

# Rubber band ligation of hemorrhoids - An Office Procedure

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## SUMMARY

Rubber band ligation [RBL] is one of the most popular non-surgical procedures available for hemorrhoids. The aim of this study was to prospectively evaluate the effectiveness of RBL in respect to eradication percentages, post-procedure pain, and complications as well as the simplicity of the technique. Eighty-seven patients with 2<sup>nd</sup> and 3<sup>rd</sup> degree internal symptomatic hemorrhoids - denying surgical procedure - were enrolled in this study. Four patients stopped treatment after the 1<sup>st</sup> session; 24 patients required one banding session [3 bands]; 49 patients two sessions [mean 5.36 bands] and 14 patients three sessions [mean 6.78 bands]. Forty-two patients [rate 52.5%] experienced no pain at all; 25 patients [31.2%] slight pain and 13 [16.2%] moderate pain, needing analgesics. There were three complications, all managed conservatively: one bleeding, one thrombosis and one patient experienced severe rectal pain. After termination of the treatment, and for a one-year follow up, hemorrhoids remained reduced by at least one grade, in comparison with that of the initial assessment.

We conclude that rubber band ligation is a safe and effective procedure, easy to perform, thus it is advised as an office-procedure for hemorrhoid treatment.

Hemorrhoids are one of the most common gastrointestinal disorders affecting approximately half the Western population.<sup>1</sup> They arise as localized cushions of specialized submucosal vascular tissue located in the anal canal adjacent to the squamous-columnar epithelium

junction, but they do not constitute disease until prolapse, bleeding or thrombosis occurs. When bleeding or prolapsing persists, despite conservative management, surgical or non-surgical intervention is required.

Rubber band ligation [RBL] is considered one of the most popular non-surgical procedures available, representing the most reasonable balance between efficacy, pain and potential of complications.<sup>2,3</sup> However, the method seems not to be so widely used in Greek hospitals,<sup>4</sup> thus we try to prospectively evaluate the effectiveness of RBL in respect to post-procedure pain and complications of the method, as well as eradication percentages and simplicity of the technique, in order to advise it as an office-procedure for Greek practitioners.

## PATIENTS-METHOD

Over a five-year, period 87 patients with 2<sup>nd</sup> and 3<sup>rd</sup>-degree internal hemorrhoids unresponsive to conservative treatment and denying surgical procedure were included in the study. Patients' characteristics are shown in Table 1. Patients with a history of inflammatory bowel disease or corticosteroid therapy were excluded, while pregnancy [2 patients], cirrhosis [2 patients], immunodeficiency [5 patients] or coagulopathy [3 patients] were not considered as contraindications. Flexible sigmoidoscopy and colonoscopy were performed at the discretion of the authors, according to the age and symptoms of the patients.

Anoscopy was performed without sedation and the area to be ligated was identified. The ligature device [Kil-Roid, Astra Tech, Sweden] was then inserted through the anoscope, the dentate line re-visualized, a point 5-7mm above it suctioned into the clear ligating device and a single elastic band was then released. Since patients usually have three hemorrhoidal complexes, 3 rubber bands were applied at different levels above the dentate line, to avoid stricture formation. The total procedure,

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**Table 1.** Demographic data

Patients	87	
Gender [M/F]	52/35	
Age [median/range]	48/32-65	
Rate [2 <sup>nd</sup> /3 <sup>rd</sup> degree]	59/28	
Symptoms	bleeding	25 patients
	prolapse	14 patients
	bleeding+prolapse	18 patients

from the insertion of the anoscope to the placement of the 3 bands took less than 10min.

Treatment was repeated at 20-day intervals until the internal hemorrhoids were eradicated or reduced by at least one grade, with resolution of symptoms. Patients were instructed to maintain a high fiber-diet and take cold baths throughout the treatment period.

Patients were asked to record symptoms, complications and analgesic consumption after the procedure and report the findings at the next visit. An urgent telephone line was available for emergencies.

### Statistical analysis

Data were entered into a computer database programme for analysis. Categorical variables were compared by the chi-squared test and a p value of less than 0.05 was considered to be statistically significant.

## RESULTS

Eighty-three out of the 87 patients concluded the therapy - that is 164 sessions and 430 elastic bands. One banding session [3 bands] was required in 24 patients; a second session [2-3 bands] was required in 49 patients; a third session [1-2 bands] in 14 patients. Four patients were lost after the first session. Results are tabulated in Tables 2 and 3.

Reduction of hemorrhoids, by one grade or more, occurred in 81 out of 83 patients [rate 97.6%,  $p=0.001$ ], while all reported alleviation of the symptoms after just one session.

Three complications [3 out of 164 sessions, rate 1.83%,  $p=0.0001$ ] were reported: one patient experienced rectal hemorrhage one week later, due to ulcer bleeding at the site of prior ligation; the hemorrhage was stopped by application of another rubber band and the patient went home – no transfusion was needed; one patient needed emergency assistance for severe rectal pain

**Table 2.** Number of RBL sessions and hemorrhoidal degree

Patients	Sessions		
	Single	Two	Three
2 <sup>nd</sup> degree	22	31	6
3 <sup>rd</sup> degree	2	18	8
Total [%]	24 [27.5]	49 [56.3]	14 [16.1]

**Table 3.** Number of rubber bands used in association with the number of sessions

Sessions	Patients	Bands used	Mean number per patient
Single	24	72	3
Two	49	263	5.36
Three	14	95	6.78

not managed by analgesics per os [Lonargal, Beringer-Ingelheim, Germany]. Meperidine i.m. injection and sham-removal of the ligature relieved his pain; the third patient presented with acute rectal pain 24hs post-procedure, due to a thrombosed external hemorrhoid that was successfully treated by incision-evacuation. After exclusion of these 3 cases, data concerning pain, per patient and per session are tabulated in Table 4 [ $p=0.05$ ].

Two weeks post-procedure anoscopy revealed superficial healing ulcers, similar to those after banding of esophageal varices in 21 cases out of 161 sessions [rate 13%,  $p=0.05$ ].

One year follow up by anoscopy revealed hemorrhoids remain reduced by at least one grade, in comparison of that of the initial assessment.

## DISCUSSION

This study shows that there is a significant reduction in both symptoms and the grade of hemorrhoid cushion after the first session, which was the only one for 27.5% of patients. Traditionally,<sup>5</sup> hemorrhoid ligation is per-

**Table 4.** Post-banding pain per patient and per session

	Patients [%]	Sessions [%]
no pain	42 [52.5]	94 [58.4]
slight pain	25 [31.2]	51 [31.7]
moderate pain [needed analgesics]	13 [16.2]	16 [9.9]
Total	80	161

formed in multiple sessions dealing with each column in a separate session, to avoid pain. However, good results in respect to discomfort after multiple ligations in one session have been reported by others, thus confirming this technique both effective and acceptable to most patients.<sup>6-10</sup>

Proper technique of ligation, to avoid pain, dictates that rubber bands be placed well above the dentate line. According to Tchirkow et al<sup>11</sup> post-banding pain in properly banded cushions is due to a band being placed within the receptive field of an aberrant somatic cutaneous nerve or to a band into which fibers of the internal sphincter are being drawn. Besides these theories, another possible cause of pain is the pressure sensation caused by edema produced by the rubber band or the foreign body sensation of the band on the rectal mucosa.

In our cases, apart from the one patient suffering extreme pain, which ceased following administration of meperidine and the sham-removal of the band, no pain was reported after ligation in 42 patients/94 sessions, and slight pain, not needing medication, in 25 patients/51 sessions. When the degree of pain experienced by each individual patient was assessed over all sessions, we found that patients experiencing pain during the first session, continued to do so during all sessions. Since there is no self-evident explanation of this event, we hypothesize the individual sense of pain to be the main reason.

Although, immunodeficient and coagulopathy patients constitute a high-risk subgroup for infection and bleeding,<sup>12</sup> we accepted the risk of treatment after informed consent had been obtained. For HIV-positive patients, no antibiotics were used, while for coagulopathy patients fresh frozen plasma was stocked, but no need for transfusion arose.

Assessing the procedure from the point of view of the physician, it is a simple procedure, with low cost [35 euro per session], which takes only a few minutes, but an assistant or a nurse is required for reloading the device. There is no need for anesthesia, and no need for special training in the method for anyone experienced in endoscopy. However, colon examination for co-existent pathology must not be overlooked in any patient referred

for rectal bleeding.

In conclusion, we believe that rubber band ligation is a safe, economic and effective procedure for symptomatic hemorrhoid treatment, well tolerated by patients, the majority of whom experienced little or no pain. Thus, rubber band ligation is indicated as an office-procedure for hemorrhoid treatment.

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