors consistently associated with SSI included complicated appendicitis, open appendectomy, delayed presentation, obesity, diabetes mellitus, prolonged operative time, and inadequate antibiotic prophylaxis.

Corresponding Author:- Hoda Jehad Abousada
Address:-Obstetrics and Gynaecology, KFSHRC, KSA.

Conclusion: SSI following appendectomy remains a significant problem in Saudi Arabia. Targeted preventive strategies are required.

Introduction:-

Appendectomy is one of the most frequently performed emergency surgical procedures worldwide. Despite improvements in laparoscopic techniques and perioperative infection prevention, surgical site infections continue to pose a significant clinical burden. In Saudi Arabia, appendicitis represents a leading cause of emergency admissions, with variations in presentation severity and management strategies across regions. Understanding the epidemiology and determinants of SSI after appendectomy is essential to optimize outcomes and guide national surgical practice.

Methods:-

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Eligible studies included retrospective and prospective observational studies and interventional trials conducted in Saudi Arabia that reported SSI incidence, types, microbiological findings, or risk factors following appendectomy. Data extraction focused on study characteristics, patient demographics, surgical approach, SSI definitions, outcomes, and statistical associations such as odds ratios (OR) and relative risks (RR) when available.

Results:-

Across the 32 included studies, overall SSI incidence ranged from 0.9% to 15%. The majority of infections were classified as superficial incisional SSI, followed by organ/space infections such as intra-abdominal abscesses. Open appendectomy was consistently associated with higher SSI rates compared with laparoscopic appendectomy. Several studies reported statistically significant associations between SSI and patient comorbidities, disease severity, and operative factors.

Table 1. Characteristics of Included Studies (Saudi Arabia)

Author (Year)	City / Center	Study Design	Population	Sample Size	Surgical Approach	Overall SSI (%)
Al-Saif 2008	Riyadh	Retrospective	Adults	420	Open	9.5
Al-Qahtani 2015	Riyadh	Prospective	Adults	300	Open/Lap	6.5
Koumu 2021	Jeddah	Retrospective	Adults	459	Open/Lap	9.8
Fayraq 2023	Multicenter	Retrospective	Adults	812	Open/Lap	7.2
Alkhalifah 2024	Jeddah	Retrospective	Adults	720	Open/Lap	Open 6.0 / Lap 0.9

Table 2. Distribution of Surgical Site Infection Types

Study	Superficial SSI (%)	Deep SSI (%)	Organ/Space SSI (%)
Al-Saif 2008	6.8	1.4	1.3
Koumu 2021	7.1	1.8	0.9
Fayraq 2023	5.6	0.9	0.7

Table 3. Risk Factors for SSI After Appendectomy

Risk Factor	Studies Reporting	Effect Measure	Statistical Significance
Complicated appendicitis	≥10 studies	OR 2.5–4.8	Significant
Open appendectomy	≥8 studies	OR 1.8–3.2	Significant
Diabetes mellitus	≥6 studies	OR 1.6–2.9	Significant

Obesity (BMI ≥30)	≥5 studies	OR 1.5–2.4	Significant
Delayed presentation	≥7 studies	RR 1.7–3.1	Significant
Prolonged operative time	≥6 studies	OR 1.4–2.6	Significant

Table 4. Common Microorganisms Isolated from SSI

Microorganism	Frequency	Notes
Escherichia coli	Most common	Associated with perforated appendicitis
Klebsiella spp.	Common	Gram-negative predominance
Enterococcus spp.	Moderate	Often polymicrobial
Staphylococcus aureus	Moderate	MRSA reported in some centers
Bacteroides fragilis	Less frequent	Anaerobic infections

Discussion:-

This systematic review demonstrates that superficial incisional SSI is the most common postoperative infection after appendectomy in Saudi Arabia. The findings are consistent with international literature and confirm that both patient-related and procedure-related factors contribute to infection risk. The laparoscopic approach consistently showed lower SSI rates, supporting its preferential use when feasible.

Conclusion:-

Superficial incisional SSI remains the predominant infection following appendectomy in Saudi Arabia. Early diagnosis, appropriate antibiotic prophylaxis, and wider adoption of laparoscopic techniques are essential to reduce postoperative SSI.