

Excisional hemorrhoidal surgery and its effect on anal continence

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Abstract

AIM: To investigate the role of anal cushions in hemorrhoidectomy and its effect on anal continence of the patients.

METHODS: Seventy-six consecutive patients (33 men and 43 women) with a mean age of 44 years were included. They underwent Milligan-Morgan hemorrhoidectomy because of symptomatic third- and fourth-degree hemorrhoids and failure in conservative treatment for years. Wexner score was recorded and liquid continence test was performed for each patient before and two months after operation using the techniques described in our previous work. The speed-constant rectal lavage apparatus was prepared in our laboratory. The device could output a pulsed and speed-constant saline stream with a high pressure, which is capable of overcoming any rectal resistance change. The patients were divided into three groups, group A (< 900 mL), group B (900-1200 mL) and group C (> 1200 mL) according to the results of the preoperative liquid continence test.

RESULTS: All the patients completed the study. The average number of hemorrhoidal masses excised was 2.4. Most patients presented with hemorrhoidal symptoms for more than one year, including a mean duration of incontinence of 5.2 years. The most common symptoms before surgery were anal bleeding ($n = 55$), prolapsed lesion ($n = 34$), anal pain ($n = 12$) and constipation ($n = 17$). There were grade III hemorrhoids in 39 (51.3%) patients, and grade IV in 37 (48.7%) patients according to Goligher classification. Five patients had experienced hemorrhoid surgery at least once. Compared with postoperative results, the retained volume in the preoperative liquid continence test was higher in 40 patients, lower in 27 patients, and similar in the other 9 patients. The overall preoperative retained volume in the liquid continence test was 1130.61 ± 78.35 mL, and postoperative volume was slightly decreased (991.27 ± 42.77 mL), but there was no significant difference ($P = 0.057$). Difference was significant in the test value before and after hemorrhoidectomy in group A (858.24 ± 32.01 mL vs 574.18 ± 60.28 mL, $P = 0.011$), but no obvious difference was noted in group B or group C. There was no significant difference in Wexner score before and after operation (1.68 ± 0.13 vs 2.10 ± 0.17 , $P = 0.064$). By further stratified analysis, there was significant difference before and 2 months after operation in group A (2.71 ± 0.30 vs 3.58 ± 0.40 , $P = 0.003$). In contrast, there were no significant differences in group B or group C (1.89 ± 0.15 vs 2.11 ± 0.19 , $P = 0.179$; 0.98 ± 0.11 vs 1.34 ± 0.19 , $P = 0.123$).

CONCLUSION: There is no difference in the continence status of patients before and after Milligan-Morgan hemorrhoidectomy. However, patients with preoperative compromised continence may have further deterioration of their continence, hence Milligan-Morgan hemorrhoidectomy should be avoided in such patients.

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Key words: Anal cushion; Anal incontinence; Liquids continence test; Wexner score; Hemorrhoidectomy

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INTRODUCTION

Hemorrhoids are very common and it occurs in men and women of all ages. It is estimated that 50% of the people older than 50 years have hemorrhoids symptoms at least for a period of time^[1]. The most common symptoms include rectal bleeding, pain, anal irritation and anal mass prolapse and a disrupted quality of life. There has been much speculation over the years as to the nature of “hemorrhoids”. It is now generally accepted that “hemorrhoids” are a disorder of the anal cushions^[2]. Thomson demonstrated that in patients suffering from hemorrhoids, the specialized “cushions” of submucosal tissue lining the anal canal slide downwards, together with the anal mucosa, due to the fragmentation of Parks’ ligament^[3-5]. This means that hemorrhoids result from distal enlargement of the anal cushions. The anal cushions are connective tissue complexes that contain smooth cells and vascular channels; they are thought to provide an effective tight seal to close the anal in concert with the internal anal sphincter^[6].

For patients with grades III and IV hemorrhoids, surgical excision remains the most common choice of treatment. Two main approaches have been used, one removes the cushions (e.g., Milligan-Morgan hemorrhoidectomy) and the other retains the cushion (e.g., stapled hemorrhoidopexy or procedure for prolapse and hemorrhoids). The expensive stapled hemorrhoidopexy has become a widely accepted alternative to excisional hemorrhoidectomy for treating the third- and fourth-degree hemorrhoids in China over the recent decade, it even has a trend to replace the traditional hemorrhoidectomy^[7]. According to Thomson’s theory, impairment of the anal cushions may lead to anal incontinence. Some previous studies^[8-13] indicate that hemorrhoidectomy might be complicated with fecal incontinence. Therefore, many non-excisional options have become available to overcome the disadvantages of traditional surgery, which have given rise to dispute around the world. However, to our knowledge, there has been no direct evidence supporting the function of the anal cushion. Our study aims to define the role of the anal cushions in hemorrhoidectomized patients by performing a liquid continence test simulating anorectal continence of liquid stool and using the Wexner score (the Cleveland clinic continence scoring system)^[14,15].

MATERIALS AND METHODS

Patients

Consecutive patients with hemorrhoids were included in the study. Inclusion criteria for the cohort were: the existence of symptomatic third- and fourth-degree hemorrhoids, and failure in conservative treatment for years and intention for Milligan-Morgan hemorrhoidectomy. Patients younger than 18 or older than 80 years, who had experienced concomitant anal diseases (fissure, abscess, fistula, inflammatory bowel disease, rectal cancer) were excluded. Eligible patients were asked for signed informed consent. The study was approved by the local ethics committee.

Eighty patients who referred to our hospital between April 2005 and September 2010 were recruited. Four patients, who lost to follow-up and did not complete the second Wexner scoring and liquid continence test, were excluded. Eventually, 76 patients were eligible and completed the study. The demographic and clinical data, and the results of liquid continence test were obtained. The anal continence was assessed using the Wexner scoring system.

Liquid continence test was performed and Wexner score was recorded for each patient before and two months after operation. The patients were divided into three groups: group A (< 900 mL), group B (900-1200 mL) and group C (> 1200 mL) according to the retained volume in the liquid continence test done before operation.

Each patient underwent the standard Milligan-Morgan hemorrhoidectomy using conventional instruments for dissection and a monopolar coagulator for hemostasis by experienced surgeons.

Liquid continence test

Liquid continence test was performed preoperatively in all the patients. At 2 mo follow-up after operation, wounds were healed in all the patients. The same tests were repeated two months after surgery (60 ± 3 d).

This test was performed using the techniques described in our previous work^[16]. The speed-constant rectal lavage apparatus was prepared in our laboratory^[16]. The device could output a pulsed and speed-constant saline stream with a high pressure, capable of overcoming any rectal resistance change.

The first liquid continence test was performed at the preoperative days 1 and 2. Patients were advised to empty their rectums before the examination. The patient sat on the device. After a F16 balloon urethral catheter was introduced into the rectum about 8-cm deep, the balloon was inflated with 5 mL air. The warm saline (37 °C) was infused at a rate of 60 mL/min. The patients were instructed to hold the liquid as long as possible. If the device was alarmed when a leakage amount reached 10 mL or the infusing liquid reached the maximum (1500 mL), the test stopped. The total volume retained was recorded. After the end-point was recorded, the balloon was deflated and the catheter was extracted.

Table 1 Demographic characteristics of hemorrhoid patients

Variables	Values
Age (yr) ¹	44 (22-72)
Gender (male/female)	33/43
Chief complaints, <i>n</i> (%)	
Prolapse	32 (42.1)
Anal bleeding	55 (72.3)
Anal pain	12 (15.8)
Constipation	17 (25.4)
Hemorrhoids stage, <i>n</i> (%)	
Third-degree	39 (51.3)
Fourth-degree	37 (48.7)
Resected piles (<i>n</i>) ²	2.4 ± 0.3
Disease duration (yr) ²	3.6 ± 1.1

¹Data are median (range); ²Data are means ± SD.

Wexner score

Anal incontinence was assessed using the Wexner grading system^[14]. Wexner score contains three items about the type and frequency of incontinence (scored from zero to four) and items on pad usage and lifestyle alteration (both scored from zero to four). Data were collected by physicians through a patient interview.

Statistical analysis

Statistical analysis was performed with SPSS 16.0 software. The data were expressed as mean ± SD or median (range). Continuous data were compared using paired Student's *t* test. Difference was considered to be significant when the *P* value was < 0.05.

RESULTS

The demographics and clinical details of the 76 patients are shown in Table 1. The mean age of patients was 44 years (range: 22-72 years) and the male to female ratio was 1:1.3. The number of hemorrhoidal masses excised varied from 2-4 (mean: 2.4 ± 0.3). The mean duration of incontinence was 5.2 years. Most patients had hemorrhoidal symptoms for more than one year, and some patients even for more than 20 years. The most common symptoms observed in the patients before surgery was anal bleeding (55 cases), prolapsed lesion (34 cases), anal pain (12 cases) and constipation (17 cases) (Table 1). Thirty-nine (51.3%) patients had grade III hemorrhoids, and 37 patients (48.7%) had grade IV hemorrhoids according to the Goligher classification. Five patients experienced hemorrhoid surgery at least once.

Compared with the postoperative results, the retained volume in the preoperative liquid continence test was higher in 40 patients, lower in 27 patients, and similar in the rest 9 patients. The overall preoperative volume in the liquid continence test was 1130.61 ± 78.35 mL, and postoperative values were slightly decreased (991.27 ± 42.77 mL), but there was no significant difference (*P* = 0.057).

According to the results of preoperative test, patients were divided into three groups: 17 patients in group A (<

900 mL), 26 in group B (900-1200 mL) and 32 in group C (> 1200 mL) (Table 2). Interestingly, significant difference was found in the test results before and after hemorrhoidectomy in group A (858.24 ± 32.01 mL *vs* 574.18 ± 60.28 mL, *P* = 0.011), but no obvious difference was noted in group B or group C (Table 2).

There was no significant difference in the Wexner score before and after operation (1.68 ± 0.13 *vs* 2.10 ± 0.17, *P* = 0.064; Table 2).

By further stratified analysis, there was significant difference in the Wexner score before and two months after operation in group A (2.71 ± 0.30 *vs* 3.58 ± 0.40, *P* = 0.003). In contrast, there were no significant differences in group B or group C (1.89 ± 0.15 *vs* 2.11 ± 0.19, *P* = 0.179; 0.98 ± 0.11 *vs* 1.34 ± 0.19, *P* = 0.123; Table 2).

DISCUSSION

To evaluate accurately the anal continence is still a clinical challenge. Parks^[17] pointed out that it is difficult to evaluate postoperative anal continence due to the flaws related to subjective and objective factors. We, therefore, used liquid continence test and Wexner scoring system in combination to better assess the anal continence status. The liquid continence test could simulate liquid stool; compared with anorectal manometry, it is more applicable, which can yield objective assessment with quantitative data^[16,18,19]. The Wexner Continence Grading Scale has been widely used for evaluating anal continence^[20-22]. It is convenient in practice and easily acceptable by the patients. Consequently, our assessments based on liquid continence test and questionnaire scoring system, are likely to be more reliable.

In our study, the mean Wexner Continence Grading Scale did not vary significantly after surgery in the overall patients. By further subgroup analysis, after hemorrhoidectomy, the Wexner score significantly increased in patients with preoperative continence defect or subclinical incontinence (group A), while no significant difference was observed in the group with normal anal continence (groups B and C). Similar results were obtained by means of the liquid continence test. While the liquid continence test and Wexner scoring system yielded the similar results, the former is more direct and objective. Baxter *et al*^[23] insisted that fecal incontinence is manifested as a symptom, so any evaluation of incontinence must be built on the perception of the patient. This is one of the reasons why we prefer the liquid continence test in the evaluation.

What is the role of anal cushion in hemorrhoidectomy? In spite of the high incidence of hemorrhoidal diseases worldwide, some aspects of its pathophysiology still remain unknown. According to Thomson's attractive theory, the anal cushions serve as a conformable plug to ensure complete closure of the anal canal and contribute to the anal continence mechanism^[3]. Hemorrhoidectomy is associated with the removal of the anal cushions, and may occasionally lead to anal incontinence^[7,11]. Jóhannsson *et al*^[12] concluded from his questionnaire that 29% of

Table 2 Results of liquid continence test before and after hemorrhoidectomy and Wexner score assessments (mean)

	Liquid continence test (pre-operation) (mL)	Liquid continence test (post-operation) (mL)	P value	Wexner score (pre-operation)	Wexner score (post-operation)	P value
Total patients	1130.61 ± 78.35	991.27 ± 42.77	0.057	1.68 ± 0.13	2.10 ± 0.17	0.064
Group A (n = 17)	858.24 ± 32.01	574.18 ± 60.28	0.011	2.71 ± 0.30	3.58 ± 0.40	0.003
Group B (n = 26)	977.96 ± 15.96	927.31 ± 53.23	0.061	1.89 ± 0.15	2.11 ± 0.19	0.179
Group C (n = 33)	1391.21 ± 16.95	1257.79 ± 51.53	0.124	0.98 ± 0.11	1.34 ± 0.19	0.123

the patients reported the incontinence after hemorrhoidectomy. Thekkinkattil *et al.*^[24] demonstrated that the cushion: canal ratio was reduced in patients with idiopathic fecal incontinence. However, the theory is controversial by the fact that submucosal hemorrhoidectomy does not yield better functional outcome than excisional hemorrhoidectomy^[25]. Our study revealed that hemorrhoidectomy (excised anal cushions) did not impair the function of anal continence. Our findings agree with a previous report^[26] that no incontinence occurred after conventional hemorrhoidectomy. However, there is still much uncertainty regarding the role of anal cushion in fecal incontinence. It is important to note, although no obvious change was observed in anal continence in the patients after excising the anal cushion, further subgroup analysis showed that the patients with a lower value of liquid continence test (< 900 mL) after surgery did impair the fecal continence. This may be partly attributed to the fact that this group of patients had been complicated with continence defect or subclinical incontinence.

Our data support that the traditional hemorrhoidectomy, which necessitates excision of anal cushions, is a safe procedure for patients with normal fecal continence. From the perspectives of cost-effectiveness, the traditional hemorrhoidectomy should be recommended, especially in the developing countries. Nevertheless, surgeons should keep in mind that this kind of surgery may increase the risk of complicated anal incontinence in the patients with anal function defect or subclinical incontinence. Best of all, this study enhances the awareness of surgeons that preoperative evaluation of hemorrhoid patients is important regarding the choice of surgical procedure.

Our study had several limitations, such as a small sample size, short follow-up, and saline continence test could not assess the solid stool, which might result in improper findings. Further studies are being conducted to work out an objective test for solid and flatus stool, and compare the anal cushion preserving and non-preserving procedures as well.

In conclusion, removing anal cushions does not obviously impair the fecal continence in patients with a proper indication for the operation, and therefore it is a safe procedure. It is not necessary to pay excessive attention to anal cushion in hemorrhoid patients. Thorough investigations should be carried out on anal continence so as to prevent the occurrence of postoperative complications.

COMMENTS

Background

Traditional hemorrhoidectomy is tended to be replaced by stapled hemorrhoidopexy with anal cushion retained, because the anal cushion theory considers that the removal of the anal cushions will damage the anal rectal control function. In this study, water retention test and Wexner scoring were used to observe the changes of the anus and rectum control function in the patients treated with traditional hemorrhoidectomy.

Research frontiers

The authors evaluated the anal continence in the patients with hemorrhoids before and after operation using liquid continence test and Wexner scoring system in combination so as to define the role of anal cushions in hemorrhoidectomy.

Innovations and breakthroughs

To evaluate accurately the anal continence is still a clinical challenge, and it is especially difficult to evaluate the postoperative anal continence due to flaws related to subjective and objective factors. The authors, therefore, used liquid continence test and Wexner scoring system in combination in an attempt to better assess the anal continence. The liquid continence test could simulate liquid stool, thus yielding objective assessment with quantitative data. The Wexner scoring system is convenient in practice and easily acceptable by the patients. Consequently, the assessments obtained by this study based on liquid continence test and questionnaire scoring system, are likely to be more reliable. The authors also found that removing anal cushions does not obviously impair the fecal continence in patients with a proper indication for the traditional hemorrhoidectomy, and therefore it is a safe procedure.

Applications

According to this study, that the traditional hemorrhoidectomy, which necessitates excision of anal cushions, is a safe procedure for patients with normal fecal continence. From the perspectives of cost-effectiveness, the traditional hemorrhoidectomy should be recommended, especially in the developing countries. Nevertheless, surgeons should keep in mind that this kind of surgery may increase the risk of complicated anal incontinence in the patients with anal function defect or subclinical incontinence.

Peer review

This study provides new evidences on the safety of Milligan-Morgan hemorrhoidectomy which is less expensive for patients. Some elements may substantiate the study, such as fecal continence test for not only liquid and but also for solid and flatus stools, and comparison between anal cushion preserving and non-preserving procedures.

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