

A STUDY ON STRATEGIES TO PREVENT SURGICAL SITE INFECTION AND CURRENT ANTIBIOTIC PRACTICES IN POST APPENDECTOMY PATIENTS IN A TERTIARY CARE CENTRE OF WEST BENGAL: THIS CROSS-SECTIONAL OBSERVATIONAL STUDY

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ABSTRACT

Background: Surgical site infections (SSIs) are one of the most common complications following appendectomy. Antibiotic prophylaxis and adherence to infection control practices are essential in reducing postoperative infections. Objectives: To assess current antibiotic prophylaxis strategies and identify effective methods to prevent SSIs in appendectomy patients in a tertiary care centre of West Bengal. Methods: This cross-sectional observational study included 28 patients who underwent appendectomy. Data on demographic characteristics, risk factors for appendicitis, type and timing of antibiotic prophylaxis, and incidence of SSI were collected. Results: Preoperative antibiotic prophylaxis was given in 100% of cases, predominantly using ceftriaxone and metronidazole. SSI incidence was 14.3% (4 out of 28 patients). Risk factors such as delayed presentation (>48 hours), diabetes, obesity, and perforated appendix were significantly associated with SSIs. Compliance with infection control protocols correlated with reduced SSI rates. Conclusion: Proper timing and choice of antibiotic prophylaxis, combined with strict surgical asepsis and early diagnosis, are key strategies to reduce SSI following appendectomy.

KEYWORDS: Appendectomy, infections.

INTRODUCTION

Appendectomy is the most common emergency abdominal surgery. Despite being a routine procedure, the risk of surgical site infection (SSI) remains significant. Factors such as late diagnosis, perforation, and improper antibiotic prophylaxis can contribute to increased infection risk [1].

Appendicitis is a common gastrointestinal surgical emergency in India, particularly among young adults. While the exact prevalence can vary, studies suggest a lifetime prevalence of around 6-8%. It's more common in some seasons and can be more prevalent in certain age groups and genders. Prevalence: A lifetime prevalence of appendicitis is estimated to be around 6-8% in India. Age and Gender: The 11-20 and 21-30 age groups are most commonly affected [2-6]. While some studies show a slight male predominance, others indicate nearly equal occurrence in both sexes. Seasonal Variation: Studies suggest that appendicitis incidence may be higher during

the rainy season (July-September) in India, potentially due to increased humidity, bacterial infections, and parasitic infestations [7-10].

Socioeconomic Factors: While appendicitis can affect individuals regardless of socioeconomic status, some studies suggest that non-vegetarians may be more affected than vegetarians. **Diagnosis and Treatment:** Appendicitis is typically diagnosed through a combination of clinical evaluation, imaging (ultrasound or CT scan), and laboratory tests. Treatment usually involves surgery (appendectomy) to remove the inflamed appendix, which can be performed laparoscopically or through open surgery [11].

This study aims to evaluate the strategies used for SSI prevention, particularly antibiotic prophylaxis, and correlate them with postoperative outcomes.

METHODS

This study was conducted in a tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 28 patients in the department of General Medicine, at a tertiary care centre, from June / 2020 to December/2020

Total 28 participant were approached to project among No one were excluded in this study and Total 28 Confirmed cases were included on the basis of fulfilling of the eligibility criteria.

The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination.

- **Study Design:** Cross-sectional observational study
- **Study Location:** Tertiary care centre in West Bengal
- **Duration:** 6 months
- **Sample Size:** 28 patients undergoing open or laparoscopic appendectomy

Inclusion Criteria:

- Patients diagnosed with acute appendicitis
- Age >10 years
- Patients who consented to participate

Exclusion Criteria:

- Patients already on antibiotics for other reasons
- Immunocompromised patients

Data Collection:

- Demographic profile
- Risk factors (e.g., diabetes, obesity, smoking, delayed presentation)
- Type of appendicitis (simple/perforated/gangrenous)
- Type, dose, and timing of antibiotic prophylaxis
- SSI occurrence within 30 days postoperatively

Statistical Analysis:

Descriptive analysis and chi-square test were used to evaluate associations.

Flowchart of Study Process:

Patient Admission → Diagnosis of Appendicitis →
Inclusion/Exclusion Screening →
Consent Taken → Appendectomy Performed →

Statistics and analysis of data

Data is put in excel sheet then mean, median and association is analysed by SPSS version 20. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. MS Excel and MS word was used to obtain various types of graphs such as bar diagram. P value (Probability that the result is true) of $P\text{value} < 0.05$ was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data. Sample size is calculated by N master statistical software

RESULTS

In this study we found that Appendicitis is associated with demographic profile of patient. Appendicitis depends on Smoking History of patient its prevalence 21.4%. Appendicitis depends upon BMI > 25.

Male were more prone to suffered of Appendicitis as compared to Female. Appendicitis was associated to Diabetic Patients, Its prevalence 14.3% (Table 1)

Age is also associated factors for Appendicitis. Average mean age of Appendicitis is 26.4 ± 9.8 years (Table 1). Appendicitis is more predominance among Urban residence. It mean it is causing factor for it, its prevalence 64.3%.

Demographic Profile Table 1

Variable	Frequency (n=28)	Percentage (%)
Age (mean $\pm$ SD)	26.4 ± 9.8 years	-
Gender		
• Male	16	57.1%
• Female	12	42.9%
Residence		
• Urban	18	64.3%
• Rural	10	35.7%
BMI > 25	7	25%
Diabetic Patients	4	14.3%
Smoking History	6	21.4%

Appendicitis has many risk factors among them these are most important risk factors which causing appendicitis, these are Delayed presentation >48 hrs, Diabetes, Obesity (BMI >25), Perforated Appendix and Smoking.

Risk Factors Table of Appendicitis Table 2

Risk Factor	No. of Patients	% Among Total	SSI (%)
Delayed presentation >48 hrs	8	28.6%	50%
Diabetes	4	14.3%	75%
Obesity (BMI >25)	7	25%	42.8%

Risk Factor	No. of Patients	% Among Total	SSI (%)
Perforated Appendix	5	17.8%	60%
Smoking	6	21.4%	33.3%

Type of Appendicitis:

- Simple: 17 (60.7%)
- Perforated: 5 (17.8%)
- Gangrenous: 6 (21.5%)

SSI Incidence:

- Total: 4 patients (14.3%)
- All SSIs occurred in patients with one or more risk factors.

Antibiotic Prophylaxis Used:

- **Ceftriaxone + Metronidazole** (Preoperative): 100%
- **Duration:** 24–48 hours postoperatively in complicated cases
- **Timing:** 100% received antibiotics within 1 hour before incision

Surgical Approach:

- Open Appendectomy: 20 patients (71.4%)
- Laparoscopic: 8 patients (28.6%)
- SSIs were more frequent in open surgery group.

DISCUSSION

This study shows that while appropriate antibiotic prophylaxis was followed in all cases, SSIs still occurred, predominantly in high-risk patients. Factors such as diabetes, perforated appendix, and delayed presentation significantly contributed to SSI risk[12]. Laparoscopic approach had fewer infections than open surgery.

Appendicitis, an inflammation of the appendix, is influenced by several demographic factors. Age, sex, and socioeconomic status are key factors. The condition is most common in children and young adults, particularly between the ages of 10 and 30. Males are also more likely to be diagnosed with appendicitis than females. Additionally, socioeconomic factors, such as lower income, can be associated with higher rates of appendicitis and perforated appendicitis, according to a study in Taiwan[13-15].

Here's a more detailed breakdown: Age: Appendicitis is most prevalent in younger individuals, with the highest incidence occurring in children and adolescents. While it can occur at any age, the risk is significantly higher between 10 and 30 years old. Sex: Several studies indicate that appendicitis is more common in males than females[16]. Socioeconomic Status: Research suggests that lower socioeconomic status may be linked to a higher risk of appendicitis and, in particular, perforated appendicitis. Other factors: Family history of appendicitis is also a factor, with children who have appendicitis being more likely to have a positive family history. Additionally, seasonal variations and environmental factors like temperature may also play a role[17].

In this study we found that Appendicitis is associated with demographic profile of patient. Appendicitis depends on Smoking History of patient its prevalence 21.4%. Appendicitis depends upon BMI > 25. Male were more prone to suffered of Appendicitis as compared to Female. Appendicitis was associated to Diabetic Patients, Its prevalence 14.3% (Table 1)

Age is also associated factors for Appendicitis. Average mean age of Appendicitis is 26.4 ± 9.8 years (Table 1). Appendicitis is more predominance among Urban residence. It mean it is causing factor for it, its prevalence 64.3%.

Appendicitis has many risk factors among them these are most important risk factors which causing appendicitis, these are Delayed presentation >48 hrs, Diabetes, Obesity (BMI >25), Perforated Appendix and Smoking.

Preoperative antibiotic prophylaxis, when administered correctly, can significantly reduce the incidence of surgical site infections (SSIs) and improve postoperative outcomes in clean surgeries [18]. However, it's crucial to administer antibiotics at the right time and in the appropriate dosage to maximize benefits and minimize potential harms like antibiotic resistance or adverse reactions. Benefits: Reduced Surgical Site Infections: Prophylactic antibiotics, when given before surgery, can significantly lower the risk of SSIs. Studies have shown that administering antibiotics within a specific timeframe (e.g., within one hour before incision) can be particularly effective in reducing infection rates. Improved Postoperative Outcomes:

By preventing SSIs, prophylactic antibiotics can contribute to shorter hospital stays, reduced readmissions, and overall better patient outcomes. Cost-Effectiveness: Although antibiotic prophylaxis involves a cost, the reduction in SSIs can lead to significant cost savings by minimizing complications, extended hospital stays, and additional treatments. Considerations: Timing: The timing of antibiotic administration is crucial[19]. Administering antibiotics too early or too late can diminish their effectiveness or even increase the risk of infection. Antibiotic Selection: The choice of antibiotic should be based on the type of surgery, the patient's individual factors (allergies, comorbidities), and local antibiotic resistance patterns[20].

Potential Harms: While prophylactic antibiotics are generally safe, potential harms include antibiotic-related side effects, allergic reactions, and the development of antibiotic resistance[21].

Individualized Approach: In some cases, a more tailored approach to antibiotic prophylaxis, taking into account a patient's specific risk factors and history of infections, may be beneficial[22]. Antimicrobial Stewardship: Antimicrobial stewardship programs are essential to ensure appropriate antibiotic use, minimize resistance, and optimize patient outcomes. The use of ceftriaxone and metronidazole aligns with global and national guidelines, and their effectiveness is seen in uncomplicated cases. However, in perforated or gangrenous appendicitis, extended postoperative antibiotic use may be required[23].

Preventive Strategies for appendicitis is Timely diagnosis and surgery (within 24 hours),Pre-incision antibiotic within 60 minutes, Surgical aseptic protocol adherence And Preference for laparoscopic approach in eligible cases

CONCLUSION

The incidence of SSIs post-appendectomy can be minimized by Early surgical intervention, Strict adherence to preoperative antibiotic timing, Adequate infection control practices, tailoring antibiotic therapy based on appendicitis severity, despite small sample size, the findings highlight the critical role of prophylactic antibiotics and modifiable risk factor management in preventing SSIs

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CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

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