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COMPARATIVE EVALUATION OF POSTOPERATIVE OUTCOMES BETWEEN MINIMALLY INVASIVE PROCEDURE FOR HAEMORRHOIDS (MIPH) AND CHIVATE'S TRANSANAL SUTURE RECTOPEXY: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: Hemorrhoidal disease is a common anorectal disorder requiring surgery. Minimally Invasive Procedure for Haemorrhoids (MIPH) and Chivate's transanal suture rectopexy are tissue-preserving alternatives to conventional haemorrhoidectomy, but direct comparative evidence remains limited.

Objective: To compare postoperative outcomes between MIPH and Chivate's transanal suture rectopexy in patients undergoing haemorrhoid surgery.

Methods: This prospective observational study was conducted over 21 months at a tertiary teaching hospital in Gujarat, India. Sixty-four patients with Grade II–IV haemorrhoids were enrolled by convenient sampling and allocated to Chivate's procedure (n = 32) or MIPH (n = 32). Operative time, bleeding, postoperative pain (Wong–Baker FACES scale) on days 1, 3, and 7, hospital stay, complications, 3-month recurrence, and patient outcomes were compared using unpaired t-tests and chi-square tests.

Results: Operative time was significantly shorter with Chivate's procedure (32.6 ± 5.4 vs 38.5 ± 6.7 minutes, p = 0.0002). Pain scores were significantly lower on days 1, 3, and 7 (1.8 ± 1.1 vs 4.2 ± 1.3; 0.9 ± 0.9 vs 2.8 ± 1.2; 0.5 ± 0.6 vs 1.6 ± 0.9; all p < 0.0001). Time to first urination, bowel movement, and hospital stay was significantly shorter with Chivate's procedure. Three-month recurrence was lower (3.1% vs 18.8%, p = 0.045), while complications and satisfaction were similar.

Conclusion: Chivate's transanal suture rectopexy demonstrated less postoperative pain, faster clinical recovery, shorter hospital stay, and lower short-term recurrence than MIPH, with comparable complications.

Keywords: Haemorrhoids; Minimally Invasive Procedure for Haemorrhoids; Transanal Suture Rectopexy; Chivate's Procedure; Postoperative Pain; Stapled Hemorrhoidopexy

1 INTRODUCTION

Hemorrhoidal disease is one of the most common anorectal diseases that a surgeon encounters in practice and affects a large part of the adult population at some point in their lives.[1] Population-based estimates suggest that prevalence increases gradually with age, reaching a peak in the fifth and sixth decades of life, with a relatively equal distribution between the sexes in community samples, but surgical series consistently report a male preponderance, reflecting differences in disease severity, symptom tolerance and health-seeking behavior between men and women. Symptomatic disease generally occurs in the fourth to sixth decades but an increasing number of younger adults are now being diagnosed and the associated bleeding, prolapse, mucous discharge, pruritus and pain significantly impair quality of life, productivity and daily function.[1,2] Social stigma and reluctance to seek early medical attention contribute to under-reporting and variability in published estimates of true disease burden.

Anatomically, hemorrhoids are normal anal vascular cushions participating in fine continence. Symptomatic hemorrhoidal disease is due to pathological enlargement and distal displacement of these cushions, mainly due to chronic straining, elevated intra-abdominal pressure and progressive weakening of the supporting connective tissue.[2,3] Traditionally internal hemorrhoids are staged by the degree of prolapse, while external hemorrhoids more often present with thrombosis and acute pain. Low-grade disease is usually treated conservatively or with office-based procedures such as rubber band ligation or sclerotherapy. Higher-grade prolapsing hemorrhoids (Grade III-IV) often necessitate surgical intervention.

Conventional excisional hemorrhoidectomy, open (Milligan-Morgan) or closed (Ferguson) has been the reference standard for advanced hemorrhoidal disease for a long time.[4] However, both techniques excise hemorrhoidal tissue distal to the dentate line—an area richly supplied by somatic sensory afferents—and are therefore consistently associated with significant postoperative pain, delayed wound healing, and complications such as urinary retention and anal stenosis, which prompted a sustained search for less morbid, tissue-preserving alternatives.[4,5] The Minimally Invasive Procedure for Hemorrhoids (MIPH) based on the principle of circular stapled hemorrhoidopexy was introduced in the 1990s and represented a paradigm shift in the surgical management of prolapsing hemorrhoids.[6] MIPH is the resection of a circumferential band of rectal mucosa and submucosa above the dentate line. This interrupts the blood supply to, elevates and repositions prolapsing hemorrhoidal tissue into its anatomical location. It avoids excision of the sensate anoderm and thus the incidence of postoperative pain is substantially reduced compared to conventional hemorrhoidectomy.[6,7] The technique was quickly embraced around the world, and has been included in several surgical guidelines as an accepted alternative for Grade II-IV hemorrhoids. However, MIPH is not without its limitations: staple-line bleeding, persistent or recurrent prolapse, and rare but serious complications such as pelvic sepsis and rectovaginal fistula have tempered its universal adoption. Reported long-term recurrence rates range widely from 5% to 30% depending on patient selection and surgical expertise.[7,8] The additional constraint of a disposable circular stapling device adds also a significant cost burden. This is a major constraint in low resource healthcare systems where affordability is as critical as clinical efficacy.[9]

As the stapling technology has developed, indigenous suture based alternatives have developed. Chivate's transanal suture rectopexy has attracted special attention among these because of its simplicity, economy and reproducibility.[10] In this procedure, circumferential transanal sutures are placed above the dentate line to secure the prolapsing hemorrhoidal cushions back to the rectal wall, restoring the cushions to their anatomical position without excision of any tissue. The technique eliminates the need for a stapling device, avoiding the cost and risk of serious staple-related complications, and early institutional series have reported favorable outcomes with low postoperative pain and a quick return to normal activity.[10,11]

Postoperative outcome assessment after hemorrhoid surgery is inherently multidimensional. Pain is still the most important determinant of patient satisfaction and early recovery. Complications like secondary bleeding, urinary retention and wound infection directly influence the safety of the procedure.[12] Length of hospital stay and time to return to normal activity are measures of the broader socioeconomic impact of treatment, especially for working-age adults. Recurrence and long-term quality of life are measures of the durability of benefit.[12,13] Cost-effectiveness has become an ever more important endpoint in modern surgical decision-making, especially in settings where out-of-pocket expenditures dominate the financing of healthcare.[13,14]

A large body of evidence comparing conventional hemorrhoidectomy with MIPH generally confirmed reduced pain and earlier recovery with the latter at the cost of higher expense and variable recurrence[7,9]. Direct prospective comparisons between MIPH and suture-based alternatives such as Chivate’s rectopexy remain sparse. Reported data are mostly limited to small retrospective or single-arm series, and robust prospective head-to-head comparisons are

lacking, which hinders evidence-based decision-making for surgeons and health-policy planners, especially in resource-limited settings.[10,11,15] This evidence gap is of practical relevance: although MIPH has been widely adopted for its minimally invasive profile compared with conventional hemorrhoidectomy, concerns regarding recurrence and cost persist, while Chivate's technique has been proposed as a cost-effective, tissue-sparing alternative with anecdotally lower pain and recurrence but without adequate prospective validation in direct comparison with MIPH. Hence, the present study was planned to prospectively compare the postoperative parameters such as operative time, intraoperative bleeding, serial postoperative pain, parameters of functional recovery, complications, recurrence at 3 months and patient satisfaction between MIPH and Chivate's transanal suture rectopexy in patients operated for hemorrhoids at a tertiary care center of western India. The results are meant to assist surgeons in making better-informed procedural decisions and to improve preoperative counseling and future research in the surgical management of hemorrhoidal disease.

2 MATERIALS AND METHODS

2.1 Study design

Prospective observational study with systematic observation of postoperative outcomes in patients undergoing Chivate's transanal suture rectopexy and MIPH without experimental randomization or blinding. The choice of an observational design was based on the fact that both procedures are accepted methods of treatment and that ethical issues precluded random allocation in this clinical setting. It also allowed for patient management that mirrors real-world surgical practice, thus increasing the external validity of the findings.

2.2 Study setting

The study was conducted in the Department of General Surgery of GMERS Medical College and Hospital, Nanakwada, Valsad, a tertiary care teaching hospital in Gujarat, India, catering to a mixed urban and rural patient population. Both procedures were performed by experienced surgeons under standardized perioperative protocols and the availability of preoperative evaluation, anesthesia support and structured outpatient follow-up facilitated reliable data capture.

2.3 Study duration

Patients were recruited over a 21-month period from February 2024 to October 2025, based on an expected institutional accrual of approximately three hemorrhoidectomy cases per month. After enrollment, each patient was followed up for 3 months after the operation. The visits were scheduled weekly for the first post-operative month and then monthly.

2.4 Participants

All adult patients (>18 years, both sexes) admitted with symptomatic hemorrhoids who underwent either Chivate's transanal suture rectopexy or MIPH, and who gave written informed consent for participation and follow-up were eligible for inclusion. Patients with recurrent hemorrhoids following previous surgery, patients with other anorectal diseases (eg, fissures, fistulas, or cancers), patients with systemic diseases that rendered surgery unsafe, and patients who failed to keep their follow-up appointments were excluded.

2.5 Sampling and sample size

Convenient sampling technique was used. All eligible patients admitted consecutively during the study period were recruited to minimize selection bias and to reflect routine clinical practice. A target of 32 patients per group (total n = 64), considering the average caseload per institution, was selected to assure adequate statistical power for the planned comparisons. Patients were not randomized to a procedure, but group allocation was determined on the assessment of the treating surgeon and the patient's preference after counseling on both techniques.

2.6 Study groups

Group A consisted of 32 patients subjected to Chivate's transanal suture rectopexy and Group B consisted of 32 patients subjected to MIPH using Longo stapled hemorrhoidopexy technique. Both groups were followed prospectively using the same observation schedules and data collection instruments to allow for meaningful comparison. Surgical technique: All patients received standardized preoperative preparation, including a liquid diet for 24 hours and a proctolytic enema on the nite before surgery. Group A patients underwent Chivate's transanal suture rectopexy under spinal anesthesia in the lithotomy position. Two circumferential rows of polyglactin sutures were placed about 2 cm and 4 cm above the dentate line, elevating and fixing the lax mucosa and submucosa to the underlying rectal musculature. In Group B, MIPH was performed using a 33-mm circular stapler. A circular anal dilator was inserted and a purse-string suture was placed 3–4 cm above the dentate line. The stapler was inserted and fired, and the redundant

mucosal ring was removed and stapled. All patients in both groups received standardized postoperative hemostasis checks, analgesia and monitoring prior to discharge.

2.7 Study parameters and data collection

Data was collected on a structured proforma including demographic data, personal and family history, co-morbidities and baseline clinical and investigational findings. Intraoperative variables recorded were type of anesthesia, operating time and intra-operative bleeding. The primary postoperative parameters were pain assessed by the Wong–Baker FACES pain rating scale at postoperative days 1, 3 and 7, and occurrence of complications such as bleeding, urinary retention, fecal incontinence, wound infection, anal stenosis, discharge and external tags. Secondary parameters were time to first urination, time to first bowel movement, duration of hospital stay, recurrence of prolapse at 3 month follow-up and patient reported satisfaction graded as highly satisfied, satisfied or dissatisfied. Data were entered into a structured spreadsheet to create a master database, and regularly cross-checked to ensure accuracy.

2.8 Statistical analysis

Continuous parametric variables (operative time, pain scores, time to first urination and bowel movement, hospital stay) are reported as mean ± standard deviation and compared between the two independent groups using unpaired student's t-test. The categorical variables (complications, recurrence, satisfaction) were compared using the chi-square test and are presented as frequencies and percentages. Throughout, a two-tailed p-value < 0.05 was considered statistically significant.

2.9 Ethical issues

The study was conducted after getting the approval from the Institutional Ethics Committee of GMERS Medical College and Hospital, Valsad. Written informed consent in their preferred local language was obtained from all participants with a clear understanding of the surgical procedures and follow up requirements. Patient confidentiality was strictly maintained. Participation was voluntary, and refusal to participate did not affect the standard of care provided. Since both procedures were standard surgical practice, no additional experimental risk was imposed on participants and the right was retained for patients to withdraw at any stage without penalty

3 RESULTS

A total of 64 patients completed the study and follow up protocol; 32 patients in each of MIPH and Chivate groups. Baseline demographics and clinical characteristics were comparable between the two groups (Table 1). Males predominated in both arms (68.8% in MIPH vs 75.0% in Chivate, $\chi 2 = 0.309$, $p = 0.578$) and mean age was comparable (46.2 ± 12.0 vs 45.2 ± 11.1 years, $t = 0.366$, $p = 0.715$) with most patients in both groups aged 41–50 years. The most common indication for surgery in both arms was Grade III hemorrhoids (59.4% in MIPH vs 56.2% in Chivate, $\chi^2 = 0.427$, $p = 0.808$) followed by Grade IV (25.0% vs 21.9%) and Grade II (15.6% vs 21.9%) disease. The presentation with bleeding per rectum (93.8% vs 90.6%), mass prolapse (84.4% vs 78.1%) and pain (50.0% vs 43.8%) did not differ significantly between groups (all $p > 0.05$) confirming both groups entered surgery with similar burden of disease. Intraoperative parameters are shown in table 2. The mean operative time was significantly less with the Chivate's procedure (32.6 ± 5.4 minutes, range 22–44) than with MIPH (38.5 ± 6.7 minutes, range 28–52; $t = 3.908$, $p = 0.0002$). In the large majority of patients in both groups (MIPH 93.8% vs Chivate 90.6%), bleeding during the operation was minimal. There was no significant difference in the severity of bleeding between the groups ($\chi 2 = 0.217$, $p = 0.641$). The reduced operating time with Chivate's procedure was not associated with an increased risk of intra-operative bleeding. Wong-Baker FACES scale postoperative pain scores were consistently and significantly lower in the Chivate group at all time points studied (Table 3). The mean pain scores on postoperative day 1 were 1.8 ± 1.1 in the Chivate group versus 4.2 ± 1.3 in the MIPH group ($t = 7.887$, $p < 0.0001$); this difference persisted on day 3 (0.9 ± 0.9 vs 2.8 ± 1.2, $t = 6.690$, $p < 0.0001$) and remained significant on day 7 (0.5 ± 0.6 vs 1.6 ± 0.9, $t = 5.754$, $p < 0.0001$), indicating sustained superior analgesia throughout the first postoperative week with the suture rectopexy technique. Postoperative per rectal bleeding was infrequent and similar between the groups (12.5% MIPH vs 9.4% Chivate, $\chi^2 = 0.160$, $p = 0.689$). Also, the recovery parameters were in the favor of the procedure of Chivate (Table 4). The Chivate group had significantly shorter time to first urination (6.8 ± 1.7 hours vs 8.4 ± 2.1 hours, $t=3.344$, $p=0.0014$) and time to first bowel movement (24.3 ± 5.0 vs 28.6 ± 6.5 hours, $t=2.966$, $p=0.0043$). The mean length of stay was about one day shorter with Chivate's technique (1.4 ± 0.6 days, median 1.0) compared to MIPH (2.4 ± 0.8 days, median 2.5; $t = 5.849$, $p < 0.0001$). Postoperative complications and 3-month outcomes are shown in Table 5. There was no significant difference between the two techniques in urinary retention (15.6% MIPH vs 9.4% Chivate, $\chi^2 = 0.571$, $p = 0.450$) and fecal incontinence (6.2% in both groups, $\chi^2 = 0.000$, $p = 1.000$). Other minor complications were more frequent numerically after MIPH but did not individually reach statistical significance (all $p > 0.05$) — anal stenosis (6.2% versus 0%), anal discharge (9.4% versus 3.1%), wound infection (3.1% versus 0%) and external skin tags (12.5% versus 6.2%). The recurrence of prolapse at 3-month follow-up was significantly lower after Chivate's procedure (1 patient, 3.1%) compared with MIPH (6 patients, 18.8%; $\chi\ 2 = 4.010$, $p = 0.045$).

Table 1: Baseline Demographic and Clinical Characteristics

Parameter	MIPH (n=32)	Chivate (n=32)	p-value
Male sex, n (%)	22 (68.8%)	24 (75.0%)	0.578
Female sex, n (%)	10 (31.2%)	8 (25.0%)	—
Mean age (years), Mean ± SD	46.2 ± 12.0	45.2 ± 11.1	0.715
Age 41–50 years, n (%)	11 (34.4%)	13 (40.6%)	—
Grade II hemorrhoids, n (%)	5 (15.6%)	7 (21.9%)	0.808
Grade III hemorrhoids, n (%)	19 (59.4%)	18 (56.2%)	—
Grade IV hemorrhoids, n (%)	8 (25.0%)	7 (21.9%)	—
Bleeding per rectum, n (%)	30 (93.8%)	29 (90.6%)	0.641
Mass prolapse, n (%)	27 (84.4%)	25 (78.1%)	0.522
Pain as presenting symptom, n (%)	16 (50.0%)	14 (43.8%)	0.616

*p < 0.05 indicates statistical significance. SD = standard deviation. MIPH = minimally invasive procedure for hemorrhoids; SD = standard deviation.

Table 2: Intraoperative Parameters

Parameter	MIPH (n=32)	Chivate (n=32)	p-value
Operative time (min), Mean ± SD	38.5 ± 6.7	32.6 ± 5.4	0.0002*
Operative time range (min)	28–52	22–44	—
Minimal intraoperative bleeding, n (%)	30 (93.8%)	29 (90.6%)	0.641
Moderate intraoperative bleeding, n (%)	2 (6.2%)	3 (9.4%)	—

*p < 0.05 indicates statistical significance. SD = standard deviation. MIPH = minimally invasive procedure for hemorrhoids; SD = standard deviation.

Table 3: Postoperative Pain (Wong–Baker FACES Scale) and Bleeding

Parameter	MIPH (n=32)	Chivate (n=32)	p-value
Pain score Day 1, Mean ± SD	4.2 ± 1.3	1.8 ± 1.1	<0.0001*
Pain score Day 3, Mean ± SD	2.8 ± 1.2	0.9 ± 0.9	<0.0001*
Pain score Day 7, Mean ± SD	1.6 ± 0.9	0.5 ± 0.6	<0.0001*
Postoperative bleeding PR, n (%)	4 (12.5%)	3 (9.4%)	0.689

*p < 0.05 indicates statistical significance. SD = standard deviation; PR = per rectum. MIPH = minimally invasive procedure for hemorrhoids; SD = standard deviation; PR = per rectum.

Table 4: Postoperative Recovery Parameters

Parameter	MIPH (n=32)	Chivate (n=32)	p-value
Time to first urination (hours), Mean ± SD	8.4 ± 2.1	6.8 ± 1.7	0.0014*
Time to first bowel movement (hours), Mean ± SD	28.6 ± 6.5	24.3 ± 5.0	0.0043*
Hospital stay (days), Mean ± SD	2.4 ± 0.8	1.4 ± 0.6	<0.0001*
Hospital stay, median (days)	2.5	1.0	—

*p < 0.05 indicates statistical significance. SD = standard deviation. MIPH = minimally invasive procedure for hemorrhoids; SD = standard deviation.

At 3 months, patient reported satisfaction (Table 6) was trending in favor of Chivate's procedure, with 81.2% of patients being highly satisfied vs 56.2% after MIPH, and less dissatisfied patients in the Chivate group (3.1% vs 12.5%), although this overall difference was not statistically significant (χ 2 = 4.921, p = 0.085).

Table 5: Postoperative Complications and Recurrence at 3 Months

Complication	MIPH (n=32)	Chivate (n=32)	p-value
Urinary retention, n (%)	5 (15.6%)	3 (9.4%)	0.450
Fecal incontinence, n (%)	2 (6.2%)	2 (6.2%)	1.000
Anal stenosis, n (%)	2 (6.2%)	0 (0.0%)	0.492
Anal discharge, n (%)	3 (9.4%)	1 (3.1%)	0.612
Wound infection, n (%)	1 (3.1%)	0 (0.0%)	1.000
External skin tags, n (%)	4 (12.5%)	2 (6.2%)	0.671
Recurrence at 3 months, n (%)	6 (18.8%)	1 (3.1%)	0.045*

*p < 0.05 indicates statistical significance. MIPH = minimally invasive procedure for hemorrhoids.

Table 6: Patient Satisfaction at 3-Month Follow-up

Satisfaction Level	MIPH (n=32)	Chivate (n=32)	p-value
Highly satisfied, n (%)	18 (56.2%)	26 (81.2%)	0.085
Satisfied, n (%)	10 (31.2%)	5 (15.6%)	—
Dissatisfied, n (%)	4 (12.5%)	1 (3.1%)	—

*p < 0.05 indicates statistical significance. MIPH = minimally invasive procedure for hemorrhoids.; *Statistically significant (p < 0.05). SD = standard deviation; PR = per rectum.

4 DISCUSSION

In the present prospective observational study, we compared postoperative outcomes between MIPH and Chivate's transanal suture rectopexy in 64 patients undergoing surgery for symptomatic Grade II–IV hemorrhoids and found that Chivate's procedure was associated with shorter operative time, significantly less postoperative pain at every assessed interval, faster return of bladder and bowel function, shorter hospital stay, and lower recurrence at 3 months, without any significant increase in complications.

Baseline comparability: The two groups were comparable in age, sex and grade of hemorrhoids, which enhanced the internal validity of the comparison and indicated that the differences in outcome observed were due to surgical technique rather than differences in severity of disease or patient demographics. The preponderance of males in both arms (68.8–75.0%) is consistent with Surakod et al. (76%) in patients with Chivate's hemorrhoidopexy [16], and the modal age group of 41–50 years in our cohort is generally in line with the predominantly 31–40-year age distribution described in the same series [16], all supporting the well-established pattern that operative hemorrhoidal disease has a predilection for middle-aged, male-predominant populations. The predominance of Grade III–IV disease in both arms is in keeping with the case-mix of previous comparative series including those of Gupta et al. , Vardhani et al. , which also concentrated on higher-grade hemorrhoids requiring definitive surgical correction.[17,18]

Duration of operation and blood loss: Chivate's procedure was associated with a significantly shorter operative time (32.6 vs 38.5 minutes), likely due to the relative simplicity of a purely suture-based technique compared with the additional steps of purse-string placement, stapler positioning and firing required for MIPH. This finding is contrary to that of Prasad et al who reported a longer operative duration for Chivate's procedure (54 minutes) than for open hemorrhoidectomy (37 minutes),[19] which may be a reflection of differences in surgeon experience, learning curve or case selection rather than a limitation of the technique per se. In contrast, Islam et al reported an even shorter mean operative time of 27.7 ± 1.6 minutes for Chivate's procedure, broadly in keeping with the present findings of a brief, efficient procedure.[20] Importantly, the reduction in operative time using Chivate's technique was not at the expense of increased intraoperative bleeding (93.8% vs 90.6% minimal bleeding, p = 0.641). This trend was corroborated by

Vardhani et al who reported intraoperative bleeding in one Chivate patient compared to three in the Milligan-Morgan comparison arm.[18]

Pain after surgery: The most clinically relevant finding in this study was the consistent and significant reduction in postoperative pain with Chivate's procedure at all time points. This is biologically plausible: neither technique entails excision of the sensate anoderm distal to the dentate line, but the circular staple line created in MIPH may include deeper submucosal or muscular tissue and is known to cause “staple-line pain” due to tissue tension and localized foreign-body reaction. The gradual, physiological repositioning of tissue achieved with circumferential sutures in Chivate's technique seems to induce less discomfort comparatively. [6,21] The present MIPH day-1 pain score of 4.2 ± 1.3 finds a close parallel in the score of about 4 reported at 12 hours after MIPH by Nagula et al.,[22] lending external support to the reliability of the present findings. The Chivate day-1 score of 1.8 ± 1.1 compares with the 24-hour visual analog score of 2.09 ± 0.30 reported by Islam et al. for the same procedure.[20] Several other series including those of Vardhani et al. and Singh have reported an essentially painless postoperative course following Chivate's technique further cementing its reputation as a comparatively low pain alternative to both conventional hemorrhoidectomy and stapled hemorrhoidopexy. The finding of significantly lower pain scores at day 3 and day 7 in the present study supports the conclusion that this analgesic benefit is not limited to the first 24 hours but extends well beyond the immediate perioperative period. [18,23]

Functional recovery and length of hospital stay: The earlier return of bladder and bowel function and shorter hospital stay seen in the Chivate group are plausible downstream effects of better pain control. Reduced perianal discomfort and reflex sphincter spasm are known to promote earlier voiding and defecation, respectively, which in turn allows earlier safe discharge.[24] The MIPH hospital-stay figure obtained in this study (2.4 ± 0.8 days) is very close to the mean stay of 2.4 days reported by Poonia et al. for the same procedure,[25] and this supports the internal consistency of the present findings. Vardhani et al. reported discharge within 24 hours for all patients for Chivate's procedure,[18] and Prasad et al. reported a shorter mean stay for Chivate's procedure than for open hemorrhoidectomy (3 vs 4 days),[19] both patterns concordant with the roughly one-day reduction in stay observed here. A reduction in hospital stay of approximately one day may translate into a meaningful reduction in bed occupancy and utilization of resources when extrapolated to high surgical volumes – an important consideration for publicly funded and resource-limited healthcare systems. Complications and safety [9,26] In terms of safety, the two methods were largely similar. The rates of postoperative bleeding, urinary retention and fecal incontinence were not significantly different. Minor complications such as anal stenosis, discharge, wound infection and external tags were numerically more common after MIPH but none of these differences achieved statistical significance. This probably reflects the modest sample size and low absolute event rates for these complications. This pattern is consistent with the findings of Poonia et al who reported an overall early complication rate of 28% after MIPH (including bleeding, urinary retention, pain and prolapse) with a 4% rate of late anal stricture,[25] and with Surakod et al who described a low complication burden after Chivate’s procedure, including 6% postoperative bleeding, 4% pain and 2% constipation.[16] The identical rate of fecal incontinence in both arms (6.2%) is reassuring and suggests that the marked benefits of Chivate's technique in terms of pain and recovery were not obtained at the expense of continence, a finding supported in the general absence of postoperative soiling reported by Singh in a similar series.[23] Recurrent. One of the most clinically important results of this study is the finding of significantly lower recurrence with Chivate’s procedure at 3-month follow-up (3.1% vs 18.8%) but this result should be interpreted with appropriate caution given the relatively short follow-up interval. This rate of recurrence of MIPH is slightly higher than the 4% and 6% rates reported for short-term follow-up by Poonia et al. and Nagula et al., respectively,[22,25] although the latter also noted the recurrence rate increased to 10% at six months, citing a known limitation regarding the long-term durability of stapled hemorrhoidopexy.[22] The Chivate recurrence rate of 3.1% reported herein is well supported by the previous literature: Chivate's procedure resulted in 6% recurrence compared to 40% after open hemorrhoidectomy [19], Rao et al. reported 13.3% recurrence after Chivate's procedure versus 26.6% after stapled hemorrhoidopexy [15], and Vardhani et al. and Singh reported no recurrence during their follow-up periods.[18,23] Collectively, this evidence suggests that the deeper circumferential fixation achieved by transanal sutures in Chivate’s technique may provide more durable rectopexy of prolapsing hemorrhoidal cushions than the mucosal excision-and-staple approach used in MIPH, although confirmation with longer follow-up beyond 3 months is needed.

4.1 Satisfaction of patients

Patient satisfaction, although not statistically significant in the present cohort ($\chi^2 = 4.921$, $p = 0.085$), consistently trended toward Chivate's procedure (81.2% vs 56.2% highly satisfied), in line with its benefits in pain, recovery and recurrence, and in agreement with the positive patient-reported outcomes reported by Prasad et al. and Killedar et al. following Chivate's technique.[19,11] Interestingly, Rao et al. reported a marginally better postoperative compliance with stapled hemorrhoidopexy despite its higher recurrence rate [15]. This emphasizes that patient-reported satisfaction is influenced by several, sometimes conflicting, factors and should be evaluated in conjunction with objective clinical outcomes and not in isolation. Gefen et al. found similar satisfaction with excisional hemorrhoidectomy, stapled hemorrhoidopexy and combined techniques when the technique was tailored to the individual patient’s

anatomy and preference, supporting the finding that appropriate patient selection and counseling may be at least as important to perceived outcome as the specific technique chosen.[28] This supports the idea that, although the objective data in the current study are clearly favorable to Chivate's procedure in several parameters, the selection of the procedure in routine practice should continue to be based on individualized decision-making considering patient preference, anatomical suitability and surgeon expertise.

Mechanistic considerations and the differences observed between the two procedures are also consistent with the understanding of their respective mechanisms of action. MIPH involves circumferential excision of a mucosal-submucosal donut above the dentate line with immediate stapled anastomosis. This creates an acute circumferential wound with a foreign-body staple line that must heal by primary intention under tension. Localized ischemia at the staple line has been suggested as a contributor to the discomfort and occasional staple-line bleeding described in the wider literature. [6,21] Conversely, Chivate's transanal suture rectopexy achieves hemorrhoidal fixation by a gradual tension adjustable suturing technique without circumferential mucosal excision, thus avoiding both the acute wound of stapling and the persistent foreign material of retained staples. This is likely to explain the lower and more rapidly resolving pain profile, as well as the numerically lower rates of staple-line related complications such as anal stenosis and discharge seen in the present cohort. [10,21] Chivate's technique does not involve excised tissue and this may also explain the shorter operative time. This may account for the lack of need for specimen retrieval, inspection of the staple line for hemostasis and stapler-related troubleshooting which may occasionally prolong MIPH.

4.2 Economic and health system view

Cost is an important outcome that is often under reported in the comparative hemorrhoid surgery literature. MIPH requires a special single use circular stapling device which can represent a significant part of total procedural cost especially in settings where such devices are imported or subject to import duties. In contrast, Chivate's technique uses only standard absorbable suture material that is cheap and widely available even in peripheral surgical units[9,14] Taking into account the reduced hospital stay and analgesic use demonstrated in the present study, the total direct and indirect cost of Chivate's procedure is expected to be significantly lower than MIPH. This is corroborated by the wider health-economic literature regarding the management of hemorrhoid disease, where the cost of the device and consumables is invariably mentioned as a major factor in the overall cost of the procedure.[9,26] In publicly funded or out-of-pocket healthcare systems, for example much of India and other low- and middle-income countries, this differential in cost may be as clinically relevant to patients and health administrators as the differences in pain and recovery documented here. Formal cost-effectiveness analysis and future comparative trials would help to quantify this advantage more precisely.

4.3 Implications for clinical and health system

In addition to individual clinical outcomes, Chivate's transanal suture rectopexy eliminates the need for a disposable circular stapling device, thereby significantly reducing the per-case cost, an important consideration in low- and middle-income healthcare settings where out-of-pocket costs often determine access to surgical care.[9,14,26] Shorter operative time, decreased analgesic requirement, earlier discharge and decreased short-term recurrence suggest that increased adoption of Chivate's technique, especially in high-volume surgical units in the public sector, could have benefits in terms of patient experience and resource efficiency without sacrificing safety. These results further support the inclusion of structured, serial postoperative pain assessment and short-term recurrence monitoring into standard institutional protocols for hemorrhoid surgery as outcome measures can identify differences in procedure-related attributes that may not be detected by operative success alone.

4.4 Strengths

The main strength of this study is the direct prospective head to head comparison of MIPH and Chivate's procedure in a single institution and in a homogeneous perioperative protocol, which reduces inter-institutional variability. The baseline comparability between groups on several demographic and clinical variables is good, which enhances the internal validity of the postoperative comparisons. The assessment of a wide range of clinically relevant endpoints, including intra-operative, early postoperative, and 3-month outcomes, offers a full picture of both efficacy and safety, rather than a narrow, single-outcome comparison.

4.5 Limitations

This study has several limitations that need to be considered. Firstly, allocation to procedure was not randomized and was based on surgeon and patient preference, which may lead to selection bias despite the documented comparability of baseline characteristics between groups. Second, although the sample size was adequate to detect differences in the primary outcomes studied, it was modest and collected from a single tertiary care center, which may limit generalizability to other settings with different case-mix, surgical expertise, or perioperative protocols. Third, we only followed patients for 3 months, which precluded our ability to evaluate long-term recurrence, durability of repair, and delayed complications such as late anal stenosis; some previous series suggest that recurrence after MIPH continues to

accrue well beyond this interval.[22] Fourth, pain was assessed with a subjective visual scale; assessors and patients were not blinded to the procedure performed, which could have resulted in observer or reporting bias. Finally, this study did not incorporate formal cost-effectiveness analysis, validated quality of life instruments or objective anorectal physiological testing (e.g. manometry) and the inclusion of these would strengthen future comparative work in this area.

4.6 Implications for practice

The present findings are of practical importance when considered together for surgical decision making, preoperative counseling and institutional protocol design. The data support the use of Chivate's transanal suture rectopexy as a first-line option for appropriate Grade II–IV hemorrhoids in patients in whom early postoperative recovery, minimal pain, and early discharge are clinical priorities. MIPH remains a reasonable and internationally validated alternative, particularly if surgeon familiarity or specific anatomical considerations favor a stapled approach. For patients, the demonstrated benefits in terms of pain and recovery can be incorporated into shared decision making during preoperative counseling, allowing patients to consider procedure-specific trade-offs against their own priorities regarding cost, recovery time and perceived durability of outcome. Chivate's procedure is technically simple and inexpensive in terms of consumables and as such lends itself to wider dissemination for training programs and institutions, especially those centers with a high hemorrhoidectomy caseload and limited capital budgets for disposable surgical devices.

4.7 Future Directions

Larger, multicentre, randomized controlled trials with longer follow-up (>6 to 12 months), blinded outcome assessment wherever possible, formal cost-effectiveness analysis and validated quality of life instruments are required to confirm and extend the present findings. Future studies should also evaluate outcomes in surgeons with varying experience with Chivate's technique to assess reproducibility and the effect of the learning curve. Subgroup analyzes by hemorrhoid grade should be considered to identify patient populations that benefit most from each procedure.

5 CONCLUSION

In this prospective observational comparison of 64 patients, Chivate's transanal suture rectopexy was associated with shorter operative time, significantly better postoperative pain control at all assessed intervals, faster return of bladder and bowel function, shorter hospital stay, and lower 3-month recurrence than MIPH, with a comparable overall complication profile and a favorable, though not statistically significant, trend in patient satisfaction. Given its additional advantages of technical simplicity and avoidance of disposable stapling equipment, Chivate's procedure represents a safe, effective, and cost-effective alternative to MIPH for the surgical management of hemorrhoids, particularly relevant to resource-limited settings. Larger randomized trials with longer follow-up are recommended to validate these findings and to define the durability of outcomes beyond the short term.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare that they have no financial or non-financial conflicts of interest related to this study or its publication.

Statement of ethical approval

The study was approved by the Institutional Ethics Committee of GMERS Medical College and Hospital, Valsad, Gujarat, India, and was conducted in accordance with the ethical standards of the Declaration of Helsinki.

Statement of informed consent

Written informed consent was obtained from all participants in their preferred local language after explaining the study procedures, surgical interventions, follow-up requirements, and their right to withdraw from the study at any time without affecting their standard of care.

Author Contributions

- Vikas Bhikanrao Dalvi (VBD): Study design, patient recruitment, clinical data collection, perioperative management, follow-up, and manuscript preparation.
- Chetan Kumar Tandel (CKT): Study supervision, surgical management, clinical guidance, interpretation of findings, critical review and revision of the manuscript.
- Jaswant Jaisankar* (JJ)(Corresponding Author) Conceptualization, methodology, surgical management, data collection and analysis, interpretation of results, manuscript drafting, critical revision, and correspondence with the journal.
- Meet Dave (MD): Surgical management, patient recruitment, clinical data collection, postoperative follow-up, interpretation of clinical outcomes, and critical revision of the manuscript.
- Hiren Patel (HP): Patient recruitment, clinical data collection, perioperative documentation, postoperative follow-up, and contribution to manuscript preparation.

Data Availability Statement

All data supporting the findings of this study are included within the manuscript. Additional information may be made available by the corresponding author upon reasonable request.

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