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POST-SURGICAL OUTCOMES AMONG HAEMORRHOIDECTOMY PATIENTS ON ORAL METRONIDAZOLE IN A TERTIARY CARE HOSPITAL, KERALA, INDIA

Dissertation submitted to the

Kerala University of Health Sciences, Thrissur

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of the requirements for the degree of

M.S in General Surgery

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STRUCTURED ABSTRACT

INTRODUCTION: Hemorrhoids are vascular cushions in the anal canal that acts as a comfortable barrier for the anus. Their exact cause is not fully understood, but current theories suggest that deterioration of these cushions leads to hemorrhoid formation. Excisional hemorrhoidectomy is a common and effective treatment for severe cases. Postoperative symptoms include bleeding, swelling, discharge, anal itching, and pain, with pain being the most immediate and distressing. Pain management is crucial due to the complex and subjective nature of pain, influenced by factors such as excessive tissue removal and infections. While various treatments have been tested, metronidazole has been shown to reduce postoperative pain but is not widely used.

METHODOLOGY: The study included all patients admitted to the Surgery ward at Government Medical College, Kozhikode, with grade 2, 3, and 4 uncomplicated hemorrhoids who were scheduled for open hemorrhoidectomy (Milligan-Morgan procedure). A total 108 patients were included in the study and divided into two groups. Postoperative pain assessments were conducted at 6, 12, and 24 hours on Postoperative Day 0 (POD-0), and again on days 4, 7, and 14 using VAS scores. The study also recorded the timing of the first bowel movement after surgery, the pain associated with it, and the need for additional analgesics.

RESULTS: Descriptive statistics was used, presenting data as the mean with standard deviation or the median with interquartile range (IQR) for continuous variables, and as frequencies and percentages for categorical variables. A p-value of less than 0.05 is considered statistically significant.

On postoperative day 4, patients showed a significant decrease in VAS scores. However, there was no statistically significant reduction in VAS scores on postoperative days 0, 7, and 14. While patients in the metronidazole group experienced earlier bowel movements, this difference, was not statistically significant. Similarly, although fewer patients of the metronidazole group required additional postoperative analgesia, the difference between the two groups was not statistically significant.

CONCLUSION: In post-hemorrhoidectomy patients, the use of oral metronidazole is linked to a significant reduction in pain on postoperative Day 4. However, no significant improvements were observed in other outcomes for patients receiving oral metronidazole.

KEY WORDS:

Open Hemorrhoidectomy, VAS Score

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INTRODUCTION

Hemorrhoids are vascular structures located in the anal canal that serve as cushions to help maintain the closure of the anus. When these cushions become problematic and cause symptoms, it is referred to as hemorrhoidal disease.(1) It is estimated that between 50% and 66% of people will experience hemorrhoid issues at some point in their lives. (2) Among those over 40 years old, approximately 50% have some form of hemorrhoidal disease, with Grade I hemorrhoids being the most frequently observed. The incidence of hemorrhoidal problems is similar in both men and women.(3)

The precise mechanisms behind hemorrhoidal disease are not yet fully understood. The outdated idea that hemorrhoids arise from varicose veins in the anal canal has been replaced by the notion that the condition results from the degeneration of the anal cushions. Hemorrhoids are categorized based on their position relative to the pectinate line into external, internal, or mixed types.(1,4) External hemorrhoids originate from ectoderm, while internal ones develop from endoderm. Several factors are believed to contribute to hemorrhoid formation, including low-fiber diets, straining, and constipation. A diet low in fiber leads to smaller, harder stools that cause straining during bowel movements, which can impede venous return and result in hemorrhoidal congestion. Additionally, prolonged sitting on the toilet may decrease venous return in the perianal region, leading to further congestion of the hemorrhoids.(5)

Around 40% of people with pathological hemorrhoids experience no significant symptoms. The most common clinical sign is painless rectal bleeding during bowel movements. Hemorrhoids are generally diagnosed through a physical exam, where inspecting the anus and surrounding area can confirm the presence of external hemorrhoids and prolapsed internal hemorrhoids, which may or may not be thrombosed. A comprehensive examination, including a digital rectal exam to check for polyps, tumors, enlarged prostate, or abscesses, may need to be performed under sedation due to discomfort. The distinction between external and internal hemorrhoids is based on their location relative to the dentate line.(6)

Conservative treatment for hemorrhoids generally includes increasing dietary fiber, staying well-hydrated with plenty of water and fluids, using nonsteroidal anti-inflammatory drugs (NSAIDs), taking sitz baths, and getting ample rest. While topical treatments and suppositories are available, they are usually less effective, particularly for more advanced cases. For severe hemorrhoids, surgical options are considered. Rubber band ligation is commonly used for grades 1 to 3 hemorrhoids. Sclerotherapy is about 70% effective. Other methods, such as electrocautery, infrared coagulation, laser surgery, or cryosurgery, can also be beneficial. In the most severe cases, excisional hemorrhoidectomy is often the most effective treatment. (1)

Following a hemorrhoidectomy, common symptoms include bleeding, swelling, foul-smelling discharge, anal itching, and pain, with pain being the first and most distressing symptom for patients. Despite being an elective procedure for treating prolapsed or thrombosed

hemorrhoids, pain remains a frequent postoperative issue, typically lasting 2 to 4 weeks. The intensity of pain can be affected by factors such as excessive removal of tissue, inadequate wound healing, and infections worsened by constipation, diarrhea, or fecal impaction. Pain is a major factor that may lead patients to delay or avoid surgery, potentially resulting in worse long-term outcomes. Other complications related to the surgery and associated pain include urinary retention and constipation. (8,9)

Effective management of postoperative pain is essential, especially in patients where pain stems from surgical trauma and bacterial infection of the wound. Pain is a complex and subjective experience, varying significantly among individuals due to differences in pain sensitivity. Various topical and systemic medications have been studied for pain relief, but no single treatment is universally ideal. Although metronidazole has been found to reduce postoperative pain, it is not commonly used for this purpose.

RESEARCH QUESTION

What is the effect of oral metronidazole on post-surgical outcomes in patients undergoing hemorrhoidectomy at a tertiary care hospital in northern Kerala, India?

AIMS AND OBJECTIVE

AIMS

1. To assess the post-surgical outcomes among haemorrhoidectomy patients on oral metronidazole in a tertiary care hospital, in northern Kerala, India

OBJECTIVES

1. Assess and compare pain levels at specific intervals (day 0, day 4, day 7, and day 14) between the metronidazole group and the control group.
2. Compare the incidence and types of postoperative complications between patients receiving oral metronidazole and those receiving standard care.
3. Investigate the impact of oral metronidazole on the time to the first bowel motion after surgery.
4. Evaluate the frequency of additional analgesic use required in both the metronidazole and control groups.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

The incidence of moderate to severe pain following conventional hemorrhoidectomy reported in the literature could be as high as 65% as was seen in a study by Lohsiriwat D et al. (2)

Opiate analgesia, local anaesthetic agents, GTN and calcium channel blockers, together with botulinum toxin are useful postoperative adjuncts for postoperative pain.

The patient is advised to take two warm baths daily and to use a bulk laxative twice a day, along with appropriate pain relief. A 5-day course of oral metronidazole may help alleviate pain. Dry dressings are applied as needed, with a sterile sanitary towel often being the preferred option. (53)

Di Re A et al.(10) conducted a systematic review focusing on pain scores (using the visual analogue scale, VAS) following open hemorrhoidectomy. Secondary outcomes included the time needed to resume normal activities, additional use of analgesics, and postoperative complications. Out of 14 reviewed randomized controlled trials (RCTs), 4 met the inclusion criteria and were selected for analysis. These studies involved 336 participants, with 169 assigned to metronidazole and 167 to a control group. The review found a significant reduction in VAS scores at all time points, with the greatest decrease observed on day 5 after surgery (mean difference, -2.28; 95% confidence interval, -2.49 to -2.08; $P < 0.001$). There was no significant difference in complication rates ($P = 0.13$). According to the Cochrane Risk of Bias Tool, 3 out of 4 studies had a risk of bias. While metronidazole may reduce pain, the evidence from RCTs is insufficient to make a strong recommendation, and further RCTs are needed.

Ebied EF et al[11] conducted a study to assess the efficacy of oral metronidazole administration in management of post haemorrhoidectomy pain. 80 patients presented to the General Surgery Clinic and met the inclusion criteria were divided into two groups 40 in each group. When the results of both groups were put in a comparison, it showed that group A had a significant lower pain values in day 1 and 3 than group B but both groups ($p=0.043$, $p= 0.004$) results were equivocal in day seven with no significant difference($p=0.268$). Also results showed that group B needed more analgesics than group A and that confirms that metronidazole decrease pain experienced by the patients after the operation and decreased their need for analgesics($p=0.043$). Otherwise, both groups show no significant differences according to the time of first bowel movement ($p=0.967$. Oral Metronidazole administration post haemorrhoidectomy significantly decrease the postoperative pain and decrease the need for more analgesics with no significant effect on the time of the first bowel movement.

Xia W[12] et al conducted a systematic review to investigate the effect of metronidazole on post-operative pain after excisional haemorrhoidectomy. Literatures with primary outcome operative pain reported as visual analogue score (VAS) and secondary outcomes analgesia use, complications and time to return to normal activity. Nine randomized controlled trials including

523 patients were included in the final analysis. Five studies used oral administration and four used topical. Meta-analysis showed that post-operative VAS of patients receiving metronidazole by either route was significantly less than those in comparison groups. VAS means decreased at all the time points for both oral and topical metronidazole. Topical and oral routes of administration were not compared in any study. There was no increase in complication rates and return to normal activity was significantly earlier for patients receiving metronidazole (−4.49 days; 95% confidence interval [−7.70, −1.28]; $P = 0.006$). Both topical and oral metronidazole reduce post-operative pain without an increase in complication rates and result in an earlier return to normal activity. Further work is required to determine which the optimum route of administration is.

Lyons NJ[13] et al conducted a systematic review and meta-analysis which demonstrated a significant reduction in postoperative pain for patients treated with metronidazole with a reduced mean difference for the metronidazole group on day 1 of −1.42 (95% CI: −2.14 to −0.69, $P = 0.0001$), on day 2 of −1.43 (95% CI: −2.45 to −0.40, $P = 0.006$) and on day 7 of −2.40 (95% CI: −3.10 to −1.71, $P < 0.00001$). Pain on first defaecation was likewise reduced with a mean difference of −1.38 (95% CI: −2.15 to −0.60, $P = 0.0005$). The study concluded that Metronidazole is a cheap, safe and effective intervention for reducing postoperative pain following conventional haemorrhoidectomy.

Wanis KN et al. (14) conducted a study to assess the effect of oral metronidazole on patient-reported pain after hemorrhoidectomy. The analysis included randomized controlled trials involving adults who underwent surgical hemorrhoidectomy. Participants in the active intervention group received oral metronidazole postoperatively, while the control group received either a placebo or standard care. Postoperative pain was evaluated for at least 3 days after surgery. Patients who took oral metronidazole reported significantly lower pain scores on postoperative day 1 (standardized mean difference, –0.87 ± 0.44; 95% CI, –1.73 to –0.015; p = 0.046; n = 4) and day 4 (standardized mean difference, –1.43 ± 0.71; 95% CI, –2.83 to –0.037; p = 0.044; n = 3). Additionally, metronidazole use was linked to a significantly shorter time to return to normal activities (standardized mean difference, –0.76 ± 0.34; 95% CI, –1.43 to –0.088, p = 0.027). However, these benefits were not observed in a sensitivity analysis that excluded the largest trial with a high risk of bias, and no significant effects were noted during the other postoperative days.

González-Ojeda A et al[15] conducted a controlled clinical trial in adult patients who underwent elective haemorrhoidectomy for grade III/IV haemorrhoids to evaluate the effect of oral metronidazole versus placebo and to assess postoperative pain following haemorrhoidectomy. Patients were assigned to receive metronidazole (500 mg q8 h orally; study group, SG) or placebo (control group, CG) for 7 days after surgery. Pain was assessed using a visual analogue scale after surgery. Analgesic administration (time and use of analgesics) and resumption of daily life activities were also assessed. Forty-four patients were included, 22 in each group. Postoperative pain differed significantly between the SG and CG at 6 h (3.86 ± 0.56, 6.64 ± 1.49), 12 h (5.59 ± 1.33, 8.82 ± 0.79), 24 h (6.86 ± 1.49, 9.73 ± 0.45), day 4 (5.32 ± 2.10, 9.50 ± 0.59), day 7 (3.14 ±

1.03, 7.36 ± 1.39), and day 14 (2.14 ± 0.46, 5.45 ± 1.29). The first analgesia dose was required at 21.27 ± 5.47 h in the CG and 7.09 ± 2.36 h in the SG ($p < 0.05$), the time of analgesic use was 6.86 ± 1.61 days in the CG and 13.09 ± 2.48 days in the SG ($p < 0.05$), and resumption of daily activities occurred at 7.59 ± 1.56 days in the CG and 14.73 ± 3.76 days in the SG ($p < 0.05$). The study concluded Oral administration of metronidazole is effective in pain management after haemorrhoidectomy.

Ala S et al. (16) conducted a double-blind, randomized trial to compare post-hemorrhoidectomy pain relief using 10% topical metronidazole versus a placebo applied to the surgical site. Forty-seven patients were randomly assigned to receive either metronidazole (n = 25) or placebo (n = 22). Pain was measured with a visual analogue scale before the procedure and at 6 and 12 hours postoperatively, as well as on days 1, 2, 7, and 14. The use of narcotics, additional analgesics, and complications were also recorded. Pain scores were analyzed and compared with baseline values and between groups using t-tests (SPSS ver.10). Patients in the topical metronidazole group experienced significantly less postoperative pain than those in the placebo group up to day 14 ($P \leq 0.04$). There was no significant difference in narcotic use between the groups, except at hour 12 ($P < 0.05$). Additionally, the metronidazole group reported significantly lower pain after defecation on day 2 ($P = 0.016$) and required fewer additional analgesics on days 2 and 7 ($P \leq 0.04$). These results suggest that 10% topical metronidazole significantly reduces post-hemorrhoidectomy pain and discomfort, particularly after defecation, compared to placebo.

METHODOLOGY

MATERIALS AND METHODS

STUDY DESIGN

Hospital based, prospective cohort study.

STUDY SET UP

The study will be conducted at Department of General Surgery, Govt. Medical College Hospital, Kozhikode.

STUDY DURATION

The study will be carried from May 2023 to May 2024.

STUDY POPULATION

All patients presented to the General Surgery, Govt. Medical College Hospital, Kozhikode with haemorrhoids who were advised to undergo open haemorrhoidectomy under local anaesthesia will be eligible for study.

Inclusion Criteria:

i. Patients > 18 years old
ii. Patients able to consent
iii. Patients with grade 2, 3 and 4 hemorrhoids

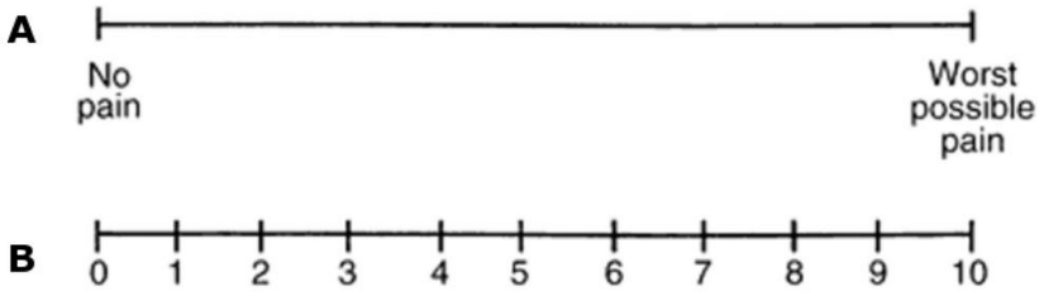
Exclusion Criteria:

i. Complicated haemorrhoids
ii. Haemorrhoidectomy under spinal anaesthesia
iii. Patients undergoing stapled haemorrhoidopexy
iv. Patients known to have IBD
v. Patients with associated fissure
vi. Patients known allergic to oral metronidazole
vii. Patients who are not consenting for the study.

STUDY TOOLS

- A semi structured proforma
- A visual analogue score (VAS) for pain

The visual analogue scale (VAS) is widely used in studies to measure pain. It consists of a 100-mm horizontal line where patients indicate their pain intensity by placing a mark between the extremes of "no pain at all" and "worst pain imaginable." The VAS is preferred for its straightforward design, reliability, and validity, as well as its ratio scale properties, making it an effective tool for evaluating pain severity. Patients are asked to mark their level of pain on the line, and the distance from the "no pain at all" end to the mark quantifies the intensity of their pain.



- Graphic Rating Scale (GRS)

If descriptive terms like ‘mild’, ‘moderate’, ‘severe’ or a numerical scale is added to the VAS, one speaks of a Graphic Rating Scale (GRS).

VAS score	Description of pain
0	No pain
>0 – 2.9	Mild pain
3 – 6.9	Moderate pain
7 - 10	Severe pain

SAMPLE SIZE

Sample size was calculated using the formula: -

$$N = \underline{(u+v)^2 \{P_1 (100-P_1) + P_2 (100-P_2)}$$

$$(P_2-P_1)^2$$

Where, u = 0.84 for 80% power

v = 1.96 at 95% confidence interval

P_1 = 47.5% (Proportion of VAS 0-4 pain on day 3 of post haemorrhoidectomy among metronidazole group)

P_2 = 27.5% (Proportion of VAS 0-4 pain on day 3 of post haemorrhoidectomy among placebo group), from the study by Ebeid EF et al.[11]

Using the above formula, a sample size of **54** was obtained. Hence 54 participants will be recruited to haemorrhoidectomy group with oral metronidazole for pain (Group A) and 54 will be recruited to haemorrhoidectomy group without oral metronidazole for pain prescription (Group B).

RECRUITMENT:

Eligible inpatients posted for open haemorrhoidectomy under local anaesthesia will be recruited to the study after explaining the study from the hospital wards. Patients will be categorized into two groups based on the post operative management care after discussing with the treating doctor. A preoperative visit will be done on the day before surgery and a good rapport will be established. Eligible patients fulfilling the inclusion criteria will be informed about the study and the consenting patients will be enrolled. Fifty-four patients will be selected to group A (haemorrhoidectomy group with oral metronidazole after surgery) and the rest of the patients will be recruited to group B (haemorrhoidectomy group without oral metronidazole after surgery) along with the standard post-operative care in both groups.

Post-operative patients with change of plan on post-op management with oral metronidazole, may be interchanged the group from group A to B or vice versa. Those participants who required spinal anaesthesia during surgery also will be excluded from study and the data will be recorded. More participants will be recruited from pre-op ward if post operatively the plan of analgesia or mode of anaesthesia changed for the already assigned patient/s, till attaining the minimum sample size in each group.

DATA COLLECTION

- The study protocol will be presented to Institutional Ethics Committee (IEC) for ethical clearance
- Study will be conducted after getting clearance form IEC.
- Cases will include all patients admitted in Surgery ward with grade 2,3 and 4 uncomplicated piles who were advised to undergo open haemorrhoidectomy (Milligan Morgan Haemorrhoidectomy)in Govt medical College, Kozhikode.
- All selected subjects will be approached personally and explained and the procedure and purpose of the study will be explained.
- A consent will be taken from the patients before surgery to observe the procedures and record the post-operative treatment and to communicate with the patients postoperatively to assess their response to the given treatment
- Strict confidentiality will be employed in carrying out the survey and use of information provided by each respondent.

Data Collection Method

- After taking informed consent, background data will be collected as per proforma from the selected patients, before surgery.
- Investigation findings will be taken through interview, old reports and case sheet of the patient.
- Data on operative procedures will be taken during the surgery or post operatively from patients' case sheets (Date of surgery, type of haemorrhoidectomy, complications or any events during surgery)
- Post operatively data on pain will be asked at hours 6, 12 and 24 on POD-0 in hospital
- Details of pain on day 4 and day 7 will be enquired through telephone(video call) and that on day 14 will be collected on patients follow up visit on day 14.
- Time of first defaecation after surgery and pain on first defaecation also will be asked

Follow-up

- Patients' perception of pain and other complications will be asked through phone on days 4 and 7.

- On day 14 patient will be reviewed in surgery OPD and data will be taken in person there.

STUDY VARIABLES

Independent variables

- ✓ Age
- ✓ Gender
- ✓ Body mass index (BMI)
- ✓ Clinical symptoms and signs
- ✓ Duration of haemorrhoids
- ✓ Comorbidities, medical and surgical history
- ✓ Addictions
- ✓ Clinical examination (general and systemic)
- ✓ Local examination
- ✓ Stage of haemorrhoid
- ✓ Blood test results
- ✓ Pre-operative pain

Outcome variables

- ✓ Operative procedures
- ✓ Postoperative complications
- ✓ First bowel motion after surgery and pain.
- ✓ Post operative pain on day 0, 4, 7 and 14
- ✓ Duration for requirement for additional analgesia
- ✓ Other complications

DATA ANALYSIS

- Descriptive analysis will be done with mean with standard deviation or median with inter quartile range (IQR) for quantitative variables and frequencies and percentages for qualitative variables.
- A p value of < 0.05 will be considered significant.

- Office Excel 2019 (Microsoft Corp., Redmond, WA, USA) and SPSS version 26 for Windows (IBM Corp., Armonk, NY, USA) will be used for data processing and statistical analysis, respectively.

ETHICAL ISSUES

- The study protocol will be presented to Institutional Ethics Committee (IEC) for ethical clearance, after getting clearance form IEC the participants will be approached for data collection.
- Participants will be explained about the purpose and procedure of the study in simple language.
- A written informed consent will be obtained from the subjects after full explanation of the requirement of the study.
- There will not be any interference or influence of research process on the treatment of the patient. The treating team will be free to administer the treatment as it considers appropriate based on clinical requirement of the patient.
- Name or personal identifiers of the patients will not be taken and all the information collected will be strictly used for study purpose and confidentiality will be strictly maintained.

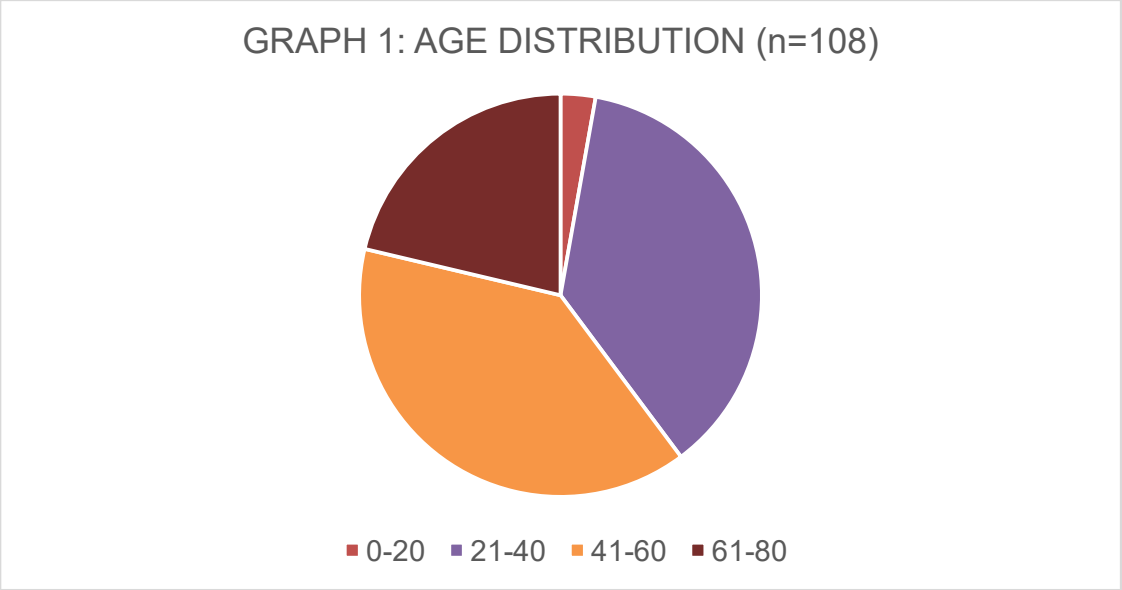
RESULTS

1. Age distribution in the study

TABLE 1: AGE DISTRBUTION

AGE GROUP	NUMBER OF PATIENTS	Percent(%)
0-20	3	2.8
21-40	40	37.0
41-60	42	38.9
61-80	23	21.3
Total	108	100.0

The mean age of the study being 46.58 yrs with a minimum age of 18yrs and maximum age of 73 yrs of age. Majority in the study belonged to the age group between 41-60 yrs of age.

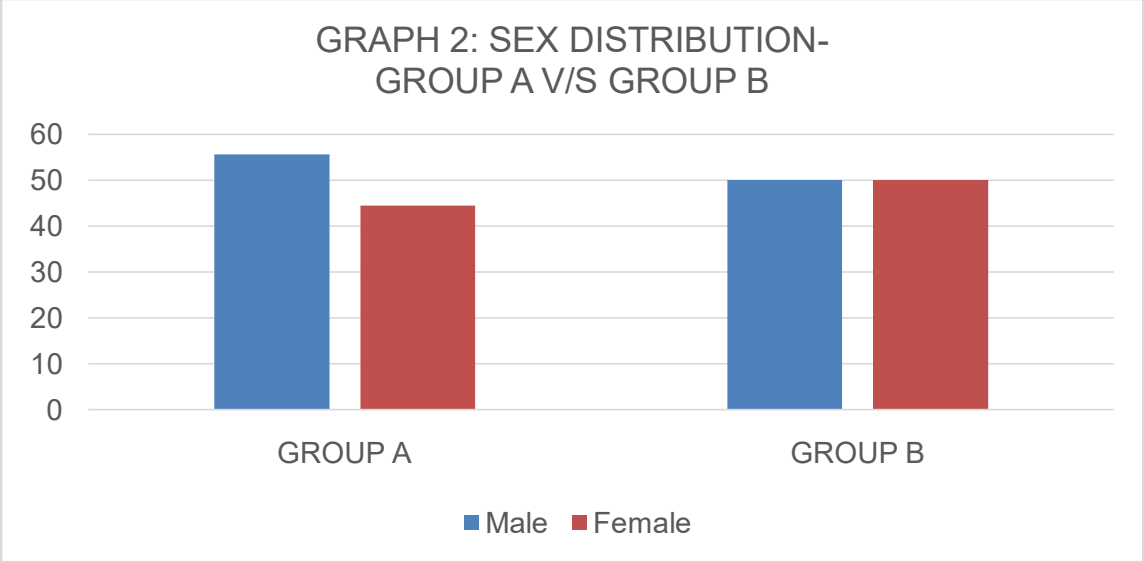


2. TOTAL SEX DISTRIBUTION IN THE STUDY

TABLE 2 : SEX DISTRIBUTION IN THE STUDY

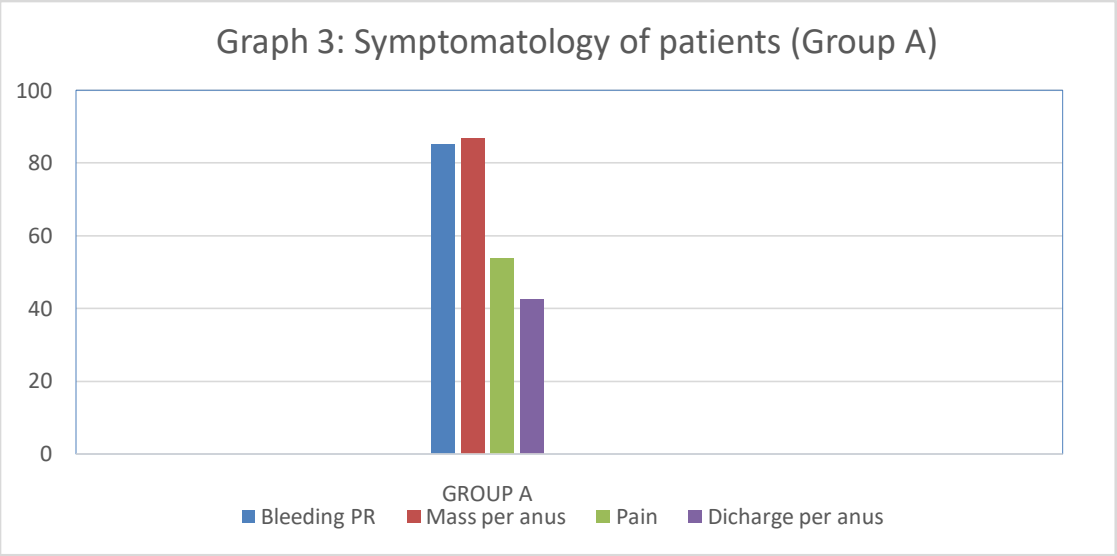
Gender	Number of patients	Percentages
Male	57	52.8
Female	51	47.2
Total	108	100.0

Among the 108 study patients, 57(52.8%) were male and 51(47.2%) were female.

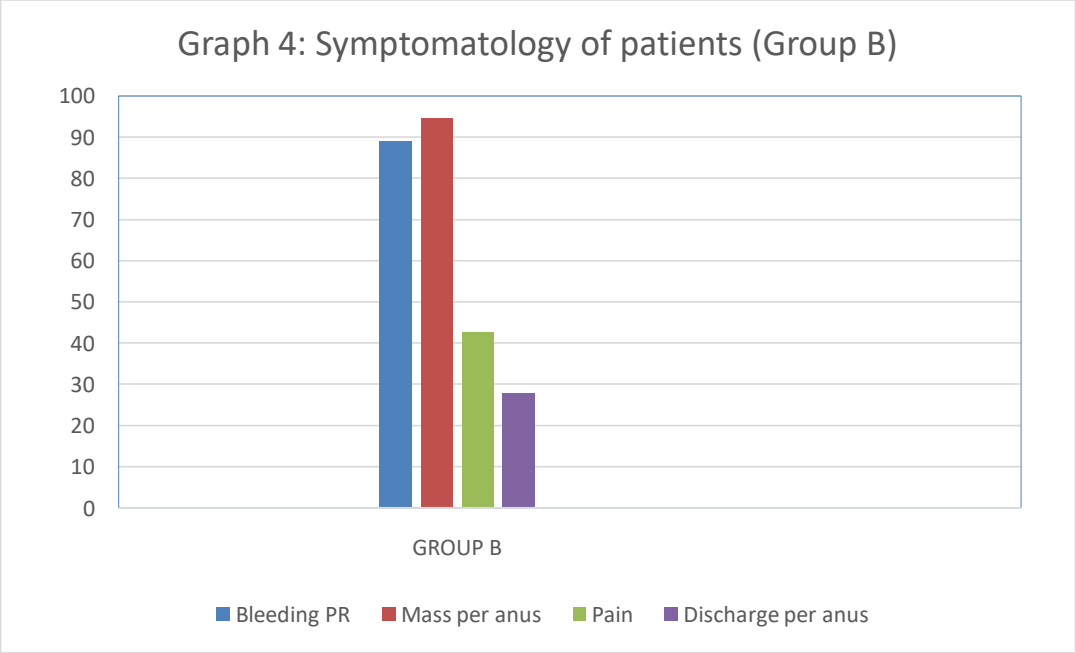


In group A, 55.6% of the study patients were male while 50 % of the patients were female in group B

3. Symptomatology of patients

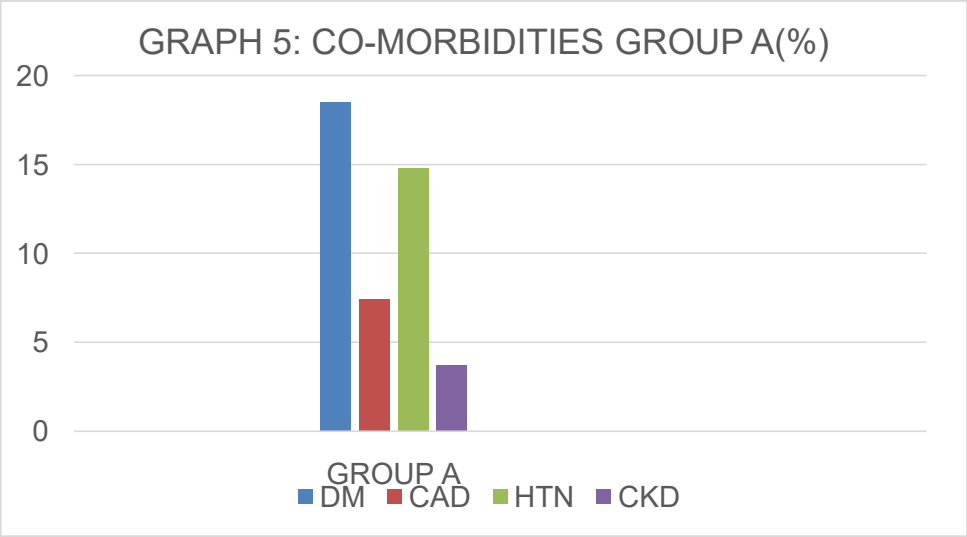


Among patients in Group A, 46(85.2%) patients had bleeding PR, 47(87%) had mass per anus, 29(53.7%) patients had perianal pain, 23(42.6%) patients had discharge per anus.

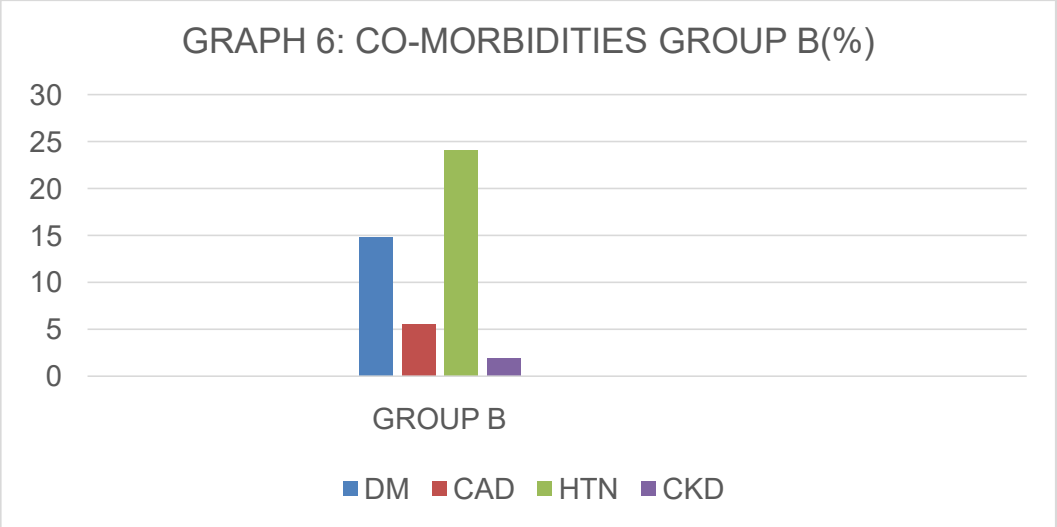


Among the Group B patients, 48(88.9%) patients had bleeding PR, 51(94.4%) patients had mass per anus, 34(63%) patients had pain, 15(27.8%) patients had discharge per anus.

4. Co-morbidities of Patients

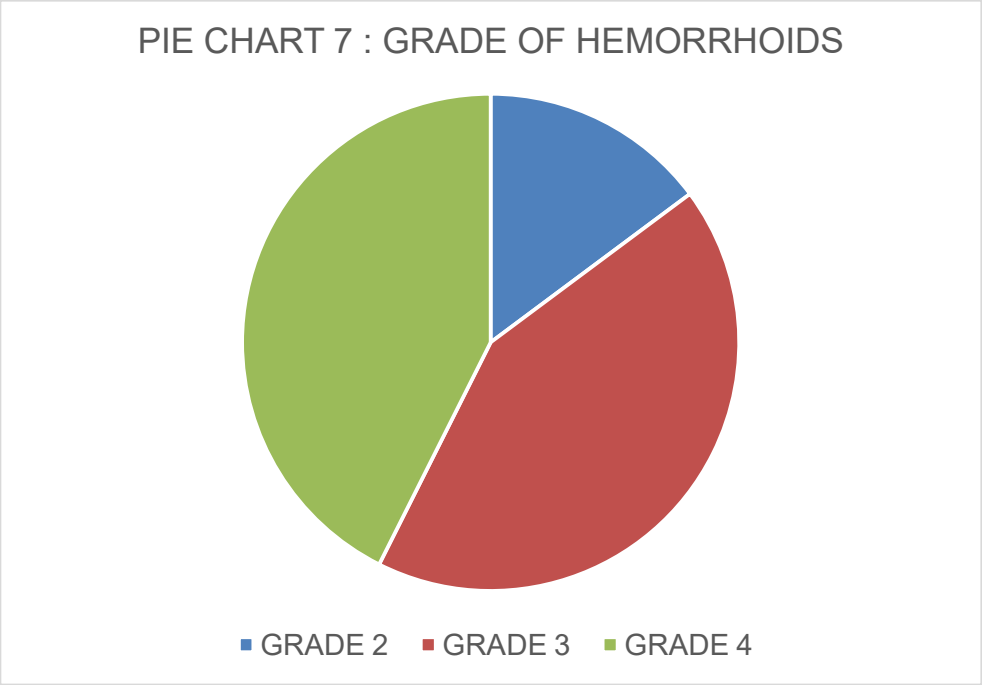


Among the patients in Group A, 10 patients had Diabetes mellitus, 4 patients had CAD, 8 patients had Hypertension, 2 patients had CKD



Among the patients in Group A, 8 patients had Diabetes mellitus, 3 patients had CAD, 13 patients had Hypertension, 1 patients had CKD

5. Grade of Hemorrhoids among patients



Among the patients who took part in the study 16 patients had Grade 2 hemorrhoids, 46 patients had Grade 3 hemorrhoids, 46 patients had Grade 4 hemorrhoids.

6. Post-operative pain, (VAS) POD 0 at 6 hrs

TABLE 3: VAS SCORES FOR PATIENTS POD 0 AT 6 HRS

GROUP A- Oral Metro, GROUP B- Placebo		No. of patients	Percent
GROUP A	Mild pain (>0-2.9)	8	14.8
	Moderate pain (3-6.9)	42	77.8
	Severe pain (7-10)	4	7.4
	Total	54	100.0
GROUP B	Mild pain (>0-2.9)	3	5.6
	Moderate pain (3-6.9)	45	83.3
	Severe pain (7-10)	6	11.1
	Total	54	100.0

TABLE 4: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 0 AT 6 HRS

(GROUP A)

	FREQUENCY VARIABLES		POD 0 6hrs pain
GROUP A	Mean		4.80
	Median		5.00
	Std. Deviation		1.534
	Minimum		1
	Maximum		8
	Percentiles	25	4.00
		50	5.00
		75	6.00

TABLE 5: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 0 AT 6 HRS

(GROUP B)

	FREQUENCY VARIABLES		POD 0 6hrs pain
GROUP B	Mean		5.11
	Median		5.50
	Std. Deviation		1.298
	Minimum		2
	Maximum		7
	Percentiles	25	4.00
		50	5.50
		75	6.00

TABLE 6: CHI SQUARE TESTS FOR VAS SCORES ON POD 0, AT 6HRS

Chi-Square Tests

	Chi-square Value	P value
Pearson Chi-Square	2.776[a]	0.250
N of Valid Cases	108	

Among patients in Group A, on POD 0 at 6hrs VAS score mean, median and standard deviation was 4.8, 5.0 and 1.534. In Group B the mean, median and standard deviation was 5.11, 5.5 and 1.298. Post-operative pain at 6hrs(POD 0) was less in Group A, but Chi-square tests showed that there was no significant reduction in pain scores.

7. Post-operative pain, (VAS) POD 0 at 12 hrs

TABLE 7: VAS SCORES FOR PATIENTS POD 0 AT 12 HRS

GROUP A- Oral Metro, GROUP B- Placebo		No. of patients	Percent
GROUP A	Mild pain (>0-2.9)	7	13.0
	Moderate pain (3-6.9)	44	81.5
	Severe pain (7-10)	3	5.6
	Total	54	100.0
GROUP B	Mild pain (>0-2.9)	3	5.6
	Moderate pain (3-6.9)	47	87.0
	Severe pain (7-10)	4	7.4
	Total	54	100.0

TABLE 8: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 0 AT 12 HRS

(GROUP A)

	FREQUENCY VARIABLES		POD 0 Pain 12hrs
GROUP A	Mean		4.33
	Median		4.00
	Std. Deviation		1.289
	Minimum		2
	Maximum		7
	Percentiles	25	4.00
		50	4.00
		75	5.00

TABLE 9: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 0 AT 12 HRS (GROUP B)

	FREQUENCY VARIABLES		POD 0 Pain 12
GROUP B	Mean		4.50
	Median		4.00
	Std. Deviation		1.145
	Minimum		2
	Maximum		7
	Percentiles	25	4.00
		50	4.00
		75	5.00

TABLE 10: CHI SQUARE TESTS FOR VAS SCORES ON POD 0, AT 12 HRS

	Chi-Square Value	P value
Pearson Chi-Square	1.842[a]	0.398
N of Valid Cases	108	

Among patients in Group A, on POD 0 at 12hrs VAS score mean, median and standard deviation was 4.33, 4.0 and 1.289. In Group B the mean, median and standard deviation was 4.5, 4.0 and 1.145. Post-operative pain at 12hrs (POD 0) was less in Group A, but Chi-square tests showed that there was no significant reduction in pain scores.

Post-operative pain, (VAS) POD 0 at 24 hrs

TABLE 11: VAS SCORES FOR PATIENTS POD 0 AT 24 HRS

GROUP A- Oral Metro, GROUP B- Placebo		No. of patients	Percent
GROUP A	Mild pain (>0-2.9)	7	13.0
	Moderate pain (3-6.9)	45	83.3
	Severe pain (7-10)	2	3.7
	Total	54	100.0
GROUP B	Mild pain (>0-2.9)	4	7.4
	Moderate pain (3-6.9)	50	92.6
	Severe pain (7-10)	0	0
	Total	54	100.0

TABLE 12: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 0 AT 24 HRS

(GROUP A)

	FREQUENCY VARIABLES		POD 0 Pain at 24hrs
GROUP A	Mean		4.13
	Median		4.00
	Std. Deviation		1.304
	Minimum		2
	Maximum		7
	Percentiles	25	3.00
		50	4.00
		75	5.00

TABLE 13: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 0 AT 24 HRS

(GROUP B)

	FREQUENCY VARIABLES		POD 0 Pain at 24 hrs
GROUP A	Mean		4.11
	Median		4.00
	Std. Deviation		1.058
	Minimum		2
	Maximum		6
	Percentiles	25	3.00
		50	4.00
		75	5.00

TABLE 14: CHI SQUARE TESTS FOR VAS SCORES ON POD 0 AT 24 HRS

	Chi-Square Value	P value
Pearson Chi-Square	3.081[a]	0.214
Number of Valid Cases	108	

Among patients in Group A, on POD 0 at 24hrs VAS score mean, median and standard deviation was 4.13, 4.0 and 1.304. In Group B the mean, median and standard deviation was 4.11, 4.0 and 1.058. Post-operative pain at 24hrs (POD 0) was slightly higher in Group A, but Chi-square tests showed that there was no significant difference in pain scores.

8. Post-operative pain, (VAS) at POD 4

TABLE 15: VAS SCORES FOR PATIENTS ON POD 4

GROUP A- Oral Metro, GROUP B- Placebo		Frequency	Percent
GROUP A	Mild pain (>0-2.9)	43	79.6
	Moderate pain (3-6.9)	11	20.4
	Total	54	100.0
GROUP B	Mild pain (>0-2.9)	22	40.7
	Moderate pain (3-6.9)	32	59.3
	Total	54	100.0

TABLE 16: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 4 (GROUP A)

	FREQUENCY VARIABLES		POD 4
GROUP A	Mean		1.85
	Median		2.00
	Std. Deviation		0.737
	Minimum		1
	Maximum		3
	Percentiles	25	1.00
		50	2.00
		75	2.00

TABLE 17: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 4

(GROUP B)

	FREQUENCY VARIABLES		POD 4 Pain
GROUP A	Mean		2.61
	Median		3.00
	Std. Deviation		0.712
	Minimum		1
	Maximum		4
	Percentiles	25	2.00
		50	3.00
		75	3.00

TABLE 18: CHI SQUARE TESTS FOR VAS SCORES ON POD 4

	ChiSquare Value	P value
Pearson Chi-Square	17.040[a]	0.000
N of Valid Cases	108	

Among patients in Group A, on POD 4 VAS score mean, median and standard deviation was 1.85, 2.0 and 0.737. In Group B the mean, median and standard deviation was 2.61, 3.0 and 0.712. Post-operative pain at POD 4 was less in Group A, but Chi-square showed that there was significant reduction in pain among patients in Group A than Group B.

9. Post-operative pain, (VAS) at POD 7

TABLE 19: VAS SCORES FOR PATIENTS ON POD 7

GROUP A- Oral Metro, GROUP B- Placebo		Frequency	Percent
GROUP A	Mild pain (>0-2.9)	48	88.9
	Moderate pain (3-6.9)	6	11.1
	Total	54	100.0
GROUP B	Mild pain (>0-2.9)	44	81.5
	Moderate pain (3-6.9)	10	18.5
	Total	54	100.0

TABLE 20: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 7

(GROUP A)

	FREQUENCY VARIABLES		POD 7 PAIN
GROUP A	Mean		1.70
	Median		2.00
	Std. Deviation		.662
	Minimum		1
	Maximum		3
	Percentiles	25	1.00
		50	2.00
		75	2.00

TABLE 21: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 7

(GROUP B)

	FREQUENCY VARIABLES		POD 7 Pain
GROUP A	Mean		2.00
	Median		2.00
	Std. Deviation		.325
	Minimum		1
	Maximum		3
	Percentiles	25	2.00
		50	3.00
		75	3.00

TABLE 22: CHI SQUARE TESTS FOR VAS SCORES ON POD 7

	Chi-Square value	P value
Pearson Chi-Square	1.174[a]	0.279
N of Valid Cases	108	

Among patients in Group A, on POD 7, VAS score mean, median and standard deviation was 1.7, 2.0 and 0.662. In Group B the mean, median and standard deviation was 2.0, 2.0 and 0.325. Post-operative pain on POD 7 was less in Group A, but Chi-square showed that there was no significant reduction in pain.

10.Post-operative pain, (VAS) at POD 14

TABLE 23: VAS SCORES FOR PATIENTS ON POD 14

GROUP A- Oral Metro, GROUP B- Placebo		Frequency	Percent
GROUP A	Mild pain (>0-2.9)	54	100.0
	Total	54	100.0
GROUP B	Mild pain (>0-2.9)	54	100.0
	Total	54	100.0

TABLE 24: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 14

(GROUP A)

	FREQUENCY VARIABLES		POD 14 PAIN
GROUP A	Mean		1.57
	Median		2.00
	Std. Deviation		0.499
	Minimum		1
	Maximum		2
	Percentiles	25	1.00
		50	2.00
		75	2.00

TABLE 25: DESCRIPTIVE FREQUENCIES FOR PATIENTS ON POD 0 AT 14 DAYS (GROUP B)

	FREQUENCY VARIABLES		POD 14 Pain
GROUP A	Mean		1.48
	Median		1.00
	Std. Deviation		.325
	Minimum		1
	Maximum		2
	Percentiles	25	1.00
		50	1.00
		75	2.00

Among patients in Group A, on POD 14 VAS score mean, median and standard deviation was 1.57, 2.00 and 0.499. In Group B the mean, median and standard deviation was 1.48,1.0 and 0.325. Post-operative pain on POD 14 was similar in Group A and B, but Chi-square showed that there was no significant reduction in pain.

11.Need for Extra Post-operative analgesia

TABLE 26: COMPARING NEED FOR EXTRA ANALGESIA IN GROUP A VS GROUP B

GROUP A- Oral Metro, B- Placebo		GROUP A	GROUP B	Total
Need for analgesia	Yes	16 (29.6%)	23 (42.6%)	39 (36.1%)
	No	38 (70.4%)	31 (57.4%)	69 (63.9%)
Total		54	54	108

TABLE 27: CHI SQUARE TESTS ON NEED FOR EXTRA ANALGESIA

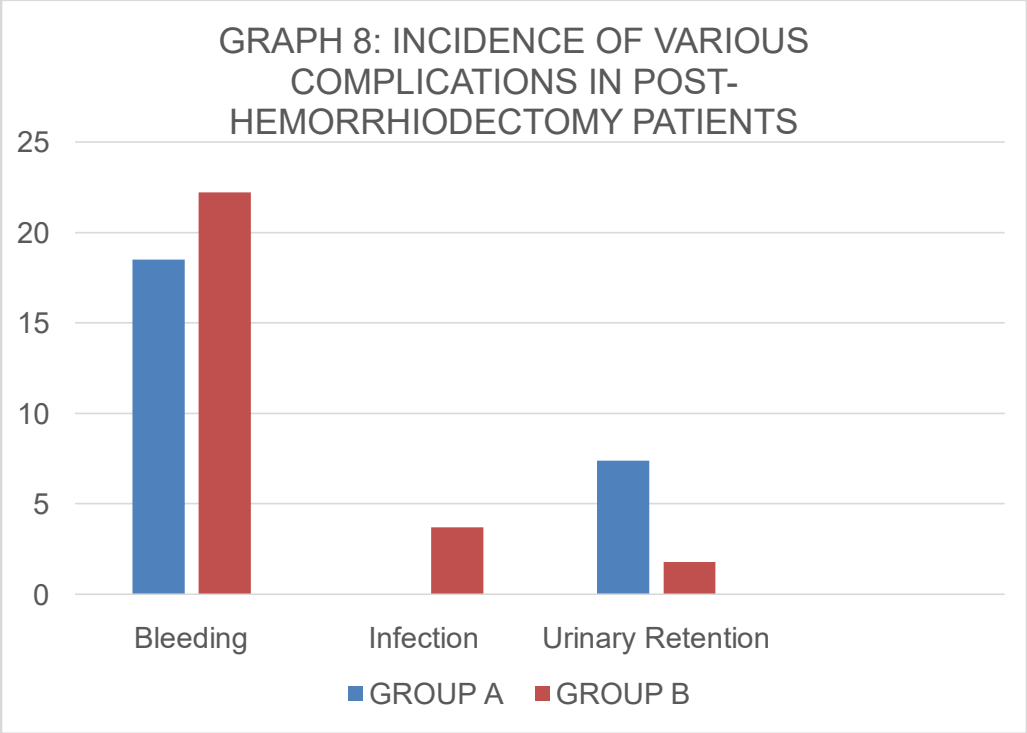
	Value	P value
Pearson Chi-Square	1.967[a]	0.161
N of Valid Cases	108	

Among patients in Group A, 16(29.6%) patients required Extra analgesia in the post-operative period. While 23(42.6%) patients required extra analgesia in Group B. Chi- square tests showed no significant difference in the need for extra analgesia.

12. **Post-operative complications –**

TABLE 28: COMPARING THE RATES OF POST OPERATIVE COMPLICATIONS IN GROUP A VS GROUP B

	GROUP A - Oral Metro, B- placebo		Total
	GROUP A	GROUP B	
Bleeding	10(18.5%)	12(22.2%)	22(20.3%)
Infection	0	2(3.7%)	2(1.85%)
Urinary Retention	4(7.4%)	5(7.4%)	9(8.3%)



The rates of different complications in post-hemorrhoidectomy patients

- bleeding (20.3%), in 22 of post-operative patients
- infection of post-operative wound in 2 patients (1.85%)
- urinary retention in 9 patients (8.3%)

There was no significant difference in the rates of complications between Group A and Group B.

13.DAY OF FIRST DEFAECATION AFTER SURGERY

		GROUP A- Oral Metro, B- placebo		Total
		GROUP A	GROUP B	
First day of bowel motion after surgery	0th day	27(50.0%)	22(40.7%)	49(45.4%)
	1st day	24(44.4%)	29(53.7%)	53(49.1%)
	2nd day	3(5.6%)	3(5.6%)	6(5.6%)
Total		54(100.0%)	54(100.0%)	108(100.0%)

14.

TABLE 29: SHOWING THE DAY OF FIRST DEFAECATION AFTER SURGERY

TABLE 30: CHI SQUARE TESTS ON THE DAY OF FIRST DEFAECATION AFTER SURGERY

	Value	P value
Pearson Chi-Square	0.982[a]	0.612
N of Valid Cases	108	

Among the patients who underwent open hemorrhoidectomy,

- 49 patients (45.4%) had their first bowel motion on Day 0
- 53 patients (49.1%) had their first bowel motion on Day 1
- 6 patients (5.6%) had their first bowel motion on Day 2

The was no significant difference in the passage of first bowel motion between Group A and Group B

DISCUSSION

Postoperative pain after hemorrhoid surgery can indeed be quite significant and is a common reason for prolonged hospital stays. The pain is multifactorial and can arise from several sources:

1. Surgical Incision: The process of making incisions to remove hemorrhoids can cause direct pain at the surgical site. This pain can be exacerbated by the movement and tension in the surrounding tissues.
2. Spasm of the Internal Anal Sphincter: Postoperative spasms of the internal anal sphincter can contribute to significant discomfort. The sphincter may spasm in response to the surgical trauma, leading to increased pain and difficulty with bowel movements.
3. Incarceration of Smooth Muscle Fibers and Mucosa: During the surgery, the smooth muscle fibers and mucosa may become entrapped or incorporated into the vascular pedicles (the blood vessels and connective tissue). This can cause ongoing pain and discomfort due to the compression and irritation of these tissues.
4. Epithelial Denudation: Removal or damage to the epithelial layer of the anal canal during surgery can result in pain as the mucosal surface heals. Epithelial denudation can make the area more sensitive and prone to pain.
5. Edema and Tissue Inflammation: Swelling and inflammation around the wound site are common after surgery and can exacerbate pain. Edema can increase pressure in the anal canal, contributing to discomfort and pain.

Management of postoperative pain typically involves a combination of analgesics, anti-inflammatory medications, and sometimes local anesthetics. Additionally, addressing issues like sphincter spasm with muscle relaxants and using sitz baths to reduce inflammation and discomfort can be helpful. Effective pain management is crucial for recovery and can help prevent complications associated with delayed discharge. (56)

Metronidazole, discovered in 1950 and synthesized in 1957, is an antimicrobial drug from the nitroimidazole family. It is effective against a wide range of anaerobic bacteria and protozoa. In proctology, it is often used in combination with other antibiotics to treat infections caused by anaerobic bacteria, depending on their severity. Given that bacterial colonization often occurs after hemorrhoidectomy, metronidazole can help minimize bacterial growth, inflammation, and pain during the postoperative period. (57,58)

The study was conducted on 108 patients that presented to the General Surgery, Govt. Medical College Hospital, Kozhikode with Grade 2,3,4 haemorrhoids who were advised to undergo open haemorrhoidectomy under local anaesthesia between May 2023 to May 2024. Fifty-four patients were assigned to group A (haemorrhoidectomy group with oral metronidazole after surgery) and rest of the fifty-four patients were assigned to group B (haemorrhoidectomy group without oral metronidazole after surgery) along with the standard post-operative care in both groups.

The mean age of the study being 46.58 yrs with a minimum age of 18yrs and maximum age of 73 yrs of age. Majority in the study belonged to the age group between 41-60 yrs of age. There was a male preponderance in study subjects in both Group A and Group B forming 52.8 % of the study population.

Of the patients who took part in the study 16 patients had Grade 2 hemorrhoids, 46 patients had Grade 3 hemorrhoids, 46 patients had Grade 4 hemorrhoids.

At 6 hours on Postoperative Day 0 (POD 0), the mean, median, and standard deviation of the VAS scores for patients in Group A were 4.8, 5.0, and 1.534, respectively. For Group B, these values were 5.11, 5.5, and 1.298. Although Group A had slightly lower pain scores at 6 hours, Chi-square tests revealed that the difference was not statistically significant.

At 12 hours on POD 0, Group A's mean, median, and standard deviation for VAS scores were 4.33, 4.0, and 1.289, while Group B's were 4.5, 4.0, and 1.145. Despite Group A showing lower pain scores at 12 hours, Chi-square tests indicated no significant difference.

By 24 hours on POD 0, Group A had a mean VAS score of 4.13 with a median of 4.0 and a standard deviation of 1.304. In comparison, Group B had a mean score of 4.11, median of 4.0, and standard deviation of 1.058. Although Group A had slightly higher pain scores at 24 hours, Chi-square tests showed no significant difference.

On POD 4, the mean, median, and standard deviation for Group A were 1.85, 2.0, and 0.737, whereas Group B's values were 2.61, 3.0, and 0.712. Group A had lower pain scores at this time, and Chi-square tests demonstrated a significant reduction in pain for Group A compared to Group B.

By POD 7, Group A's VAS scores had a mean of 1.7, median of 2.0, and standard deviation of 0.662, while Group B's scores were 2.0, 2.0, and 0.325. Group A reported less pain at 7 days, but Chi-square tests revealed no significant difference. On POD 14, the mean, median, and standard deviation of VAS scores for Group A were 1.57, 2.0, and 0.499. For Group B, they were 1.48, 1.0, and 0.325.

Pain levels on POD 14 were similar between the two groups, and Chi-square tests showed no significant difference.

In Group A, 16 patients (29.6%) needed additional analgesia after the surgery, while 23 patients (42.6%) in Group B required extra pain relief. Chi-square tests indicated no significant difference in the need for supplementary analgesia between the two groups.

Regarding complications in post-hemorrhoidectomy patients, bleeding occurred in 20.3% of the patients (22 individuals), wound infections were observed in 2 patients (1.85%), urinary retention affected 9 patients (8.3%). There were no significant differences in complication rates between Group A and Group B.

For patients who underwent open hemorrhoidectomy, 49 patients (45.4%) had their first bowel movement on the day of surgery (Day 0), 53 patients (49.1%) had their first bowel movement on the following day (Day 1), 6 patients (5.6%) had their first bowel movement on Day 2. There was no significant difference in the timing of the first bowel movement between Group A and Group B.

In contrast to our study, research by Ebied EF et al. on the effectiveness of oral metronidazole for post-hemorrhoidectomy pain revealed that Group A (receiving oral metronidazole) experienced significantly lower pain levels on days 1 and 3 compared to Group B (receiving a placebo), with statistical significance ($p=0.043$, $p=0.004$). However, by day 7, the pain scores for both groups were similar, with no significant difference ($p=0.268$). Additionally, the study found that Group B required more analgesics than Group A, supporting the notion that metronidazole reduces pain and the need for additional pain relief ($p=0.043$). Both groups, however, did not show significant differences in the timing of the first bowel movement ($p=0.967$).

In contrast, Balfour et al. (59) treated 38 patients undergoing closed hemorrhoidectomy with 400 mg of metronidazole every 8 hours but found no significant difference in outcomes compared to the control group, questioning the benefit of metronidazole in this context.

On the other hand, Al-Mulhim et al. (60) investigated the effects of metronidazole in a larger group, with 84 patients receiving the antibiotic and 82 not receiving it. The treatment group received 500 mg of intravenous metronidazole with anesthesia, followed by two additional doses at 2 and 10 hours post-surgery, and continued with 500 mg of oral metronidazole every 8 hours for 3 days. This study found a significant reduction in pain intensity on postoperative day 7 and a faster return to daily activities among those who received metronidazole.

In summary, the effectiveness of oral metronidazole in enhancing surgical outcomes immediately after surgery remains uncertain, as its benefits may not be related to infection control. However, our study demonstrated a significant reduction in pain four days post-surgery, with no notable changes in the need for additional analgesics or the timing of the first bowel movement.

LIMITATIONS

1. Variability in postoperative care practices among patients, such as differences in wound care or diet, could affect the outcomes and complicate comparisons between groups.
2. The study tracks outcomes for a fixed period (up to 14 days), which may not capture long-term complications or the full recovery trajectory.
3. Metronidazole is associated with potential side effects such as gastrointestinal disturbances, which might influence patient outcomes.

SCOPE FOR FUTURE STUDIES

1. Extend the follow-up period beyond 14 days to evaluate the long-term effects of oral metronidazole on recovery, recurrence rates, and any delayed complications.
2. Investigate the effects of administering metronidazole preoperatively versus postoperatively on outcomes.
3. Examine the effects of combining metronidazole with other therapeutic interventions or adjuvant treatments.

CONCLUSION

In our study, in post-hemorrhoidectomy patients, the use of oral metronidazole is linked to a significant reduction in pain on postoperative Day 4. However, no significant improvements were observed in other outcomes for patients receiving oral metronidazole. The effectiveness of oral metronidazole in enhancing surgical outcomes immediately after surgery remains uncertain, as its benefits may not be related to infection control.

SUMMARY

The study investigated the impact of oral metronidazole on post-surgical outcomes in patients undergoing hemorrhoidectomy at Government Medical College, Kozhikode. A total of 108 patients with grade 2, 3, and 4 uncomplicated hemorrhoids were included and assigned to either a metronidazole group or a control group receiving standard postoperative care. Pain levels were assessed using Visual Analog Scale (VAS) scores at various intervals post-surgery, and the timing of the first bowel movement, associated pain, and need for additional analgesics were also recorded.

Results indicated that patients in the metronidazole group experienced a significant reduction in pain on postoperative Day 4 compared to the control group. However, there were no significant differences in pain levels on Days 0, 7, and 14, nor were there notable differences in the timing of bowel movements or the need for additional analgesics between the two groups. These findings suggest that while metronidazole may offer short-term pain relief, its overall effect on other recovery aspects is inconclusive, highlighting the need for further research to better understand its potential benefits and limitations in postoperative care.

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