Does routine partial lateral sphincterotomy with open hemorrhoidectomy improve postoperative pain?

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Received: 22 October 2023
Revised: 31 October 2023
Accepted: 6 November 2023
Published: 31 January 2024

The Egyptian Journal of Surgery 2024, 43:89–95

Objective
In this study we aimed to detect the difference regarding the postoperative pain and continence in patients with third and fourth degree hemorrhoidal disease who underwent either hemorrhoidectomy alone or combined hemorrhoidectomy with partial internal sphincterotomy for the treatment of hemorrhoidal disease.
Patients and methods
This prospective comparative randomized clinical trial was conducted at hospitals of Tanta University during the period from March 2021 to August 2022 on 100 patients with third or fourth degree hemorrhoids who were randomly assigned either to group A, patients who only underwent hemorrhoidal excision by the classical technique of Milligan–Morgan or group B, with added partial lateral sphincterotomy to the classic technique. All patients in both groups underwent anorectal manometry both preoperatively and postoperatively. Pain following surgery was analyzed by using visual analog scale system at 24 h, 48 h, and on 10th postoperative day, other complications including incontinence, infection, hematoma, bleeding, and anal stricture were evaluated at 24 h, 48 h, 10th postoperative day, 1 month, and after 3 months.
Results
Total 100 patients were divided among both groups. The mean age of the patients was 37.7±11.3 and 36.3±11.3 years in group A and group B, respectively. Thirty-two males and 18 females were in group A in comparison to 33 males and 17 females in group B. During follow-up periods, patients in group B had less postoperative pain than those in group A with statistically significant difference. None of the patients developed fecal incontinence for solid or liquid stools in both groups, except for nine patients developed only mild degree of incontinence for flatus in the first week that improved gradually till completely resolved before the end of the 3 months follow up.
Conclusion
The addition of partial internal sphincterotomy to the classical haemorrhoidectomy technique significantly improves postoperative pain without increasing overall related morbidity.

Keywords:
hemorrhoids, pain, sphincterotomy

Egyptian J Surgery 43:89–95

1110-1121

Introduction

The downward engorgement of the venous plexuses in the submucosal plane of the anal canal known as hemorrhoids commonly presenting with either rectal bleeding, prolapse, itching, pain or one of its complications, namely thrombosis or strangulation are one of the commonest problems facing anorectal surgeons [1,2].

The famous Milligan–Morgan surgical procedure is still the most commonly widely performed for the management of third and fourth degree hemorrhoidal disease worldwide [3]. Pain is the main annoying postoperative problem affecting the patient after this technique and although the great variety of available analgesics, its management still also represent a problem for the surgeon. Other less commonly presenting postoperative complications like bleeding, mucous discharge, urinary retention, and anal stenosis may occur [4,5].

Hemorrhoidectomy related postoperative pain may result from either packing of the anal canal commonly performed by anorectal surgeons to prevent postoperative bleeding, urinary retention, wound edema or infection and spasm of the internal sphincter muscle especially in young adults who still have preserved high anal tone [6–8].

 DOI: 10.4103/ejs.ejs_246_23

So namely, pain as becoming the most popular fear among other postoperative complications after hemorrhoidectomy is still a matter of research and clinical trials to control it, like local postoperative application of glyceryl trinitrate to the surgical field or systemic use of calcium channel blockers and Diosmin and all these trials showed unremarkable symptomatic effect in controlling postoperative pain.

On the other hand, the fact of internal sphincter spasm as a major cause of postoperative hemorrhoidectomy-related pain initiated the controversy of adding routine internal sphincterotomy along with hemorrhoidectomy for the reduction of postoperative pain, as some studies like that of Di Bella and Esteinne [9], combined approach causes reduced postoperative pain that help in early recovery and return to usual daily activities that reflected on overall patient performance, while others reported not only the failure of internal sphincterotomy in reducing pain, but also it carries a risk of up to 8–30% incidence of fecal incontinence [10].

This standstill controversy aroused our interest to initiate this study regarding this classic traditional technique that although it is old technique, but still the most successful technique for hemorrhoids control.

We launched this study to evaluate the postoperative pain and also evaluating the effect of this technique on the function of anal sphincter both subjectively as described by the patient himself for his postoperative continence status and also objectively by preoperative and postoperative anorectal manometry.

We divided our patients randomly into two groups with two treatment modalities: group A that had only classical haemorrhoidectomy and group B for combined hemorrhoidectomy with partial internal sphincterotomy.

Patients and methods

This prospective randomized clinical trial (RCT) conducted during the period from March 2021 to August 2022 on 100 patients with third and fourth degree hemorrhoids in Tanta university hospitals after approval of institutional research and ethical committee. Sample size was calculated using power sample size formula.

After taking patients history and thorough clinical and proctoscopic examination the patients were eligible for the study. Anorectal manometry was done for all patients in both groups preoperatively that recorded the resting and the maximum squeeze pressures in every patient.

Exclusion criteria for the patients were those with history of inflammatory bowel disease, those presenting with associated other anal conditions like anal fissure or fistula, those with suspected malignancy, recurrent hemorrhoids, those with history of incontinence or defective sphincter function on preoperative manometry and patients with first-degree and second-degree hemorrhoids.

An approval of the study was obtained from our local research ethical committee in Tanta Faculty of Medicine. Informed and written consent was taken from all patients after oral explanation of both procedures planned for hemorrhoidectomy with explanation of the possible complications as bleeding or some degree of incontinence. Randomization was done for all patients by using the simple closed envelope technique and the patient was then assigned to either one of the two groups.

Open hemorrhoidectomy alone was the procedure done in group A, whereas group B patients underwent open hemorrhoidectomy along with partial lateral sphincterotomy. All cases were operated by the same team of surgeons and the data that was collected later analyzed and tabulated. All patients were operated in lithotomy position either under spinal or general anesthesia and were given preoperative 1 g third-generation cephalosporin and 500 mg metronidazole within 1 h from skin incision. Classical open hemorrhoidectomy described by Milligan–Morgan was performed in all patients.

In group A, additional division of the distal 1 cm of the internal sphincter through one of the same wound of hemorrhoidectomy. After hemostasis was secured, anal dressing was done without anal pack.

Postoperative analgesia included intravenous diclofenac sodium 75 mg TID for first 24 h together with intravenous nalbuphine 20 mg diluted in 10 ml saline and given 5 mg every 3 h followed by oral diclofenac sodium 50 mg twice a day for 7 days or more if needed. On the second postoperative day, anal dressing was removed and the patient continued on regular twice a day warm sitz bath for 10 days.

All patients were kept on stool softeners, oral 500 mg metronidazole TID and oral 500 mg ciprofloxacin BID for 7 days. All patients in both groups were discharged within 48 h. On 10th postoperative day, 1 and 3

months all patients were evaluated at outpatient clinic for the assessment of pain and anal continence. Anorectal manometry was repeated after 3 months postoperatively.

The degree of pain intensity was evaluated using the classical visual analog scale system giving its grades from 1 to 10 where the patients were asked to mark a point on the line that matches the intensity of pain he or she felt at 24 h, 48 h, and on 10th postoperative day. For easy statistical analytical evaluation, we interpreted The visual analog scale as follows: 0=no pain, 1–3=mild pain, 4–6=moderate pain, more than or equal to 6=severe pain. The number of days, the patients in both groups needed NSAIDs and opiates was recorded and tabulated.

Statistical analysis

The collected data were tabulated and analyzed using IBM SPSS software package, version 20.0. (IBM Corp., Armonk, New York, USA). The Kolmogorov–Smirnov was used to verify the normality of distribution of variables. Comparisons between groups for categorical variables were assessed using χ^2 test (Fisher or Monte Carlo). Student *t* test was used to compare two groups for normally distributed quantitative variables. Significance of the obtained results was judged at the 5% level.

Results

The 100 patients' demographic features are shown in Table 1. The mean age of the patients in group A was 37.7±11.3 in comparison with 36.3±11.3 years for group B with no statistically significant difference. There were 32 (64%) males and 18 (36%) females in group A that was nearly the same for group B with 33 (66%) males and 17 (34%) females.

Fifty-six percentage of patients in group A and 52% of patients in group B had confirmed diagnosis of fourth-degree hemorrhoids, while the remainder had third-degree hemorrhoids.

Severity of pain at different intervals are demonstrated in Table 2. There was statistically significant difference in the severity of pain between the patients in two groups at 24 h and at 10 days.

The mean number of days the patients in group A needed opiates and NSAIDs were 1.9±0.8 and 9±1.5

Table 1 Patients demographic data

	Without lateral sphincterotomy (*N*=50): group A	Lateral sphincterotomy (*N*=50): group B	Test of significance	*P*
Age (years)				
Mean±SD	37.7±11.3	36.3±11.3	*t*=0.629	0.531
Median (minimum–maximum)	37 (20–58)	34.5 (19–59)		
Sex [*n* (%)]				
Male	32 (64)	33 (66)	χ^2=0.044	0.834
Female	18 (36)	17 (34)		
Degree of hemorrhoids [*n* (%)]				
Third degree	22 (44)	24 (48)	χ^2=0.044	0.834
Fourth degree	28 (56)	26 (52)		

χ^2, χ^2 test; *P*, *P* value for comparing between the studied groups; *t*, Student *t* test. *Statistically significant at *P* value less than or equal to 0.05.

Table 2 Pain level in both groups

	Pain [*n* (%)]					
	No pain	Mild	Moderate	Severe	c^2	P
24 h						
Without lateral sphincterotomy	0	0	25 (50)	25 (50)	5.086*	0.024*
Lateral sphincterotomy	0	0	36 (72)	14 (28)		
48 h						
Without lateral sphincterotomy	0	17 (34)	23 (46)	10 (20)	5.870	0.053
Lateral sphincterotomy	0	28 (56)	18 (36)	4 (8)		
10 days						
Without lateral sphincterotomy	10 (20)	34 (68)	6 (12)	0	11.608*	MC*P*=0.003*
Lateral sphincterotomy	26 (52)	22 (44)	2 (4)	0		

χ^2, χ^2 test; MC, Monte Carlo; *P*, *P* value for comparing between the studied groups; *t*, Student *t* test. *Statistically significant at *P* value less than or equal to 0.05.

Table 3 Need for analgesics in both groups

	Without lateral sphincterotomy (*N*=50): group A	Lateral sphincterotomy (*N*=50): group B	Test of significance	P
Need for opiates (days)				
Mean±SD	1.9±0.8	1.5±0.7	*t*=2.766*	0.007*
Median (minimum–maximum)	2 (1–3)	1 (1–3)		
Need for NSAIDs (days)				
Mean±SD	9±1.5	1.5±0.7	*t*=4.917*	<0.001*
Median (minimum–maximum)	9 (6–12)	7 (5–11)		

P, *P* value for comparing between the studied groups; *t*, Student *t* test. *Statistically significant at *P* value less than or equal to 0.05.

days successively, while on the other hand for group B it was 1.5±0.7 and 1.5±0.7 days with statistically significant difference between the two group as demonstrated in Table 3.

Manometric findings

Anorectal manometric values including resting and maximum squeeze pressures in patients of both groups before and after surgery as shown in Table 4. Although, the resting anorectal pressure was lower in group B after lateral sphincterotomy with statistically significant difference between the two groups, the maximum squeeze pressure on the other hand was higher in group B with statistically significant difference between the two groups. None of the patients developed fecal incontinence for solid or liquid stools in both groups, except for six patients in group B developed only mild degree of incontinence for flatus in the first week that improved gradually till completely resolved before the end of the 3 months follow up. No patients in both groups developed anal bleeding, hematoma, or stricture on follow up. Only one patient in group A and two patients in group B developed postoperative infection manifested by anal purulent discharge that were managed conservatively according to culture and sensitivity without any residual complications.

Discussion

Among all anal diseases, hemorrhoids represent one of the commonest that affect patients of both sexes and different age categories especially those who are older than 50 years in which 50% of them would show hemorrhoids symptoms [11]. Recently, the management of hemorrhoids showed great advancement and many new surgical technologies became indulged to treat this disease such as Harmonic scalpel or Ligasure hemorrhoidectomy, Doppler-guided hemorrhoidal artery ligation, stapled

Table 4 Anal manometric findings

	Without lateral sphincterotomy (*N*=50): group A	Lateral sphincterotomy (*N*=50): group B	Test of significance	*P*
Resting anorectal pressure				
Before surgery				
Mean±SD	102.2±17.3	99.9±14	*t*=0.745	0.458
Median (minimum–maximum)	100 (70–145)	102 (74–140)		
After surgery				
Mean±SD	96.4±28.1	75.6±11.3	*t*=4.855*	<0.001*
Median (minimum–maximum)	100 (79–140)	73 (60–100)		
Maximum squeeze anorectal pressure				
Before surgery				
Mean±SD	239.5±54.2	263.3±47.3	*t*=2.338*	0.021*
Median (minimum–maximum)	255 (140–312)	279.5 (160–325)		
After surgery				
Mean±SD	265.3±44.1	309.4±50.4	*t*=4.651*	<0.001*
Median (minimum–maximum)	274 (145–310)	298 (166–382)		
Incontinence for stool and flatus at 3 months follow up [*n* (%)]	0	0	–	–
Other complications (infection) [*n* (%)]	1 (2)	2 (4)	c^2=0.344	^{FE}P=1.000

χ^2, χ^2 test; MC, Monte Carlo; *P*, *P* value for comparing between the studied groups; *t*, Student *t* test. *Statistically significant at *P* value less than or equal to 0.05.

hemorrhoidectomy, and laser hemorrhoidplasty, but none of them prove to be gold standard in terms of efficacy and safety.

Therefore, the Cochrane Library recent meta-analysis [12,13] confirmed that conventional hemorrhoidectomy as first described by Milligan and Morgan is still the most widely used, effective and definitive surgical treatment for patients with symptomatic grades III and IV degree hemorrhoids. However, despite its effectiveness, this procedure still has its associated problems especially in terms of postoperative pain and bleeding.

Hemorrhoidectomy postoperative pain is multifactorial related to either anal packing, urinary retention, wound edema, and inflammation, but internal sphincter spasm is one of the important causing factors as the patients suffering from hemorrhoids naturally have high sphincteric tone as evidenced by many anorectal manometric studies that becomes exaggerated after surgery [6–8].

Various techniques were applied in order to decrease the spasm of the sphincter like anal canal dilatation that was first described by Lord [14], but as a result of the marked uncontrolled damage to the anal sphincter fibers, fecal incontinence was a major problem. This induces the idea of reversible sphincterotomy by topical application of nitroglycerine, but its application did not seem to be attractive option because of severe headache, the need to apply large amount of cream several times, local skin thickness, and tissue inflammation.

Eisenhammer [15] was the first to describe the theory of internal sphincter spasm related posthemorrhoidectomy pain and as a result, its division is thought to decrease the pain. Later on, the technique of routine added internal sphincterotomy was applied and its beneficial effects in management of postoperative pain was reported many others. Mukadam and Masu [16] and Raza *et al.* [17] confirmed these results without added overall postoperative complications as regard the continence status. Our results also confirmed that reduction of pain as assessed at different intervals.

In our study, only six patients developed early flatus incontinence that completely improved before the 3 months follow up. Among the 50 patients included in Das *et al.*'s study [18], one patient developed temporary fecal soiling that lasted only for 2 weeks and two other patients that also developed temporary flatus incontinence.

Our results are consistent with the results of Amorotti *et al.* [19] and Diana *et al.* [20].

Others like Khubchandani [7], found no difference as regard postoperative pain relief after adding internal sphincterotomy to the classical hemorrhoidectomy technique, but also reported increased incidence of anal incontinence after internal sphincterotomy. Similar studies reported the same results regarding the beneficial effect of lateral sphincterotomy on postoperative pain [21–31] Also, Junior *et al.* [32] in his RCT over 20 patients, reported similar results as regard both pain and risk of incontinence, but actually this did not support his idea due to the small sample size.

The condition of hemorrhoids is commonly associated with raised anal pressures [33–35], although some authors have not been able to confirm this [36]. Lateral internal sphincterotomy (LIS) or anal dilatation have therefore been introduced as part of the hemorrhoidectomy technique in order to decrease postoperative pain [37–39] as the sheer reduction of the sphincter pressures alone was not enough to cure patients with prolapsed hemorrhoidal disease [40], and this was confirmed by the data afforded by many later RCTs that shown the superiority of haemorrhoidectomy over LIS alone in the hemorrhoids management [35,36]. This preoperative raised anal pressure is assumed to be a result of the high pressure in the vascular anal cushions [34,37–39].

In our study, hemorrhoidectomy alone without LIS did not affect the preoperative high resting anal pressures markedly. On the contrary, the addition of LIS was followed by a marked reduction of the anal pressures with statistically significant difference between the two groups. On the contrary, although the mean preoperative maximum squeeze pressure was higher in group B, this was not affected after lateral sphincterotomy as assessed both clinically and by postoperative manometry and this support the theory that the raised anal pressures in patients with hemorrhoids is not only of vascular origin, but also caused by hypertensive anal sphincter and this answered the question why the manometric values were not normalized after removal of the hemorrhoidal disease alone of as expected. According to our experience and that of others [36,40], not only anal pressures would remain high after routine hemorrhoidectomy as well as after other treatments such as rubber band ligation [41], but also that higher pressure may play a role in hemorrhoids formation. Addition of a LIS should therefore be

considered in the treatment of prolapsed hemorrhoidal disease.

The continence mechanisms are complex and its impairment followed by either temporary or permanent soiling after routine hemorrhoidectomy had been described and mostly attributed to lowering the anal pressure after removal of the anal cushions [40,41], but mostly complete continence returns within a few months [42].

Although, some authors claimed that the addition of sphincterotomy would increase the risk of incontinence [34,35], the many RCTs on the treatment of anal fissure confirmed the low incidence of incontinence, which even is transient [43]. So, the removal of anal cushions plus sphincterotomy for hemorrhoids can be successfully done with little or no morbidity [44–46]. In our experience, six patients who had a LIS developed transient episodes of flatus incontinence that disappeared within 3 months. In conclusion, abnormally high pressures in the anal canal are common in patients with severe hemorrhoidal disease and they seem to have a role in the formation of hemorrhoids. Raised anal pressures are not reduced by routine hemorrhoidectomy. The addition of LIS seems justifiable. In these cases, sphincterotomy significantly improved the postoperative course after hemorrhoidectomy and was safe.

Conclusion

The addition of LIS to open hemorrhoidectomy seems to have a positive effect on reducing the postoperative pain without causing the continence problem.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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