Original Article

Outcome of Endoscopic Mucosal Resection of Flat and Sessile Colonic Polyps

Hashmatullah Khan, Mushtaq Ahmad, Hamid Ullah, Rafi Ullah, Mujahid Aslam and Asfandyar Khan

ABSTRACT

Objective: The aim of our study was to prospectively evaluate the success, complications and recurrence following EMR of flat colonic polyps.

Study Design: prospective observational study

Place and Duration of Study: This study was conducted at the Lady Reading Hospital, Peshawar, Pakistan, from January 2014 to December 2016.

Methods: The following ethical committee approval. Consecutive patients meeting the inclusion criteria were enrolled, and demographic data were collected.

Results: A total of 243 polyps were resected in 211 patients. 23 patients had more than one polyp. Mean age was 45±13 years.En block resection was possible in 240 patients (98.8%). Bleeding immediately after resection was seen in 6 patients (2.84%) while delayed bleeding after 24 hours after the procedure occurred in 8 patients (3.8%). Perforation occurred in one patient. The overall recurrence rate was approximately 9% (18/205) during a mean follow-up of 12 months.

Conclusion: Endoscopic mucosal resection is an effective and safe outpatient procedure for sessile or flat colonic polyps.

Key Words: Endoscopic Mucosal Resection, sessile Polyps, saline-assisted polypectomy

Citation of article: Hashmatullah Khan, Ahmad M, Hamid Ullah, Rafi Ullah, Aslam M, Khan A. Outcome of Endoscopic Mucosal Resection of Flat and Sessile Colonic Polyps. Med Forum 2024;35(12):164-167. doi:10.60110/medforum.351236.

INTRODUCTION

Sessile or flat lesions of gastrointestinal tract especially when large in size are challenging to be resected by using conventional snare polypectomy[1]. Therefore, surgery is still the primary management technique in most centers throughout the world[2]. However, in centers with expertise, endoscopic mucosal resection (EMR) is now a reasonable alternative option to surgery. It is associated with high success rates and eliminates the requirement of surgical intervention thus avoiding the morbidity and mortality associated with surgery[2, 3].EMR is commonly utilized for neoplasms less than 2 cm, but the introduction of submucosal fluid injection has extended the range of endoscopically resectable polyps remarkably therefore, even larger neoplasms can be removed as piecemeal[4].

Department of Gastroenterology, Lady Reading Hospital Peshawar.

Correspondence: Hamid Ullah, Department of Gastroenterology, Lady Reading Hospital Peshawar
Contact No: 0312 9565134
Email: drhamidullah222@gmail.com

Received: January, 2024
Accepted: February-March, 2024
Printed: October, 2024

Gastroenterologists practice a few techniques of EMR. These techniques incorporate ligation, cap and injection assisted EMR. Injection-assisted endoscopic mucosal resection, also called saline-assisted polypectomy, is the most commonly utilized procedure for flat polyps of the colon. This procedure was initially reported in 1955. It involves a submucosal injection of a solution under the lesion thus lifting the lesion and providing a safety pad. It facilitates resection of the neoplasms and shields against electrocautry induced or mechanical injury to deeper layers of GI tract wall[3,5]. Improvement in endoscopic skills, increased awareness and enhanced imaging result in more frequent identification of flat and sessile lesions. A significant proportion of these neoplasms defies endoscopic resection by the conventional snare polypectomy procedure and may require EMR. The EMR is associated with low complication rate[6]. Bleeding is the most frequently encountered adverse event[6, 7] while perforation is the second most common complication[7,8]. Recurrence following a successful EMR is another risk associated with this modality[9].

The aim of the study was to prospectively evaluate the success, complications and recurrence following EMR of flat and sessile colonic polyps.

METHODS

Inclusion Criteria:

1. Patients with sessile polyps <2 cm and no evidence of malignancy on initial biopsy.

Exclusion Criteria:

1. Patients with malignancy, pedunculated polyps, polyps >2 cm, or non-lifting polyps.
2. Polyps in the context of active inflammatory bowel disease.

Definitions:

- Sessile Polyp: Protruding colonic lesion without a stalk (Paris classification type 0-Is)[11].
- Flat polyp: lesions that are at the level of the mucosa (Paris classification type 0-IIb)[11].
- Complete Endoscopic Resection: Normal mucosal margins without neoplastic cells in the excision base.

Procedure: After informed consent, EMR was performed under conscious sedation by an experienced gastroenterologist using a high-definition colonoscope (CV180 Exera, Olympus, Japan). Endoscopic data, including polyp number, size, and location. Polyp diameter was measured against open biopsy forceps.

A pre-mixed submucosal injection solution (1 ml epinephrine [1:10,000], 3 ml indigo carmine, and 100 ml normal saline) was used to lift lesions. The lifted lesion was resected with a snare using endocut mode (120 W). En bloc resection was attempted; piecemeal resection was applied if necessary. Residual tissue was removed using the same technique or adjuvant argon plasma coagulation (APC). Mucosal defects were closed with metal clips.

Resected specimens were retrieved using snares, Roth nets, suction, or forceps and analyzed by an experienced pathologist for histological classification.

Post-Procedure Care: Patients were monitored for complications such as bleeding or perforation, managed with APC or hemostatic clips as needed. Delayed bleeding was defined as fresh rectal bleeding within 24 hours post-procedure.

Follow-Up and Recurrence Management: Surveillance colonoscopy was performed at 3, 6, and 12 months. Recurrence, defined as adenomatous or polypoid tissue at the resection site, was treated with repeat EMR or APC.

Statistical Analysis: Continuous variables were expressed as mean ± standard deviation, and categorical variables as frequencies (%). Statistical analyses were performed using SPSS version 17.0 (SPSS Inc, Chicago, IL).

RESULTS

A total of 243 polyps were resected from 211 patients, with 23 patients having multiple polyps. The mean age of the patients was 45 ± 13 years, and more than 70% were male (table 1). The mean polyp size was 13 ± 6.7 mm, ranging from 6 to 20 mm (table 2). The left colon was the most common site, accounting for over 50% of polyps (figure 1). Among the 240 retrieved polyps, the most frequent histological type was tubular adenoma (50%), followed by hyperplastic polyps (25%) (figure 2).

Procedure Outcomes

En bloc resection was achieved in 98.8% (240/243) of cases, with only three polyps requiring piecemeal resection (table 3).

Immediate post-resection bleeding occurred in 6 patients (2.4%), while delayed bleeding (>24 hours) was observed in 8 patients (3.2%). Perforation was noted in a single case (figure 4).

Surveillance and Recurrence (figure 5)

At 3 months, 205 patients underwent follow-up colonoscopy. Recurrence of polypoidal or adenomatous tissue was seen in 10 patients (4.8%). Six patients were unavailable for follow-up.

At 6 months, 180 patients remained in follow-up, with 5 patients (2.7%) showing recurrence.

By 12 months, 140 patients were available for surveillance, with a recurrence rate of 2.14% (n=3).

Table No. 1: Age and gender distribution

Parameter	Value
Total no of patients	211
Age	45 ± 13years
Male	150 (71.09%)
Female	61 (28.91%)

Table No. 2: Polyp characteristics

Parameter	Value
Total no of polyps	243
Polyp Size (Mean ± SD)	13 ± 6.7mm
Range	6–20 mm

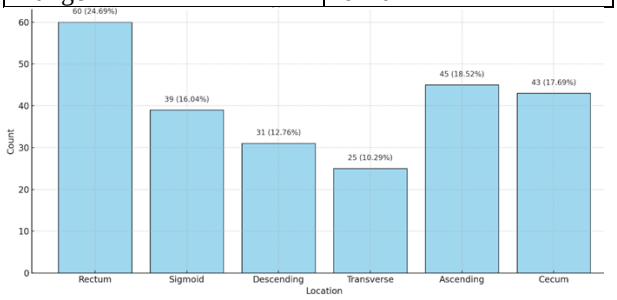

Figure No. 1: Polyp Location Distribution

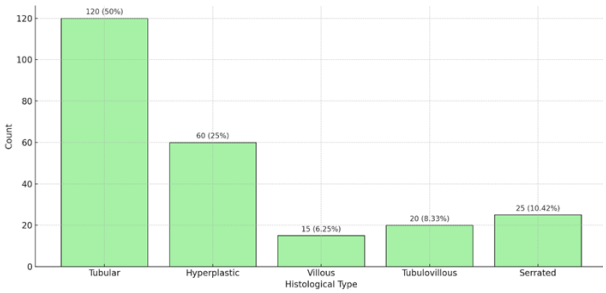

Figure No. 2: Polyp Histology Disribution

Table No. 3: Outcome of EMR

Parameter	Counts (%)
En block resection	240 (98.8)
Piecemeal resection	3 (1.2)
Complications	Figure 3
Post EMR Recurrence	Figure 4

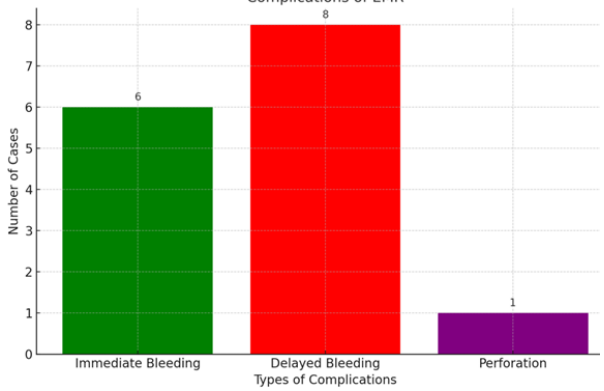

Figure No. 3: Complications of EMR

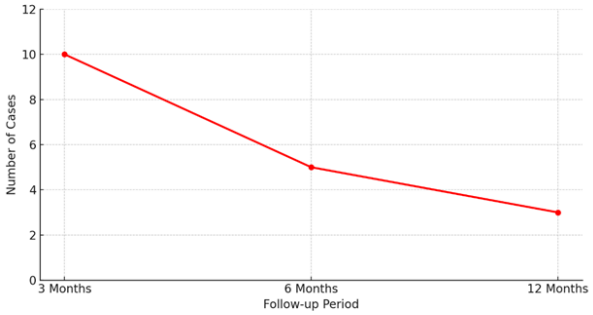

Figure No. 4: Recurrence Post-EMR

DISCUSSION

Complete resection of flat and sessile colonic polyps through traditional methods, such as snare polypectomy, is often challenging and carries a substantial risk of complications, particularly perforation[1]. Endoscopic mucosal resection (EMR), however, has emerged as a reliable and safer alternative, ensuring complete removal in most cases[3]. In our study, we achieved an impressive en bloc resection rate of 98.8%. By comparison, Moss A et al. and Laongcraft-Wheaten G et al. reported en bloc resection rates of 89.2% and 90%, respectively[11, 12]. The slightly lower rates in their studies can be attributed to the exclusive inclusion of large sessile polyps, which are technically more demanding. Complications associated with EMR are well-documented in the literature, with bleeding (1–45%), perforation (0.7–4%), and post-polypectomy syndrome (0–7.6%) being the most frequently reported[13]. In our study, complications were minimal, with only 2.8% (n=6) of patients experiencing immediate bleeding and 3.8% (n=8) reporting delayed bleeding. These rates compare favorably with those reported by Moss A et al. (2.9%) and Laongcraft-Wheaten G et al. (2% immediate, 4% delayed)[11, 12]. Notably, all bleeding episodes in our study were successfully managed endoscopically.

Perforation, a rare but serious complication, occurred in one case (0.5%) in our cohort, necessitating surgical intervention. This rate is significantly lower than the 1.3% reported by Moss A et al.,[11] and consistent with the absence of perforation noted in Conio M et al.'s study[14]. The use of submucosal injection solutions, such as normal saline with epinephrine (1:10,000) and indigo carmine, proved to be both safe and effective in minimizing such risks.

Recurrence remains a concern after EMR, especially in cases of large colonic polyps. In our study, the recurrence rate was 9% (18/205) over a mean follow-up of 12 months. This is lower than the rates reported by Moss A et al. (17%) and Laongcraft-Wheaten G et al. (20%).[11,12] Differences in recurrence rates across studies may stem from variations in polyp size, patient selection, and follow-up duration[15]. Kunihiro et al., for example, observed higher recurrence rates with electrocautery snare resection, underscoring the importance of technique in determining outcomes[16].

While our study highlights the safety and efficacy of EMR, it is important to acknowledge its limitations. The inclusion of relatively small polyps and a modest sample size limits the generalizability of our findings. Further multicenter research involving larger patient cohorts and polyps of greater size is essential to validate our results and refine EMR techniques. .

CONCLUSION

Our study highlights that when performed by skilled hands, EMR is a highly safe and effective procedure, making it the gold standard for managing flat and sessile colonic polyps. This technique not only ensures superior outcomes but also sets a benchmark for minimally invasive treatment options.

Limitations:

The study's primary limitation was its relatively small sample size and single-center design, which may limit the generalizability of the findings. Additionally, the inclusion of polyps ≤2 cm restricted the exploration of EMR outcomes for larger or more complex lesions. The short follow-up duration may also underestimate long-term recurrence rates.

Future Directions: Future research should focus on multicenter studies with larger cohorts and longer follow-up periods to validate these findings. Exploring advanced imaging techniques, novel submucosal injection agents, and refined resection methods can enhance EMR outcomes and reduce complications. Studies targeting larger polyps could further expand the procedure's applicability and success rates.

Author's Contribution:

Concept & Design or acquisition of analysis or	Hashmatullah Khan, Mushtaq Ahmad

interpretation of data:	
Drafting or Revising Critically:	Hamid Ullah, Rafi Ullah, Mujahid Aslam, Asfandyar Khan
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None
Ethical Approval: No.0455/2013 Dated 12.09.2023

REFERENCES

1. Jones MW, Henning W. Endoscopic Combined Snare-Forceps Technique for Removing Flat Sessile Polyps. Spartan Med Res J 2017;19;2(2):6349
2. Huang E, Sarin A. Colonic Polyps: Treatment. Clin Colon Rectal Surg 2016;29(4):306–14
3. Hwang JA, Konda V, Barham K. Dayyeh Chauhan SS, Enestvedt BK et al. Endoscopic mucosal resection. Gastrointest Endosc 2015;82(2):2015-26.
4. Poppers DM, Haber GB. Endoscopic mucosal resection of colonic lesions: current applications and future prospects. Med Clin North Am 2008;92(3):687-705
5. Ponchon T. Endoscopic mucosal resection. J ClinGastroenterol 2001;32:6-10.
6. Ferrara F, Luigiano C, Ghersi S, Fabbri C, Bassi M, Landi P, Polifemo AM. et al. Efficacy, safety and outcomes of 'inject and cut' endoscopic mucosal resection for large sessile and flat colorectal polyps. Digestion 2010;82:213-20.
7. Lim TR, Mahesh V, Singh S, Tan BH, Elsadig M, Radhakrishnan N, Conlong P, Babbs C, George R. Endoscopic mucosal resection of colorectal polyps in typical UK hospitals. World J Gastroent 2010;16:5324-8.
8. Brooker JC, Saunders BP, Shah SG, Williams CB. Endoscopic resection of large sessile colonic polyps by specialist and non-specialist endoscopists Br J Surg 2002;89:1020-24.
9. Arebi N, Swain D, Suzuki N, Fraser C, Price A, Saunders BP. Endoscopic mucosal resection of 161 cases of large sessile or flat colorectal polyps. Scand J Gastroenterol 2007;42:859-66.
10. The Paris endoscopic classification of superficial neoplastic lesions: esophagus, stomach, and coloncolon. Gastrointest Endosc 2002;58:3–43.
11. Moss A, Bourke MJ, Williams SJ, et al. Endoscopic mucosal resection outcomes and prediction of submucosal cancer from advanced colonic mucosal neoplasia. Gastroenterol 2011;140: 1909-18.
12. Longcroft-Wheaton G, Mead R, Duku M, Bhandari P. Endoscopic mucosal resection of colonic polyps: a large prospective single centre series. Gut 2011;60: 14-15.
13. Raju GS. Complications of endoscopic mucosal resection and endoscopic submucosal dissection. 2011;13(1),91-94.
14. Conio M, Repici A, Blanchi JDS, Dumas R, Filiberti R. Gastrointestinal Endoscopy EMR of large sessile colorectal polyps. Gastrointest Endosc 2004;60 (2):234-41.
15. Brooker JC, Saunders BP, Shah SG, et al. Treatment with argon plasma coagulation reduces recurrence after piecemeal resection of large sessile colonic polyps: a randomized trial and recommendations. Gastrointest Endosc 2002; 55:371–375.
16. Kunihiro, Tanaka S, Haruma K, et al .Electrocautery snare resection stimulates cellular proliferation of residual colorectal tumor: an increasing gene expression related to tumor growth. Dis Colon Rectum 2000;43:1107 -15..