Original Paper

Digestive Surgery

Dig Surg 2000;17:71–76

Received: December 9, 1998
Accepted: April 15, 1999

Rubber Band Ligation of Symptomatic Internal Hemorrhoids: Results of 500 Cases

Vassilios A. Komborozos George J. Skrekas Christos A. Pissiotis

2nd Department of Surgery, 'Evangelismos' Hospital, Athens, Greece

Key Words

Hemorrhoids · Treatment · Rubber band ligation · Results

Abstract

Background/Aim: In this prospective study the results of rubber band ligation (RBL) of symptomatic hemorrhoids in 500 consecutive patients with 2nd (255 cases), 3rd (218 cases) and 4th degree (27 cases) hemorrhoids are presented. ***Methods:*** The patients' symptoms were hemorrhage in 142 cases (28.4%), prolapse in 33 cases (6.6%) and both hemorrhage and prolapse in 325 cases (65%). Sixteen patients with hemorrhoids had liver cirrhosis and portal hypertension. RBL was performed using the St Marks' applicator (Seward) on an outpatient basis. Multiple ligations in two (259 cases) or three (190 cases) sessions were undertaken in 449 patients (89.8%), while a single ligation was done in 51 cases (10.2%). ***Results:*** Successful results were achieved in 440 cases (88%) in a 24-month follow-up. A total of 94 patients (18.8%) had complications which required no hospitalization. Pain and hemorrhage were the most frequent complications. RBL proved to be safe in 16 patients with coagulation disorders due to liver cirrhosis. Two years after RBL, symptomatic recurrence was 11.9% (53/445) with repeat RBL or surgery in 9.2% (41/445). ***Conclusions:*** RBL is a useful, safe and successful method for treating symptomatic 2nd and 3rd degree hemorrhoids, which can be applied successfully in selected cases with 4th degree hemorrhoids, but with an increased rate of recurrence and additional treatment requirements. Also, RBL seems to be safe in patients with liver cirrhosis and portal hypertension.

Introduction

The presence of hemorrhoids is not in itself an indication for treatment, which must be aimed at symptomatic relief and the correction of anatomic deformity. Both of the above are achieved by means of conservative or surgical methods. According to Hippocrates, 'One may cut, resect, suture or burn hemorrhoids. These measures seem to be terrible but they don't cause any damage' (Hippocrates: 'On Hemorrhoids'). Today, nonsurgical methods are an alternative to surgical ones. They aim at tissue fixation with or without tissue destruction (sclerotherapy, cryotherapy, photocoagulation, BiCAP, laser), or to fixation with tissue excision (rubber band ligation, RBL).

In 1954, Blaisdel invented the first automatic ligator of hemorrhoids, which was modified by Barron [1] in 1962. From that time, the ligation of hemorrhoids is widely used

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Prof. C.A. Pissiotis, MD, FACS
2, Iasiou Street
GR–10425 Athens (Greece)
Tel. +30 1 7245317, Fax +30 1 7211806

as an alternative method for the treatment of internal symptomatic hemorrhoids and has replaced hemorrhoidectomy in 45% of cases [2]. This method gives good results in 69–94% of cases. Although it is not associated with the problems that follow the typical surgical treatment of hemorrhoids [3–6], the method is not free of complications and even deaths have been reported to occur in immunosuppressed patients [7, 8]. In this prospective study we analyze the results of the treatment of symptomatic hemorrhoids in 500 patients, using the RBL method.

Table 1. Degree of hemorrhoids in patients where RBL was performed

Hemorrhoid degree	Patients	
	n	%
1st degree	–	0
2nd degree	255	51
3rd degree	218	43.6
4th degree	27	5.4

Table 2. Number of sessions of RBL in 500 patients with internal hemorrhoids, according to the hemorrhoidal degree

RBL sessions	Degree of hemorrhoids			Total	%
	2nd	3rd	4th		
Single ligation	38	13	–	51	10.2
Two sessions	139	111	9	259	51.8
Three sessions	78	94	18	190	38
Total	255	218	27		

Patients and Methods

Five hundred consecutive patients with symptomatic hemorrhoids of 2nd, 3rd and 4th degree are analyzed. Classification of hemorrhoids has been done according to the traditional classification of hemorrhoids, based on bleeding and prolapse. Therefore, 2nd degree hemorrhoids are defined as those with prolapse at defecation (with or without bleeding) with spontaneous return to the anal canal. Third degree hemorrhoids are those with prolapse (with or without bleeding) requiring manual reduction. Fourth degree hemorrhoids are irreducible and constantly remain in the prolapsed state (table 1). There were 315 men and 185 women. The mean age was 45.9 years (SD 14.2). These patients represent 78.4% of the total number of patients who have been treated at the same time in the department, since 78 patients had a conventional hemorrhoidectomy and 60 sclerotherapy or other treatment.

All our patients had their medical history taken, then went through a complete physical examination, rectal examination and rectoscopy. In symptomatic patients where colon disease was suspected (cancer, inflammatory disease), a barium enema or colonoscopy were performed. In 335 out of 500 patients, constipation or difficult or incomplete bowel movement was reported. In 65 of our patients (13%) the presenting symptoms were suggesting a possible additional colonic pathology. Therefore, they were submitted to a complete colon examination. Fourteen of them had a barium enema and 41 full colonoscopy. Coexisting findings were found in 29 out of 65 cases (44.6%) (adenomatous polyps in 12 patients, hypertrophic polyps in 4, diverticula in 8 and proctitis in 5 cases).

The colon examination was positive in 29 out of 65 patients (44.6%). In all cases of adenomatous polyps, endoscopic polypectomy preceded the ligation of hemorrhoids. The same happened in 5 cases of nonspecific proctitis, where local therapy with mesalazine enemas preceded hemorrhoidal ligation.

Bleeding was the presenting symptom in 142 patients (28.4%), 33 (6.6%) presented with prolapse only and 325 (65%) had both prolapse and bleeding. Coexistence of internal and external hemorrhoids was found in 89 patients (17.8%). 16 of our patients had liver cirrhosis and portal hypertension (Child B and C).

For the ligation, the St Marks' ligator (Seward), a metallic rectoscope, and St Georges' angled forceps were used. In all cases the procedure was performed without anesthesia on an outpatient basis, except 6 patients with liver cirrhosis, portal hypertension and coagu-

Table 3. Early results of RBL in 500 patients with internal hemorrhoids

Results	Degree of hemorrhoids						Total	
	2nd		3rd		4th			
	n	%	n	%	n	%	n	%
Very good	237	92.9	200	91.7	3	11.1	440	88
Improvement	13	5.1	13	6	14	51.9	40	8
Failure	5	2	5	2.3	10	37	20	4
Total	255		218		27		500	

lation disturbances. The patients were informed about the progress of the treatment (fall of the necrosed hemorrhoid nodule). We recommended high residue diet, mild laxatives and for the pain common analgetics and warm sitz baths. The patients were re-examined 3 weeks after the procedure. Depending on the results, the treatment was stopped or a new session of ligation was performed. Complications, immediate and late results, as well as the patients' opinion of the method were recorded.

All our patients were re-examined 2 years later. Results were classified as cure or great improvement if the patient was asymptomatic after the end of treatment, improvement if the symptoms had been minimized, and as failure of the method when there was not improvement at all.

Statistical analysis was done by Student's t test and χ^2 test, Yates corrected.

Results

In 449 patients (89.8%), multiple hemorrhoidal ligation was performed in two sessions (259 patients, 51.8%) and three sessions (190 patients, 38%) with 3-week intervals. In the remaining 51 patients (10.2%), single ligation was performed (table 2).

Table 4. Complications

Complications	Patients	
	n	%
Pain	43	8.6
Bleeding	11	2.2
Thrombosis	9	1.8
Ulceration	10	2
Fall of elastic band	21	4.2
Total	94	18.8

440 patients (88%) were cured or presented great improvement after the end of treatment, 40 patients (8%) were improved and in 20 patients (4%) the method failed (table 3). The presence of external hemorrhoids had no influence on the success rates of the method, since 78/89 patients (87.6%) with internal and external hemorrhoids presented good results versus 361/411 patients without external hemorrhoids (88.07%) (NS). In 94 patients (18.8%), complications were encountered (table 4). Pain was the most frequent one. In 41 cases pain was presented after the ligation of at least two nodules in a session and in 2 cases after the ligation of a single nodule. Patients with external hemorrhoids presented pain in a percentage higher than those without an external component (14/89 (15.7%) compared to 29/411 (7.05%), $\chi^2 = 5.94$, $p = 0.014$).

Also, patients with multiple hemorrhoidal banding when compared with patients with single banding, had greater discomfort and pain (42/449 (9.35%) vs. 1/51 (1.96%), $\chi^2 = 3.57$, $p = 0.05$). Pain was treated conservatively in 32 cases with analgetics and warm hip baths, whereas in the remaining 11 cases we were forced to remove at least an elastic band.

Mild to severe (significant) bleeding presented in 11 cases, 7–13 days after the procedure. It was treated conservatively in all cases by local means (anal spongostan or ligation through rectoscope). There was no need for transfusion or hospitalization in any of these cases. In 9 cases thrombosis of the external hemorrhoids was detected, as a consequence of the ligation of nodules of the internal hemorrhoidal ring. Six out of 16 patients with liver cirrhosis were preventively hospitalized due to coagulation disturbances. However, they presented no complications following RBL.

Two years after the end of treatment, 445 patients (89%) came for a follow-up examination. Table 5 provides the long-term results and the consequent treatment of our patients. Symptomatic recurrence was detected in

Table 5. Long-term results and follow-up of patients with RBL

Results	Patients	Re-examined	Asymptomatic	Symptomatic	Surgery	RBL
Very good	440	420	392	28	9	7
Improvement	40	25	–	25	13	12
Failure	20	–	–	–	–	–
Total	500	445	392	53	22	19

Table 6. Long-term results and follow-up of patients with RBL according to the hemorrhoidal degree

	Degree of hemorrhoids						Total	
	2nd		3rd		4th			
	n	%	n	%	n	%	n	%
Number of patients	255		218		27		500	
Lost to follow-up	16		26		13		55	11
Patients at follow-up	239	93.7	192	98.1	14	51.9	445	89
Asymptomatic	218	91.2	173	90.1	1	7.1	392	88.1
Symptomatic	21	8.8	19	9.9	13	92.9	53	11.9

53 out of 445 patients (11.9%), with repeat treatment in 41/445 cases (9.2%). Additional treatment due to symptomatic recurrence was required in 13/14 patients (92.8%) with 4th degree hemorrhoids, while only 28/431 patients (6.49%) with 2nd and 3rd degree hemorrhoids required additional treatment ($\chi^2 = 110.7$, $p = 0.00001$). Table 6 provides the influence of the stage of hemorrhoids on the long-term results.

Discussion

RBL of hemorrhoids is a widely used method for the treatment of symptomatic hemorrhoids. Removal of the hemorrhoidal tissue, development of fibroconnective tissue at the point of the ligation, fixation of the mucosa and correction of the prolapse are achieved with this method. The success rates of the method range between 79 and 91.8% [9–13]. In our series, 88% (440/500) of our patients were asymptomatic just after the end of the treatment and 392 out of 445 patients at follow-up (88.1%) 2 years later. Candidates for this method are patients with 2nd and 3rd degree hemorrhoids, although some authors consider RBL also suitable in appropriately selected cases of advanced hemorrhoidal disease [14]. In our study the majority of the cases had hemorrhoids of 2nd and 3rd degree (51 and 43.6% respectively), whereas 27 cases with 4th degree hemorrhoids and permanent prolapse were also treated. There was no difference in the early success rates of RBL in 2nd and 3rd degree hemorrhoids ($p > 0.05$). Also the percentage of asymptomatic patients with 2nd and 3rd degree hemorrhoids remained equally high 2 years after the ligation (91.2 and 90.1% respectively). On the contrary, the failure rate of the method was considerably high (37%) in patients with 4th degree hemorrhoids, even if half of these patients (51.9%) had temporary improvement of their symptoms after the treatment. Two years after the ligation, 13 out of 14 patients (92.9%) with 4th degree hemorrhoids were symptomatic.

The presence of external hemorrhoids (visible congestionated veins in the external plexus) had no influence on the success rate of the method, but patients with coexistent external hemorrhoids developed pain after ligation in a percentage higher than those without an external component ($p = 0.01$). Also in 9 cases thrombosis of the external hemorrhoids was detected as a consequence of the ligation of nodules of the internal hemorrhoidal ring.

In our series the results were very good in 88% of our patients right after the end of treatment. Two years after RBL, only 28 out of 420 patients with very good early results were symptomatic (6.7%). In 7 (1.7%) patients another session of ligation was performed, while in 9 (2.14%) patients conventional operation proved to be necessary. Complications in our series (18.8%) were mostly minor and no hospitalization was needed. Only 6 out of 16 patients with coagulation disturbances due to liver cirrhosis were hospitalized preventively, but RBL proved to be safe in this small group of patients. Bat et al. [11] reported 13 out of 512 cases with RBL (2.5%) who had been hospitalized because of delayed massive rectal bleeding, pain and septic complications. The relatively high rate of complications in our study, compared to that of other studies [10, 11], reflects the different health status of our patients in comparison with other series and the fact that our study is a prospective one. As in most of the other series, pain is the most frequent complication [13, 15–17]. In our series, 43 (8.6%) patients presented pain. In all cases the pain appeared immediately or a few hours after the ligation and lasted less than 2–3 days. In our experience, pain occurred most frequently when the ligation was placed too low in the anal canal. Patients with multiple hemorrhoidal banding when compared with pa-

tients with single banding, had greater discomfort and pain (42/449 (9.35%) vs. 1/51 (1.96%), $\chi^2 = 3.57$, $p = 0.05$). These results are in accordance with those of Lee et al. [18], who reported that patients with multiple hemorrhoidal banding in a single session compared with patients with single banding had greater discomfort and pain (29 vs. 4.5%). Also, Gehamy and Weakley [3] reported a percentage of symptom-free patients of 77% after multiple hemorrhoidal ligation in one session but pain was much more frequent than after single ligations. On the contrary, Hardwick and Durdley [16] failed to show any relationship between the number of bands applied and the degree of pain. Moreover, Khubchandani [19] in a prospective randomized study compared the results of single, double and triple hemorrhoidal ligation, but did not notice any difference even if they were forced to remove the elastic band in many cases in the third group. Poon et al. [20] reached the same conclusions in an analogous study.

Late bleeding is a significant complication of RBL and as in surgical hemorrhoidectomy it cannot be prevented. It is the result of the fall of the hemorrhoidal nodule and local inflammation. The percentage of bleeding in our series was 2.2%, which is no different to that previously reported [10, 11]. Hemorrhoidal thrombosis is a relatively rare complication of the method. The clinical doctor must be alert for this last complication as it may precede perirectal or pelvic sepsis. In our series there were no septic complications, but in other series regarding immunosuppressed patients they proved fatal [7, 21–24].

The disadvantage of the method is that no pathologic specimen is obtained. Therefore, some cases of anal cancer may be overseen. Despite this fact, we must neither disapprove nor limit the application of the method, because the risk is minimized by a careful clinical examination performed by an experienced doctor. Until lately, the finding of anal cancer in an excised hemorrhoid specimen was considered to be a rare event (less than 1% of the cases) [15]. Recently, Cataldo and MacKeigan [25], reviewing 21,257 hemorrhoidectomy specimens, found only 1 case of unexpected anal cancer. Based on this fact they recommended that histological examination of hemorrhoidal nodules should be a test for selected cases only rather than a routine one.

In a meta-analysis study, Johanson and Rimm [26] showed that 6.6–14.3% of the patients undergoing RBL will require additional treatment due to the recurrence of symptoms. Bayer et al. [12] reported that 18% of their patients required one or more additional sessions of RBL while 2.1% failed to be cured by RBL and were referred for conventional hemorrhoidectomy. In our study, symptomatic recurrence was 11.9% (53/445) 2 years after RBL, with repeat RBL or surgery in (41/445) 9.2% cases. Fourth degree hemorrhoids were releated to increased rate of recurrence and necessity of additional treatment ($p = 0.00001$).

Our conclusion is that hemorrhoidal RBL is a safe, effective, low-cost and easy-to-use method, with acceptable results in the treatment of 2nd and 3rd degree hemorrhoids, which can also be applied in selected cases of 4th degree hemorrhoids with less satisfactory results. RBL seems to be safe for patients with liver cirrhosis and portal hypertension.

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Invited Commentary

P. Buchmann
Department of Surgery, Stadtspital Waid, Zürich, Switzerland

The article on 'Rubber Band Ligation of Symptomatic Haemorrhoids: Result of 500 Cases' mirrors the state of the art of the treatment for second- and third-degree piles at the end of the 20th century. The patient's comfort is much higher with rubber band ligation compared to haemorrhoidectomy and the results are not inferior, except for fourth-degree piles.

Pain after placement of a rubber band ligation can be avoided by the doctor performing the procedure. As mentioned in the article the principle of the method consists of 'fixation of the mucosa by fibroconnective tissue at the point of the ligation'. Therefore, the ligation must not be put in the upper anal canal but higher, to the anorectal junction.

In our proctologic clinic we proceed as follows. During retraction of the proctoscope we define the positions of the haemorrhoids to be ligated. Then the proctoscope is brought in again pushing up the haemorrhoid cushions. After slight withdrawal the suction ligator [1] is pushed in stretching the pile upward. After having started the suction the patient is asked whether she or he is experiencing any sensation. If so, suction can be discontinued and the ligator pushed further in until maximal suction does not create any discomfort. At this point the rubber band can be placed.

Since we stick strictly to this procedure we have never ever had to remove a rubber band to relieve a patient from pain.

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