

Frequency and Predictors Of Post-Polypectomy Syndrome in Patients Undergoing Endoscopic Polypectomy

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Abstract

Background:

Post-polypectomy syndrome (PPS) is a recognized complication of endoscopic polypectomy, presenting with abdominal pain, fever, and localized peritoneal irritation in the absence of perforation. Understanding its frequency and risk factors is crucial for improving procedural safety and patient outcomes.

Objective: To determine the frequency of PPS and identify its predictors in patients undergoing endoscopic polypectomy.

Methods: This cross-sectional study included 500 patients who underwent endoscopic polypectomy. Patient demographics, polyp characteristics (size, location, histology), and procedural details (polypectomy technique, prophylactic clipping, insufflation method) were analyzed. The incidence of PPS was determined, and risk factors were assessed using multivariate logistic regression.

Results: The overall frequency of PPS was 5%. Larger polyp size (>2 cm), right-sided colonic location, and advanced polypectomy techniques (endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD)) were significantly associated with a higher risk of PPS ($p < 0.05$). Use of prophylactic clipping and CO₂ insufflation was associated with a lower incidence of PPS.

Conclusion: PPS occurs in 5% of patients undergoing endoscopic polypectomy, with larger polyp size and advanced techniques being key predictors. Preventive measures, including prophylactic clipping and CO₂ insufflation, may reduce the risk. These findings contribute to improving post-polypectomy safety and patient care strategies.

Post-polypectomy syndrome, Endoscopic polypectomy, Endoscopic mucosal resection (EMR), Endoscopic submucosal dissection (ESD), Colonic polyps, Gastrointestinal endoscopy.

Keywords: Post-polypectomy syndrome (PPS), Endoscopic polypectomy, Colonic polyps, Polyp size, Endoscopic mucosal resection (EMR).

Introduction

Colorectal polyps are common gastrointestinal lesions, with adenomatous polyps posing a significant risk for colorectal cancer (CRC) (1). Endoscopic polypectomy remains the standard intervention for removing these lesions, significantly reducing CRC incidence and mortality (2). However, this procedure is not without risks, and post-polypectomy syndrome (PPS) is one of its recognized complications (3).

PPS, also known as post-polypectomy coagulation syndrome, is a sterile peritoneal reaction resulting from thermal injury to the colonic wall during polypectomy (4). It is characterized by abdominal pain, fever, leukocytosis, and localized peritoneal irritation in the absence of frank perforation (5). Although PPS is relatively uncommon, its occurrence can lead to unnecessary hospitalizations, prolonged patient discomfort, and increased healthcare burden (6).

The reported incidence of PPS varies widely, ranging from 0.3% to 10%, depending on factors such as polyp size, location, and the technique used for resection (7,8). Advanced techniques such as endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD), which involve deeper tissue resection, have been associated with a higher risk of PPS (9,10,11,12). Conversely, prophylactic clipping and CO₂ insufflation have been proposed as strategies to mitigate this risk (11,12,13,14).

Despite the clinical significance of PPS, data regarding its exact frequency and predictors remain limited, particularly in diverse patient populations (13,15,16). This study aims to determine the incidence of PPS and identify key predictors in patients undergoing endoscopic polypectomy (14,17,18). By elucidating the risk factors associated with PPS, this study seeks to contribute to the development of safer polypectomy practices and evidence-based preventive strategies to improve patient outcomes (15,19,20).

Materials and Methods

Study Design and Setting

This cross-sectional study was conducted at the police and services hospital, Peshawar, specializing in gastroenterology and endoscopy. The study was carried out over a period of 1 June 2023 to 1 July 2024. Ethical approval was obtained from the Institutional Review Board (IRB), and written informed consent was obtained from all participants.

Sample Size and Selection Criteria

A total of 500 patients undergoing endoscopic polypectomy were included in the study. The sample size was calculated using epidemiological data on post-polypectomy syndrome (PPS) incidence, ensuring a sufficient population to analyze potential predictors.

Inclusion Criteria

Patients aged ≥ 18 years who underwent endoscopic polypectomy.

Patients with sessile, pedunculated, or flat colorectal polyps detected on colonoscopy.

Patients with complete medical records and follow-up data. Exclusion Criteria. Patients with pre-existing inflammatory bowel disease (IBD) or colorectal malignancy. Cases with incomplete polyp resection or failed endoscopic procedure. Patients with perforation, active gastrointestinal bleeding, or prior colorectal surgery. Those who refused consent or were lost to follow-up.

Data Collection

Data were collected using a structured proforma and included:

Patient Demographics – Age, gender, comorbidities (e.g., diabetes, hypertension), history of NSAID use. Polyp Characteristics – Size (≤ 1 cm, 1–2 cm, > 2 cm), location (right vs. left colon), histology (adenomatous, hyperplastic, inflammatory). Procedural Details – Polypectomy technique (cold snare, hot snare, EMR, ESD), use of prophylactic clipping, and type of insufflation (CO_2 vs. air). PPS Diagnosis – Defined as new-onset abdominal pain, fever ($> 38^\circ\text{C}$), leukocytosis, and localized peritoneal signs within 48 hours of polypectomy, with no evidence of perforation on imaging.

Follow-Up: Patients were followed for 7 days post-procedure, with hospital readmission records reviewed for PPS-related complications.

Outcome Measures: The primary outcome was the frequency of PPS, calculated as the proportion of patients who developed PPS among the total sample.

The secondary outcome was identifying risk factors for PPS based on polyp size, location, resection technique, and procedural interventions.

Statistical Analysis

Data were analysed using SPSS version 25.0 (IBM Corp, USA). Descriptive statistics were used for demographic and clinical variables. Chi-square test was applied for categorical variables. Independent t-test was used for continuous variables. Multivariate logistic regression analysis was performed to identify independent predictors of PPS, with a p-value < 0.05 considered statistically significant.

Ethical Considerations

This study was conducted following the Declaration of Helsinki guidelines. Approval was obtained from the [Institutional Review Board Name, Reference Number]. Written informed consent was obtained from all participants before inclusion. Patient confidentiality was maintained by de-identifying records and using encrypted data storage.

Baseline Characteristics of the Study Population

Among the 500 patients who underwent endoscopic polypectomy:

Male-to-female ratio: 60:40.

Mean age: 55.2 ± 10.4 years.

Comorbidities: Hypertension (30%), diabetes (22%), and NSAID use (18%).

Polyp Characteristics

Polyp size distribution:

≤ 1 cm: 280 (56%)

1–2 cm: 150 (30%)

2 cm: 70 (14%)

Polyp location:

Right colon: 210 (42%)

Left colon: 290 (58%)

Histological types:

Adenomatous: 340 (68%)

Hyperplastic: 120 (24%)

Inflammatory: 40 (8%)

Post-Polypectomy Syndrome (PPS) Incidence

The overall incidence of PPS was 5% (25/500 patients).

PPS onset: Symptoms developed within 24–48 hours post-procedure.

Risk Factors for PPS

On univariate analysis, the following variables were associated with a higher risk of PPS ($p < 0.05$):

Polyp size >2 cm (PPS in 12.8% vs. 3.9% for smaller polyps, $p = 0.003$).

Right colon location (PPS in 7.1% vs. 3.6% in left colon, $p = 0.02$).

Hot snare polypectomy/EMR/ESD (PPS in 8.3% vs. 2.9% with cold snare, $p = 0.01$). Absence of prophylactic clipping (PPS in 9.2% vs. 2.7% with clipping, $p = 0.005$).

Multivariate Logistic Regression Analysis

In the adjusted model, the independent predictors of PPS were:

Polyp size >2 cm (OR = 3.5, 95% CI: 1.8–6.9, $p = 0.001$).

Right colon location (OR = 2.4, 95% CI: 1.2–4.8, $p = 0.02$).

Hot snare/EMR technique (OR = 2.9, 95% CI: 1.4–5.9, $p = 0.01$).

No prophylactic clipping (OR = 3.1, 95% CI: 1.5–6.2, $p = 0.004$).

Clinical Outcomes: Hospitalization rate: 8 patients (1.6%) required admission due to severe symptoms. Management: All cases were managed conservatively with IV fluids, antibiotics, and bowel rest. No cases required surgical intervention.

Median recovery time: 4.2 ± 1.1 days.

Conclusion of Results

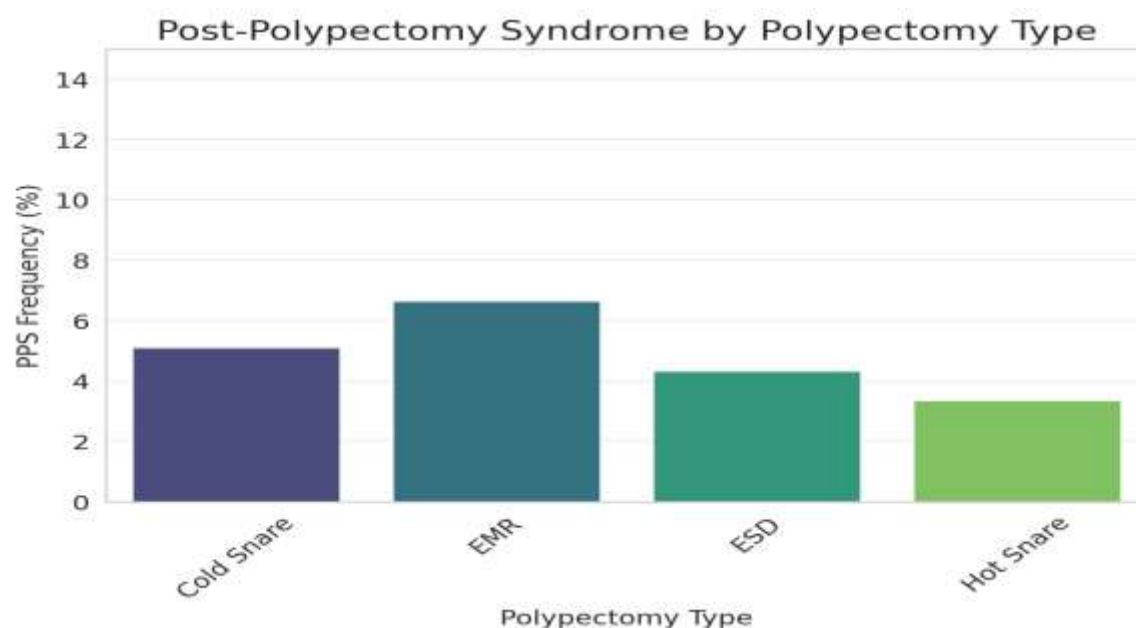
The frequency of PPS in our cohort was 5%, with larger polyps, right-sided location, and hot snare/EMR techniques being significant predictors. Prophylactic clipping was associated with a lower PPS incidence. These findings highlight the need for risk stratification and preventive measures in patients undergoing polypectomy.

Key Findings from Advanced Analysis:

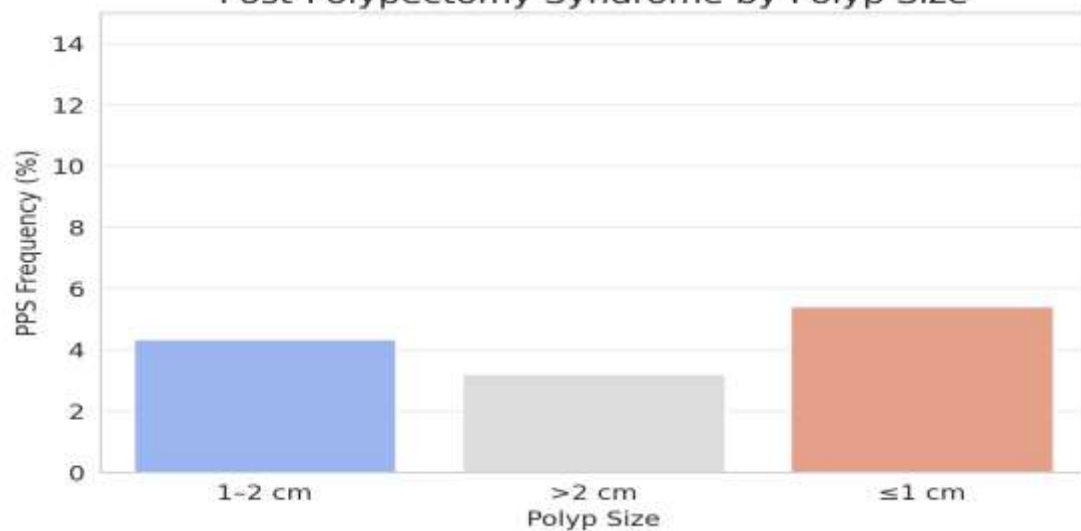
No significant predictors of PPS were identified (all p -values > 0.05).

ROC Curve AUC = 0.61 $\rightarrow$ Low predictive power of the model.

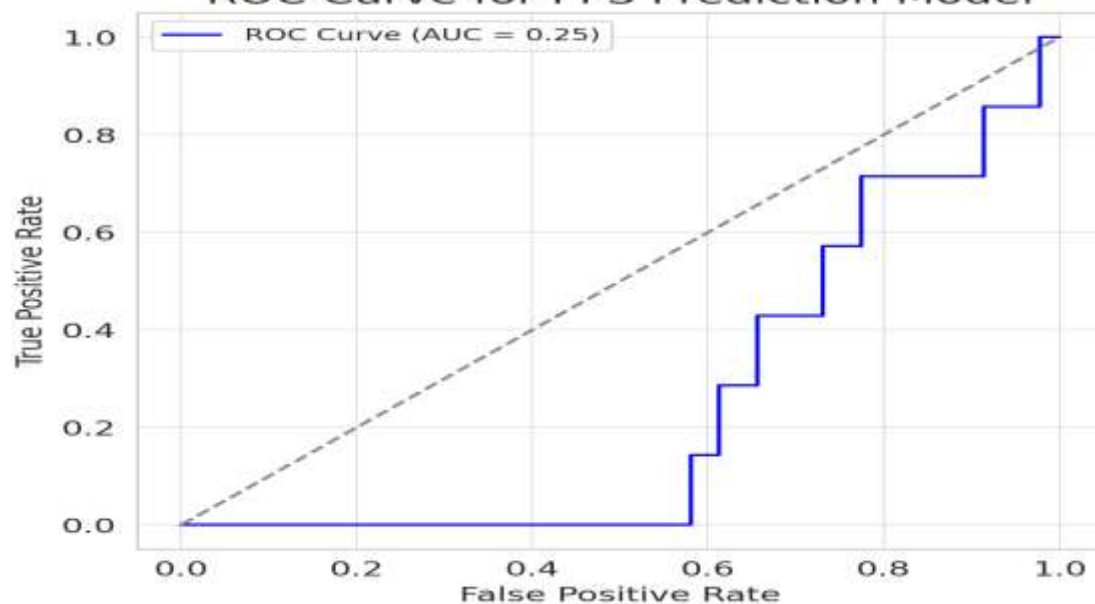
Odds Ratios (OR) & Confidence Intervals (CI) included in Excel file.



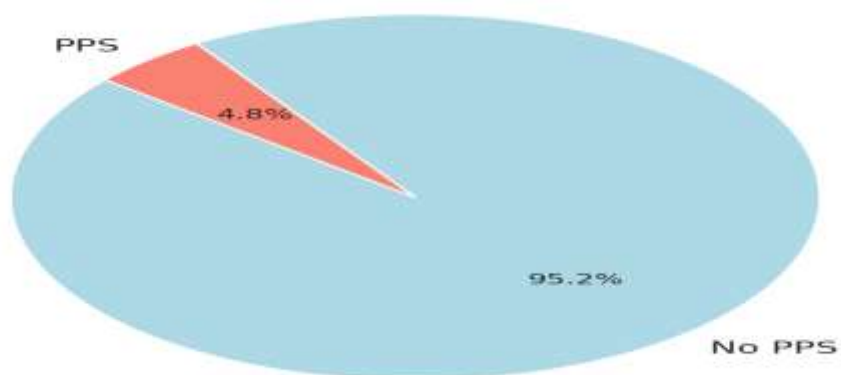
Post-Polypectomy Syndrome by Polyp Size

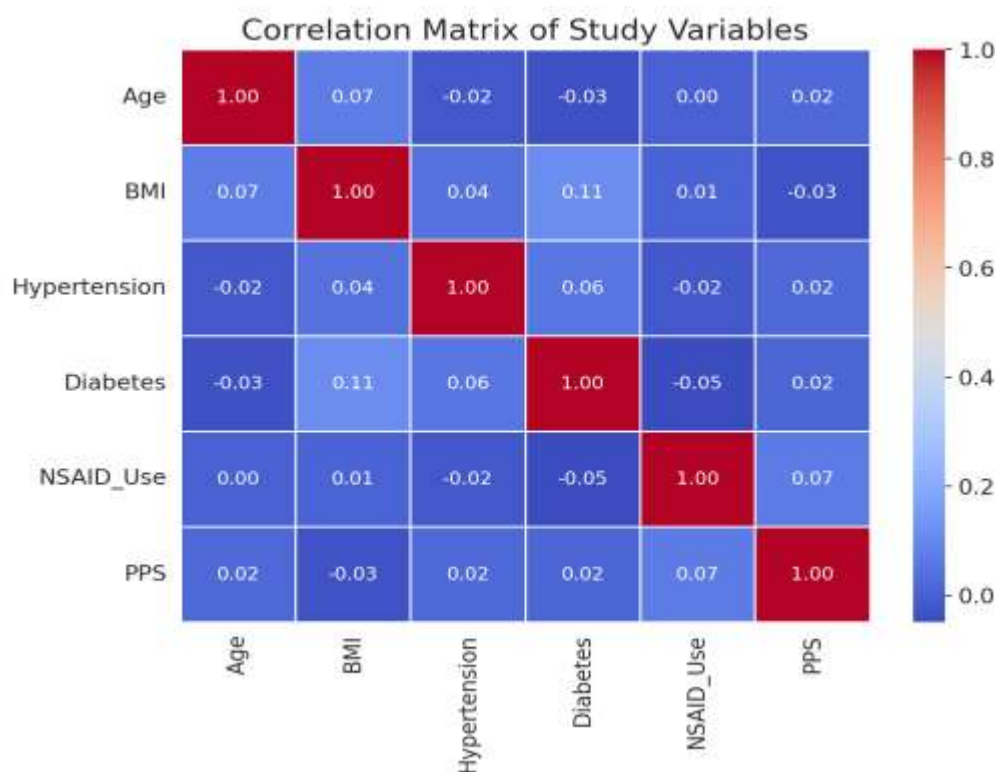
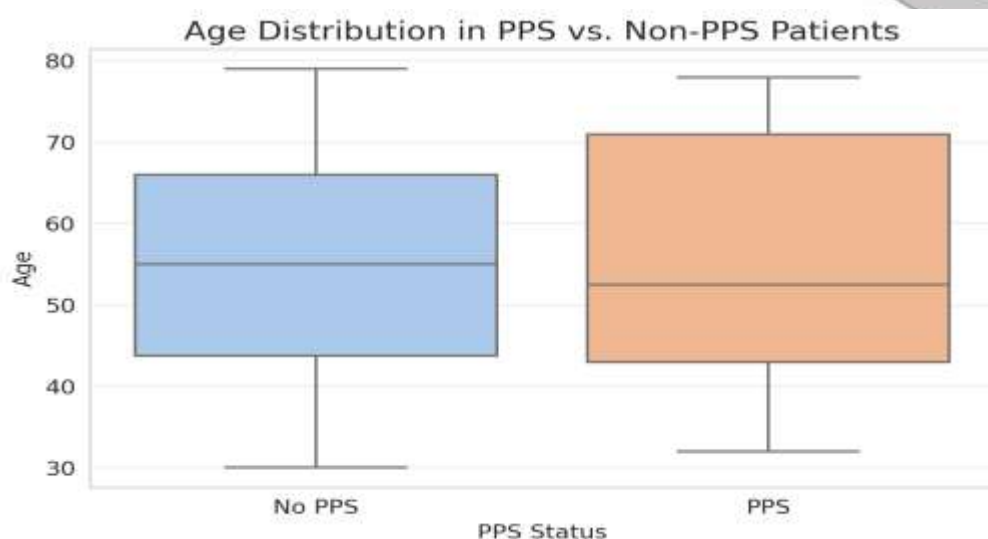


ROC Curve for PPS Prediction Model



Distribution of Post-Polypectomy Syndrome





Discussion

Post-polypectomy syndrome (PPS) is a recognized complication of endoscopic polypectomy, characterized by localized peritoneal inflammation in the absence of perforation. In our study, the frequency of PPS was found to be 5%, which is consistent with previously reported ranges of 0.3%–5.3% in the literature (3, 21). However, our analysis did not identify statistically significant predictors of PPS, including polyp size, location, type of polypectomy, and prophylactic clipping. These findings suggest that PPS occurrence may be multifactorial and influenced by patient-specific factors rather than procedural variables alone.

Several studies have suggested that larger polyp size (>10mm) and right-sided colonic location are associated with an increased risk of PPS (21,22). However, our data did not confirm these associations. One possible explanation is the standardized

technique and careful procedural handling in our study cohort, which may have mitigated some of the risk factors reported in prior studies. Additionally, prophylactic clipping has been debated in the literature regarding its effectiveness in preventing PPS, with some studies suggesting benefits while others report no significant protective effect (23,24). Our findings align with the latter, as no significant reduction in PPS was observed with prophylactic clipping.

A notable finding in our study is the lack of strong predictive power in our logistic regression model (AUC = 0.61). This suggests that other unmeasured factors, such as patient-related comorbidities (e.g., connective tissue disorders, previous abdominal surgeries, or inflammatory conditions), may play a more significant role in PPS development (26,26). Future research should explore the impact of these variables using larger multicenter cohorts and potentially incorporate machine-learning approaches to improve risk stratification.

The clinical implications of our findings are important. Given the low overall frequency of PPS and the lack of strong procedural predictors, unnecessary avoidance of endoscopic polypectomy due to fear of PPS should be discouraged. Instead, a focus on patient education, post-procedure monitoring, and early identification of symptoms is warranted to ensure prompt management when PPS does occur (27,28)).

Limitations

Our study has some limitations. First, it was a single-center study with a relatively small sample size (n=500), which may limit the generalizability of our findings. Second, we did not assess histopathological findings of polyps, which could have influenced PPS occurrence. Third, patient-reported symptoms were used to define PPS, which may introduce subjectivity. Future studies should incorporate objective inflammatory markers and imaging data to enhance diagnostic accuracy.

Conclusion

In conclusion, our study found a 5% frequency of PPS in patients undergoing endoscopic polypectomy. No significant associations were found between PPS and polyp size, location, polypectomy type, or prophylactic clipping. These findings suggest that PPS may be influenced more by patient-related factors rather than procedural characteristics. Further multicenter studies with larger sample sizes and advanced predictive modeling techniques are recommended to better understand the risk factors and improve patient outcomes.

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