Comparative Study Between Multiple and Single Rubber Band Ligation in One Session for Bleeding Internal Hemorrhoids : A Prospective Study

BUNLUE CHALEOYKITTI, M.D.*

Abstract

Objective : The aim of this study was to compare the cessation of bleeding and the complications between multiple and single ligation using high ligation technique.

Material and Method : All first-visit patients with bleeding internal hemorrhoids were studied and randomly divided into multiple and single ligation groups. High ligation technique was used. Patients visited the clinic in the second week and were invited to visit the clinic or completed questionnaires after one year.

Results : 109 patients were included in the study. 61 patients had multiple ligation and 48 patients had single ligation. The cessation of bleeding in one week occurred in 96.7 per cent of patients in the multiple group and 79 per cent of patients in the single group ($p = 0.004$). There were no differences between the multiple group and single group concerning postligation pain and tenesmus (6.5% *vs* 2%, $p = 0.532$), urinary hesitancy and frequency (6.5% *vs* 4%, $p = 0.904$), and rebleeding in one year (27.9% *vs* 34%, $p= 0.710$). No major complications such as massive bleeding and pelvic sepsis were noted.

Conclusions : Multiple ligation of bleeding internal hemorrhoids in one session can stop bleeding better than single ligation with no more complications.

Key word : Hemorrhoids, Rubber Band Ligation, Complications

CHALEOYKITTI B
J Med Assoc Thai 2002; 85: 345-350

* Division of Colon and Rectal Surgery, Department of Surgery, Phramongkutklao Hospital, Bangkok 10400, Thailand.

† Presented at 25th. Annual Scientific conference of Royal College of Surgeons of Thailand, Petchaburi, Thailand, 17 July 2000.

Multiple hemorrhoidal rubber band ligation in one session has been shown to be a safe, effective, and economical way of treating bleeding hemorrhoids, but had a higher complication rate such as pain and urinary hesitancy, especially in triple ligation[1], than single ligation. High ligation technique might decrease these complications with better results.

The length of the anal canal from the dentate line to anorectal ring is about 2 cm. Duthie and Gairns[2] reported that the proximal limit of pain sensation in the anal canal was about 0.5-1.5 cm proximal to the dentate line. Therefore, the painless area in the anal canal was about 0.5-1.5 cm from the anorectal ring. Moreover, when surgeons drew the hemorrhoidal tissue into the drum of the ligator during ligation of the hemorrhoidal head, the tissue near the dentate line would be drawn into the drum about 0.5-1.0 cm from the tissue that was seized with seizing forceps. The two above reasons explained why surgeons had to apply the seizing forceps at the upper part of the hemorroidal tissue near the anorectal ring (high ligation technique), in order to avoid ligation at the pain area which caused postligation pain and probably tenesmus and urinary symptoms.

There has been no comparative study between multiple ligation and triple ligation. Multiple ligation might be better than triple ligation because it is not necessary to perform three ligations to all three major submucosal internal hemorrhoidal complexes in every patient. In some patients, only two hemorrhoidal tissues could be ligated and the third hemorrhoidal tissue might be too small or too tense to be ligated. If surgeons tried to ligate the small ones, they had to stretch the tissue to perform small unproper ligations. This would tense the tissue and cause pain and other complications. The other reason was that only proper ligations could stop bleeding with excellent results and fewer complications. Therefore, ligation of only diseased hemorrhoids was enough to get rid of the symptoms.

The aim of the study was to compare the cessation of bleeding and postligation complications between multiple and single rubber band ligation in one session, using high ligation technique.

MATERIAL AND METHOD

All first-visit patients with bleeding first-degree to third-degree internal hemorrhoids without any previous hemorrhoidal treatment between January 1997 and December 1998 were included in this prospective study. Informed consent was obtained from every patient. They had no other medical conditions, no urinary symptoms, no hemorrhoidal conditions necessitating immediate surgical intervention, and no other perianal lesions. Abdominal examination, digital examination per rectum, rigid sigmoidoscopy and proctoscopy were performed. Barium enema or colonoscopy was performed only when clinically indicated.

A Pilling Hirschmann anoscope, 18 mm in diameter, was inserted into the lower rectum and withdrawn into the anal canal to expose the internal hemorrhoids. A Downs Barron 8.5-inch-stem hemorrhoidal ligator over a Downs St. Georges seizing forcep was introduced through the anoscope. The seizing forceps was applied to the upper part of hemorrhoidal tissue near anorectal ring, not at the main body of the hemorrhoidal tisssue (Fig. 1). The hemorrhoidal tissue was drawn into the drum of the ligator. One "O" ring rubber band was applied to the base of the tissue that was drawn. If pain occurred at this point, the rubber band would be cut and removed. In the multiple ligation group, this procedure was repeated at the remaining hemorrhoids in the same session. All ligations were performed by one surgeon experienced in this technique for more than 5 years so the learning curve did not have any effect on this study.

Patients were randomly divided into two groups, single and multiple. In the single group, one hemorrhoid which had the most visible vessels or contact bleeding was ligated. In the multiple group, as many diseased hemorrhoids as posssible were ligated. When there was one diseased hemorrhoid, only one ligation was done. When there were two, three, or four diseased hemorrhoidal heads; two, three, or four ligations were performed. All patients were instructed not to take any medication or bulk-forming agents. All patients were followed-up in the second week after ligation to have proctoscopic examinations. If bleeding persisted, the ligation would be repeated to other hemorrhoidal sites until the bleeding stopped. One year later, all patients were invited to visit the clinic for examinations. If they did not come, they would be contacted by telephone or questionnaire. At each follow-up, the patients were asked about bleeding, complications (discomfort, pain, urinary hesitancy and frequency, and dis-

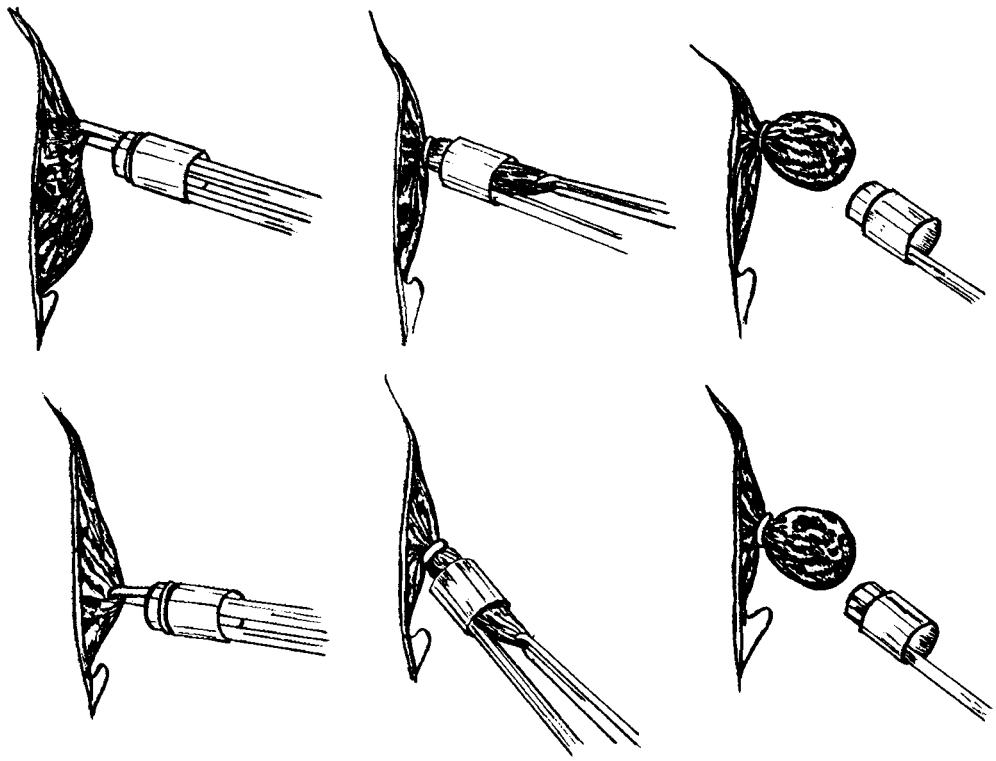

Fig. 1. Pictures in the upper row show high location for hemorrhoidal ligation. Pictures in the lower row show usual location for hemorrhoidal ligation.

charge), and medication used after ligations. Discomfort was included in mild pain because sometimes discomfort and mild pain are difficult to distinguish.

Data were analysed in a computer. Categorical variables were compared with chi-square tests and continuous variables were compared with student's *t*-tests.

RESULTS

117 patients were included in this study. 64 received multiple rubber band ligation (multiple group) and 53 received single rubber band ligation (single group). In the multiple group 3 were lost to follow-up, making the number of patients available for study 61. There were 37 males and 24 females. The mean age was 41.8 years (range, 20 to 65 years). The number of ligations is shown in Table 1. After one year, 43 patients visited the clinic or completed the questionnaires. The follow-up period ranged from 12 to 30 months (mean, 21 months). In the single group, 5 were lost to follow-up, making the number available for study 48. There were 29 males and 19 females. The mean age was 44 years (range, 25 to 89 years). After one year, 38 patients returned or

Table 1. The number of ligations in multiple group.

Number of Ligations	Number of Patients	Per cent
1	14	22.9
2	35	57.4
3	10	16.5
4	2	3.2

completed the questionnaires. The follow-up period ranged from 12 to 22 months (mean, 15.5 months). There were no significant differences in age and gender distribution between the two groups (p = 0.26 and 0.96, respectively). No pain that required tissue releasing occurred during ligation.

59 patients in the multiple group (96.7%) and 38 patients in the single group (79.1%) had no bleeding after the first week (p = 0.0044). The two patients in the multiple group who did not have bleeding cessation in one week had 3 ligations at the first visit. 41 patients in the multiple group (67.2%) and 32 patients in the single group (66.6%) had no bleeding immediately after ligation (p = 0.183). One or two more religations were required to stop bleeding to patients who did not have bleeding cessation after the first ligation.

4 patients in the multiple group (6.55%) and 1 patient in the single group (2.08%) experienced mild pain or tenesmus after ligation which required no further treatment and resolved within the first week (p = 0.532). No patients experienced severe pain that required rubber band removal. 4 patients in the multiple group (6.55%) and 2 patients in the single group (4.16%) experienced urinary hesitancy and frequency which required no further treatment, did not disturb their daily activities and resolved within the first week (p = 0.904). Pain, tenesmus, and urinary complications did not occur in the same individuals.

12 in 43 patients (27.9%) in the multiple group and 13 of 38 patients (34%) in the single group had minimal rebleeding within one year (p = 0.710). Rebleeding stopped after one more ligation. 2 in 12 rebleeders (16.7%) in multiple group and 8 in 13 rebleeders (61.5%) in the single group had early rebleeding within one month after cessation from the first ligation (p = 0.06). The latest time of first rebleeding was 20 months in multiple group and 13 months in single group.

No other complications such as vasovagal reflexes, local swelling and edema, thrombosed external hemorrhoids, anal stricture, massive bleeding, or pelvic sepsis were experienced in our study. The summary of the results is shown in Table 2.

DISCUSSION

Rate of cessation of bleeding after multiple ligation from this study (96.7%) was not different from the study of Lee et al[1] which also performed multiple ligation, but were different from the study of Poon et al (78.6%)[3] and Lau et al (86.1%)[4] which used triple ligation at three typical sites of hemorrhoidal tissues in all cases. In triple ligation, the third hemorrhoidal head might be too small or too tense to be ligated. Inappropriate ligation of the third hemorrhoidal head might cause slipping of the rubber band and incomplete necrosis which could cause pain and bleeding.

In multiple ligation, 29 per cent and 12.3 per cent of patients of Lee et al[1] had pain and urinary symptoms respectively, but 6.5 per cent and 6.5 per cent of patients in the present study had pain and urinary symptoms respectively. This study had less pain and fewer urinary symptoms than the study of Lee et al. This was probably caused by high ligation technique. The authors thought that pain and urinary symptoms did not depend on the number of hemorrhoids ligated as a single factor but depended on multiple factors such as ligation technique (site, the amount of tissue ligated, the number of hemorrhoids ligated), swelling of other hemorrhoids that were not ligated, other perianal lesions (external hemorrhoids, fissures, swelling of skin tag, hypertrophic anal papilla, etc) and pain tolerance of patients.

Most hemorrhoidectomies were done to as many diseased hemorrhoids as possible at the same operations, so rubber band ligations should also be done to as many diseased hemoerrhoidal heads as possible. Multiple ligation using high ligation tech-

Table 2. The summary of results.

	Multiple Group	%	Single Group	%	P-value
Bleeding cessation in one week	59/61	96.7	38/48	79.1	0.004
Pain or tenesmus	4/61	6.55	1/48	2.08	0.532
Urinary hesitancy and frequency	4/61	6.55	2/48	4.16	0.904
Rebleeding in one year	12/43	27.9	13/38	34	0.710

nique had excellent results in cessation of bleeding for bleeding hemorrhoids (96%). It was probably as effective as hemorrhoidectomy, but caused fewer complications than hemorrhoidectomy, for example, less time off work, less post-operative pain, no anal stenosis, no skin bridge across the anus, and no back pain after surgery(5).

In both groups of this study, some rebleeders had slight bleeding starting from the third and fourth week, which stopped after one more ligation at new hemorrhoidal sites. The sloughing ulcers from previous ligations in those rebleeders had no oozing on examination. Rebleeding was probably caused by bleeding at new hemorrhoidal sites, not by oozing of sloughing of dead tissue. Moreover, only one hemorrhoid was ligated in the single ligation group and it is very difficult to choose which hemorrhoid should be ligated in a single session. This would leave other nonligated diseased hemorrhoids bleeding. Therefore, early rebleeding or failure of ligations should occur more often in single ligation than in multiple ligation.

SUMMARY

Multiple ligation of bleeding internal hemorrhoids in one session can stop bleeding better than single ligation with no more complications.

(Received for publication on October 18, 2001)

REFERENCES

1. Lee HH, Spencer RJ, Beart RW Jr. Multiple hemorrhoidal banding in a single session. Dis Colon Rectum 1994; 37: 37-41.
2. Duthie HL, Gairns FW. Sensory nerve-endings and sensation in the anal region of man. Br J Surg 1960; 47: 585-94.
3. Poon GP, Chu KW, Lau WY, et al. Conventional *vs* triple rubber band ligation for hemorrhoids: A prospective randomized trial. Dis Colon Rectum 1986; 29: 836-8.
4. Lau WY, Chow HP, Poon GP, Wong SH. Rubber band ligation of three primary hemorrhoids in a single session-a safe and effective procedure. Dis Colon Rectum 1982; 25: 336-9.
5. Murie JA, Mackenzie I, Sim AJW. Comparison of rubber band ligation and hemorrhoidectomy for second- and third-degree hemorrhoids: A prospective clinical trial. Br J Surg 1980; 67: 786-8.

การศึกษาเปรียบเทียบระหว่างการรัดริดสีดวงทวารครั้งละหลายหัวกับครั้งละหนึ่งหัวในผู้ป่วยริดสีดวงทวารหนัก

*บรรลือ เฉลยกิตติ, พ.บ.**

วัตถุประสงค์ : เพื่อศึกษาเปรียบเทียบการทำให้เลือดหยุดและผลแทรกซ้อนระหว่างการรัดริดสีดวงทวารหนักโดยการรัดทีละหนึ่งหัวกับการรัดทีละหลายหัว โดยรัดในตำแหน่งที่สูง

วิธีการศึกษา : ผู้ป่วยริดสีดวงทวารหนักที่มีอาการถ่ายเป็นเลือดถูกแบ่งเป็นสองกลุ่มรักษาโดยการรัดริดสีดวงทวารหนักโดยการรัดในตำแหน่งที่สูง กลุ่มที่หนึ่งจะถูกรัดครั้งละหนึ่งหัว กลุ่มที่สองถูกรัดครั้งละหลายหัว ผู้ป่วยทั้งสองกลุ่มถูกนัดมารับการตรวจในสัปดาห์ที่สองและเมื่อครบหนึ่งปี

ผลการศึกษา : ผู้ป่วย 109 รายแบ่งเป็นกลุ่มที่รัดครั้งละหนึ่งหัว 48 รายและกลุ่มที่รัดครั้งละหลายหัว 61 ราย กลุ่มที่ถูกรัดครั้งละหลายหัวมีการหยุดของเลือดออกได้ดีกว่ากลุ่มที่รัดครั้งละหนึ่งหัว (96.7 เปอร์เซ็นต์เทียบกับ 79 เปอร์เซ็นต์ p=0.004) โดยที่ไม่มีความแตกต่างในเรื่องของผลแทรกซ้อนเช่นอาการปวด ปัญหาเกี่ยวกับปัสสาวะ หรือการกลับมีเลือดออกใหม่หลังจากหนึ่งปี

สรุป : การรัดริดสีดวงทวารหนักโดยรัดครั้งละหลายหัวสามารถทำให้เลือดหยุดได้ดีกว่าการรัดครั้งละหนึ่งหัวโดยไม่ทำให้เกิดผลแทรกซ้อนเพิ่มมากขึ้น

คำสำคัญ : การรัดริดสีดวงทวารหนัก, ริดสีดวงทวารหนัก, ผลแทรกซ้อน

บรรลือ เฉลยกิตติ
จดหมายเหตุทางแพทย์ ฯ 2545; 85: 345-350

* แผนกศัลยกรรมลำไส้ใหญ่และทวารหนัก, กองศัลยกรรม, โรงพยาบาลพระมงกุฎเกล้า, กรุงเทพ ฯ 10400