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Comparison of infrared coagulation and rubber band ligation for first and second degree haemorrhoids: a randomised prospective clinical trial

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Abstract

One hundred and thirty seven previously untreated outpatients with first and second degree haemorrhoids were allocated at random to treatment by infrared coagulation ($n=66$) or rubber band ligation ($n=71$). Complete follow up was obtained in 122 patients (60 who had undergone infrared coagulation (group 1), and 62 rubber band ligation (group 2)) at periods from three months to one year after completion of treatment.

Infrared coagulation produced a satisfactory outcome in 51 patients (85%): 34 were rendered asymptomatic and 17 improved. Rubber band ligation produced a satisfactory outcome in 57 patients (92%): 33 were rendered asymptomatic and 24 improved. Both methods were equally effective in first and second degree haemorrhoids. The incidence of side effects, particularly discomfort, during and after treatment was significantly higher in those treated by rubber band ligation ($p<0.001$). This appeared to be an appreciable deterrent to future patient compliance. The number of patients losing more than 24 hours from work was higher after rubber band ligation than after infrared coagulation. The number of treatments necessary to cure symptoms did not differ significantly between the two methods. Infrared coagulation

was significantly faster than rubber band ligation ($p<0.001$).

Infrared coagulation is a simple, fast, and effective outpatient method for the treatment of first and second degree haemorrhoids with fewer troublesome side effects and higher patient acceptability than rubber band ligation.

Introduction

Outpatient procedures for the treatment of first and second degree haemorrhoids are likely to be successful in 90% of cases.¹ Long term results indicate that rubber band ligation is a most effective non-operative method of treatment,² though the discomfort associated with this method appears to be the main disadvantage.³ Infrared coagulation is a recently introduced method of treatment.⁴ The results in a small series of patients suggested that it compares favourably with rubber band ligation in prolapsing haemorrhoids and is associated with considerably less discomfort.⁵

We compared the two methods in a large group of previously untreated patients.

Patients and methods

A total of 137 consecutive patients attending the outpatients department between January 1981 and February 1982 with previously untreated first or second degree haemorrhoids were entered into the trial. Age, sex, and duration of symptoms were recorded, and symptoms were ranked in order of importance. After proctosigmoidoscopy 66 patients were allocated at random to treatment by infrared coagulation (group 1) and 71 patients to treatment by rubber band ligation (group 2).

The groups were comparable. Group 1 comprised 46 men and 20 women aged 45.9 ± 15.1 years (mean $\pm$ SD); the duration of symptoms was 39.3 ± 65 months (mean $\pm$ SD). Group 2 comprised 51 men and 20 women aged 46.5 ± 15.7 years; the duration of symptoms was 49.5 ± 80.8 months. Forty of the 66 patients in group 1 and 42 of the 71 in group 2 had first degree haemorrhoids; the remainder had second degree haemorrhoids.

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The infrared coagulator (manufactured by MBB-AT Munich, distributed by Chilworth Medicals, Guildford, Surrey) generates radiation from a 15 volt tungsten halogen bulb, surrounded by a gold plated elliptical reflector and focused by a photoconductor. The tip of the instrument is coated with a polymer, which prevents tissue adherence. A built in timing device allows variation in the duration of radiation. In this study pulses of one second duration were applied at a site, similar to that for application of rubber bands, just above the base of each haemorrhoid. Initially, as recommended by the manufacturers, two pulses were applied at each site. In common with others,⁶ however, we found three pulses more effective. Satisfactory coagulation was evidenced by a pale discoloration of the mucosa. Each pulse produces an accurately defined area of necrosis, 3 mm in diameter and 3 mm deep.

Rubber bands were applied using the Seward simple pattern haemorrhoid ligator, in the standard fashion.³ Up to three sites were banded at each attendance.

Treatments were timed from lifting either the band ligator or infrared coagulator to completion. Patient sensation during treatment was recorded. No specific advice was given about dietary roughage.

Patients were reviewed every four weeks until asymptomatic or until they had undergone a maximum of four treatment sessions. The residual symptoms were ranked in order of importance. Side effects and time lost from work since the previous treatment were recorded. Proctoscopy was repeated and the presence or absence of haemorrhoids noted; however, the necessity for further treatment was directed by the patient's symptoms regardless of the proctoscopic features. Thereafter, patients were reviewed three months, six months, and one year after treatment. On each occasion the patient's assessment of the outcome of treatment was noted. Residual symptoms were again ranked in order of importance. The patient's willingness to undergo the same method of treatment, if necessary, was sought as an index of its acceptability.

Results were expressed as mean $\pm$ standard deviation. Statistical analysis was by the χ^2 test and the Student's *t* test, as appropriate.

Results

Complete follow up was obtained in 122 patients; between three and six months after completion of treatment in 13 of group 1 and 14 of group 2 and between six months and one year in 46 of group 1 and 49 of group 2.

The major presenting symptom was not significantly different in the two treatment groups. Bleeding was the foremost symptom in 80 cases (37 (56%) of group 1 and 43 (61%) of group 2). Pain was not uncommon, being the major presenting symptom in 22 cases (12 (18%) of group 1 and 10 (14%) of group 2). Although prolapse was found in 55 cases, it was the main presenting symptom in only 13 cases (eight (12%) of group 1 and five (7%) of group 2). The remaining 22 patients (nine (14%) of group 1 and 13 (18%) of group 2) presented with itch.

Table I summarises sensations experienced by patients during treatment and side effects after treatment. Significantly more patients in group 2 ($p < 0.02$) experienced troublesome sensations, particularly discomfort, during treatment and significantly more reported side effects ($p < 0.001$) after treatment, particularly major discomfort. Any pain lasting longer than 48 hours, regardless of severity, was classified as major.

Of those patients in employment, two (7%) in group 1 and eight (19%) in group 2 lost more than 24 hours from work after any individual treatment.

Infrared coagulation was performed significantly faster than rubber band ligation ($p < 0.001$). The time taken for a treatment session was 1.8 ± 1.1 minutes for infrared coagulation and 4.1 ± 1.6 minutes for rubber band ligation. A total of 34 of 58 patients in group 1 and 33 of 62 patients in group 2 were asymptomatic at review. The number of treatments required by these patients did not differ significantly between the two methods: 10 of group 1 and 11 of group 2 required one treatment, nine of group 1 and 11 of group 2 required two treatments, 11 of group 1 and eight of group 2 three treatments, four of group 1 and three of group 2 four treatments.

At review patients' assessment of outcome of treatment showed no significant difference between the groups regardless of degree of haemorrhoid or time since completion of treatment (table II).

At the latest review 30 of the 122 patients declined proctoscopy, and of the remaining 92 residual haemorrhoids were visible in 56. Of these 56, 24 were asymptomatic and 26 had improved; in only six was there no change. Of the 36 cases where no haemorrhoid was seen, 30 were

asymptomatic and six had improved. The difference in symptomatic outcome between those with and those without visible haemorrhoids was not significant.

If symptoms were to recur, four patients in group 1 (7%) and 15 in group 2 (24%) stated that they would be unwilling to undergo further treatment by that method ($p < 0.01$).

TABLE I—Sensations experienced by patients during and side effects after treatment by infrared coagulation (group 1) or rubber band ligation (group 2). Figures are numbers (%) of patients

	Group 1	Group 2
Sensation during treatment*:		
None	34 (52)	29 (41)
Discomfort	2 (3)	12 (17)
Tingling	26 (39)	20 (29)
Urge to defecate	4 (6)	9 (13)
Total	66	70
Side effects:		
None	35 (58)	13 (21)
Minor discomfort	21 (35)	33 (53)
Major discomfort	3 (5)	15 (24)
Bleeding	1 (2)	1 (2)
Total	60	62

*One patient excluded because of ambivalent reply.

TABLE II—Patients' assessment of outcome by degree of haemorrhoid and time since completion of treatment. Figures are numbers (%) of patients

	Asymptomatic	Improved	No change	Total
Group 1:				
First degree	21 (62)	9 (26)	4 (12)	34
Second degree	13 (54)	8 (33)	3 (13)	24
Total	34 (59)	17 (29)	7 (12)	58*
Group 2:				
First degree	16 (46)	15 (43)	4 (11)	35
Second degree	17 (63)	9 (33)	1 (4)	27
Total	33 (53)	24 (39)	5 (8)	62
Time since completion of treatment:				
3-6 months	17 (63)	7 (26)	3 (11)	27
6-12 months	50 (54)	34 (37)	9 (9)	93

*Two patients in group 1 not included because of ambivalent replies.

Discussion

Rubber band ligation was introduced in 1958 by Blaisdell as an outpatient method of management of haemorrhoids. The results of many studies have confirmed its superiority over other non-operative methods—for example, sclerotherapy,⁷ cryotherapy,⁸ and anal dilatation.⁹ It has also compared favourably with haemorrhoidectomy in second and third degree haemorrhoids, with fewer side effects and higher patient acceptability.¹⁰ Any new non-operative method should ideally offer comparable efficiency in symptom relief to rubber band ligation with fewer side effects. In 1977 Neiger⁴ described a technique that entailed the infrared irradiation of the haemorrhoid pedicle, causing protein coagulation over an area of 3 mm to a depth of 3 mm. This mucosal ulcer heals by cicatrization, with resultant fixation of the haemorrhoidal cushion to the underlying tissues. Early studies have suggested that this is a fast, trouble free, and effective technique in non-prolapsing haemorrhoids. Our study has, unlike most, compared these two techniques in previously untreated first and second degree haemorrhoids. The effectiveness of each technique has been based on the patients' assessment of outcome, regardless of proctoscopic appearance. The poor correlation between symptoms and proctoscopic appearance has been established by Buie's study¹¹ reporting proctoscopic evidence of haemorrhoids in 52% of a large series of unselected

Mayo Clinic patients. The symptomatic outcome was similar in both methods and both were similarly effective in both first and second degree haemorrhoids.

The commonest symptom in our patients was bleeding; however, pain was not uncommon. This, in keeping with other studies, contradicts traditional teaching that pain is rarely a feature of uncomplicated haemorrhoids. There was significantly more discomfort during and after rubber band ligation than infrared coagulation, despite the fact that all ligations were performed by a group of surgeons experienced in the technique. No bands had to be removed because of inappropriately low placement. We believe that the discomfort associated with correctly applied rubber bands has been underestimated: pain was the major deterrent to further treatment by this method in our study. We now find that patients adequately warned of the possibility of pain and given access to effective analgesia are less apprehensive and more compliant to subsequent treatment. Infrared coagulation has proved a much more acceptable method to our patients. The significantly shorter time lost from work after this treatment is also likely to influence patient compliance, apart from its undoubted economic importance. The speed with which infrared coagulation can be undertaken and the fact that a nurse does not need to be available to hold the proctoscope is an additional attraction.

Although our longest period of follow up is one year, we are reassured by a recent study¹² suggesting that if symptomatic improvement is evident at this interval it is likely to be maintained in the longer term.

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Prospective randomised comparison of photocoagulation and rubber band ligation in treatment of haemorrhoids

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Abstract

Two hundred and sixty eight patients with haemorrhoids were allocated at random to treatment by either photocoagulation (group 1, n=141) or rubber band ligation (group 2, n=127) and followed up for one year. There was no significant difference in the symptomatic outcome of treatment between the two groups at one, four, or 12 months, irrespective of whether first or second degree haemorrhoids were treated. Side effects of treatment (bleeding or severe pain) were significantly more common after rubber band ligation (n=11) than after photocoagulation (n=2; p<0.01). Further outpatient treatment, however, was required significantly more often after photocoagulation (n=23) than rubber band ligation (n=6) (p>0.02), and 19 patients (14 in group 1 and five in group 2; NS) subsequently had a haemor-

rhoidectomy. At one year 26 of 103 patients were dissatisfied after photocoagulation compared with 20 of 88 after rubber band ligation.

Photocoagulation is a safe and comfortable treatment which gives long term results that are as good as those of rubber band ligation. Complications are more common after rubber band ligation, but further treatment is required more commonly after photocoagulation.

Introduction

There are many methods of treating haemorrhoids in the outpatient clinic. In a busy rectal clinic an important requirement is a method that is quick, easy to administer, non-invasive, takes up minimal nursing time, and is effective in the control of symptoms. Injection and rubber band treatment usually require an assistant; furthermore, rubber band ligation has been associated with rectal discomfort in at least one tenth of patients.¹ Infrared coagulation is a new procedure that produces an area of submucosal fibrosis.² When it is applied above the haemorrhoidal tissue it results in a reaction similar to that observed after injection or rubber band ligation. The small ulcer caused by band ligation and photocoagulation causes mucosal fixation and reduces the tendency to further prolapse.

We compared the outcome of photocoagulation with that of rubber band ligation in patients followed up for one year.

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