

Hemorrhoids

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ABSTRACT: Hemorrhoids are vascular spaces forming cushions above the anal canal which allow the passage of gas without stool, and cause clinical problems only when they become engorged and prolapse with resulting pain, bleeding, itching or discharge. Hemorrhoids require treatment only if they cause symptoms, and should be treated only as long as symptoms persist. Techniques of treatment including injection therapy, rubber band ligation, infrared coagulation, bipolar probe, heater probe, ulroid and YAG laser are described. At present, rubber banding is the most cost effective therapy. Diet education is essential to prevent recurrence. *Can J Gastroenterol* 1990;4(9):554-558

Key Words: Hemorrhoids, Nonoperative treatment

Les hémorroïdes

RESUME: Les hémorroïdes sont des coussinets variqueux situés au-dessus du canal anal. Permettant l'évacuation de gaz sans selle, elles ne causent de problèmes cliniques qu'en cas d'engorgement et de prolapsus, provoquant alors douleurs, saignements, prurit ou écoulement muqueux. Le traitement ne devrait s'appliquer qu'en présence de symptômes et se limiter à leur durée. Le présent article décrit diverses techniques thérapeutiques – injections sclérosantes, ligature élastique, coagulation aux infrarouges, sonde bipolaire, thermosonde et laser YAG. La ligature élastique constitue présentement le traitement le plus économique. L'éducation du client en matière de régime alimentaire est essentielle à la prévention des récives.

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HEMORRHOIDS ARE A COMMON problem seen in clinical gastroenterological practice. In the past, both the nonoperative mode (ie, rubber banding) and operative treatment were thought to be the preserve of the surgeon. Current gastroenterology training programs are not geared to produce trainees capable of handling hemorrhoidal disease. Thus, the nonoperative management of these proctological problems would seem to be ideally suited to a course in therapeutic endoscopy.

Hemorrhoids are not veins in the true sense of the word, but are vascular spaces which form cushions above the anal canal (1). They have an important function in the control of continence and allow the passage of gas without stool. These vascular spaces are present at birth. They cause clinical problems only when they become engorged, and may eventually prolapse with resulting pain, bleeding, itching or discharge. This occurs when the connective tissue

TABLE 1
Classification and symptoms of internal hemorrhoids

Stage	Prolapse	Symptoms
I	None	Bleeding
II	Occurs with movement but reduces spontaneously	Prolapse, bleeding, mild discomfort
III	Occurs with bowel movements – manual reduction	Prolapse, bleeding, occasional pruritis, discharge, discomfort
IV	Persistent, reduction not possible	Prolapse, bleeding, pain, thrombosis, soiling, discharge

and smooth muscle, which form the supportive scaffolding of these venous sinuses, stretch and fragment.

When the anal canal is opened during defecation, the high intra-abdominal pressure is opposed by atmospheric pressure, so that a shearing force is developed that is greatly accentuated by prolonged or excessive straining, such as that produced by faulty bowel habits and/or diets low in fibre. These hemorrhoidal plexi are subjected to this shearing force by virtue of their position, and supportive tissue is progressively destroyed. As the tissue stretches and is disrupted, the vascular spaces dilate. The grading and symptoms related to this are shown in Table 1. During straining there is a transudation of blood through the tissue and thinned wall, resulting in rectal bleeding (grade I). Continual stretching results in prolapse of the submucosa, which at first returns to the anal canal spontaneously (grade II hemorrhoids). With increasing disruption, manual reduction may be necessary (grade III), and in the final stage, when disruption includes the mucosal suspensatory ligament which normally attaches the mucosa to the muscular wall at the line of the crypts, forming a watershed between the internal and external hemorrhoid plexuses; there is now a free communication between these two plexi and a true internal/external hemorrhoid is formed which is irreducible (grade IV).

Hemorrhoids require treatment only if they cause symptoms, and should be treated only as long as symptoms persist. There is no place for prophylactic or cosmetic treatment of hemorrhoids.

In the past, gastroenterologists have been primarily prescribers of high fibre diets and local treatment in the form of

suppositories or cream. More definitive and invasive treatment was left to the surgeon. This is not to minimize the great importance of patient education as far as sound dietary advice and good habits of defecating. An Italian study (2) stressed the importance of following rubber band ligation with instruction and advice about a high fibre diet. Patients who did not attempt to correct their excessive straining and dry stool experienced a high incidence (60%) of hemorrhoid recurrence within one year.

Nonoperative treatment of hemorrhoidal disease includes sclerotherapy, rubber band ligation, thermal means such as infrared coagulation, BICAP probe, heater probe, YAG laser, contact and noncontact probes and the recently introduced ultroid (Microvasive Inc, Massachusetts) (Table 2).

The examination of the patient begins with inspection of the perineum. With the gloved hand, the area is probed to see whether there are any painful areas. Rectal examination will give a good indication of sphincter

tone. Unless the hemorrhoids are large or thrombosed they will often not be felt. The best endoscopic examination is with a proctoscope. The hemorrhoidal columns are usually in the left lateral, right posterior and right anterior positions.

Once it is decided that intervention is appropriate and that dietary and local therapy have not relieved the symptoms, one of the techniques in Table 2 should be considered. They all have the common aim of fixation and elimination of sagging rectal mucosa. The anchoring effect is best achieved by fibrosis caused by a mild inflammatory reaction, which could be accomplished by the submucosal perivascular injection of a sclerosant, or by the production of a shallow mucosal ulcer, either by rubber band ligation or thermal methods such as infrared coagulator, BICAP or heater probe.

INJECTION THERAPY

From an historical perspective, injection therapy has been used for the longest time. It is still popular in certain parts of the world, such as Great Britain.

With this technique a sclerosant polidocanol 3% (Aethoxysklerol; Kreussler, Germany) or 5% phenol in oil is injected into the submucosal space to produce submucosal fibrosis. It is appropriate and effective only for grade I hemorrhoids (3). The author believes that with increased use of convenient and effective thermal methods, injection therapy will become redundant.

TABLE 2
Internal hemorrhoids – Nonoperative intervention

Technique	Principle	Ideal grades	Choice for
Thermal			
Infrared coagulator	Destruction fixation	I,II	Bleeding, insufficient tissue to ligate
BICAP	Destruction fixation	I,II	
Heater probe	Destruction fixation	I,II	
YAG laser (noncontact)	Destruction fixation	I,II	
Cryo	Destruction fixation	II,III	Rarely used
Chemical			
Sclerotherapy	Fixation	I,II	Bleeding, insufficient tissue to ligate
Electrochemical			
Ultroid	Destruction fixation	I,II,III (?IV)	Bleeding, persistent symptoms
Mechanical			
Ligation	Destruction fixation	II,III	Bleeding, persistent symptoms

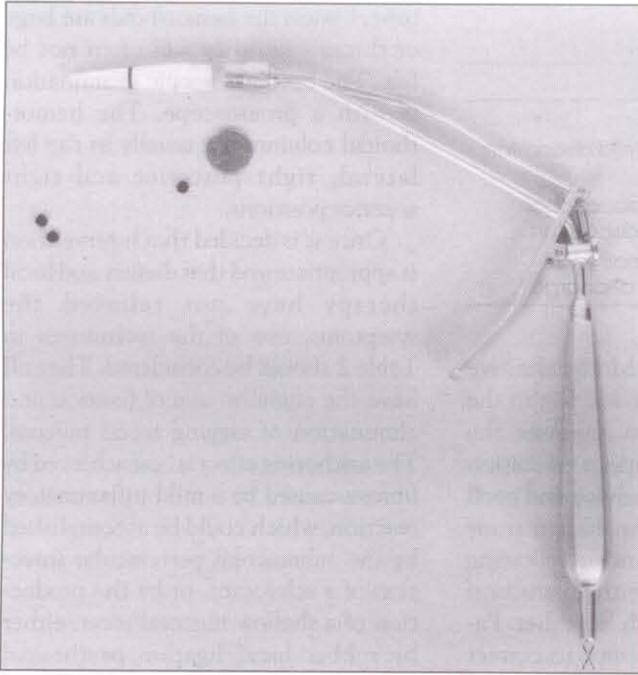


Figure 1) Suction ligator with cone applicator and rubber bands (1 cent coin for size comparison). Suction applied at X

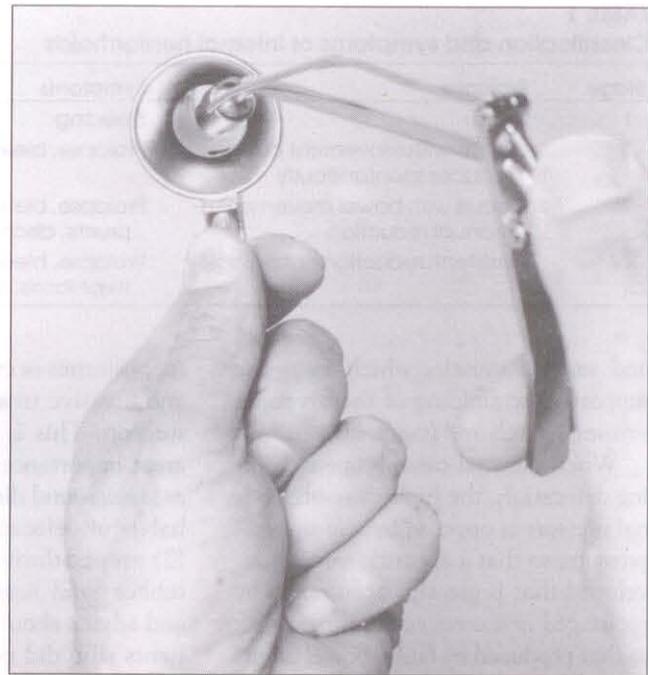


Figure 2) Rubber band can be applied by one operator

RUBBER BAND LIGATION

This is the most popular method of treatment for grades II and III hemorrhoids in North America and Europe. It was introduced by Blaisdale in 1958 (4). A modification of the ligator by Barron was reported in 1962 (5). The advantage of the technique is the removal of redundant tissue and production of an area of shallow ulceration, leading to an inflammatory response and fixation. The original technique, described by Barron, requires two individuals – an assistant to hold the proctoscope in place and the physician who, using both hands, applies the ligator with one and, using forceps, the other passes through the ring to grasp the hemorrhoid at its apex. The tissue is then pulled into the ring and a trigger attachment then slips an elastic band over the neck of tissue, essentially strangling it. This results in ischemic necrosis and sloughing of the banded tissue after a period of two to four days.

In the early 1970s a simple ingenious suction ligator was developed which uses suction to pull the redundant tissue into a cup-like probe. A trigger then releases the stretched rubber band down over the entrapped tissue (Figure 1). The great advantage of this technique is that it can be done by the

physician without assistance. With one hand the physician holds the proctoscope in place (Figure 2), and with the other he places and fires the ligator. The availability of two loaded ligators makes application of the bands very fast, as the operator doesn't need an assistant to reload for the second ligature.

Usually only one or two bands are applied at a time, although some proctologists advocate the placement of up to three bands. This may lead to discomfort for a day or two as the procedure can produce edema and a sensation of incomplete emptying. Rubber banding is useful only when there is redundant tissue. It is not useful for grade I hemorrhoids.

A number of studies (7,8) have compared rubber band ligation and infrared coagulation. The consensus would appear to be that infrared coagulation is probably as effective for grades I and II, but less adequate for grade III. The role of infrared coagulation is controversial for grade III hemorrhoids.

The advantage of rubber band ligation is that it can be carried out by one individual, the instrument is inexpensive (\$400), and the technique simple to learn and master. It has a success rate at three months of approximately 80 to

90%, and at one year of about 70%. The procedure can be repeated.

Rubber band ligation, although used by gastroenterologists in continental Europe, has seldom been used by gastroenterologists in North America. This technique is easy to learn and quick, and can be applied to patients without sedation or bowel preparation (8,9). Patients may complain of anal discomfort and fullness for one or two days. This is usually mild. Placement of the ring too close to the dentate line may result in severe pain which will necessitate urgent removal of the ring with sharp scissors. There have been a small number of disquieting reports concerning serious pelvic sepsis following hemorrhoidal ligation (10,11). These have resulted in at least four deaths, and it has been implied that some of these young men had AIDS. One proctologist from Switzerland states that rubber band ligation should not be carried out in patients who have clinical AIDS (12).

Gastroenterologists at the Wellesley Hospital have used suction rubber band ligation since 1980 on more than 700 patients. There have been no complications related to sepsis and no patient has had to be hospitalized or seen on an urgent basis because of bleeding or pain.



Figure 3) Infrared coagulator

INFRARED COAGULATION – IRC PHOTOCOAGULATION

The infrared coagulator was developed by Dr Gunter Nath of Lumatec Inc in Munich, Germany (13) (Figure 3). The coagulator is a gun-like instrument that uses infrared heat to spotweld the mucosa. It has a timing device that allows precise control of the depth of ulceration. The first clinical study (14) was reported in 1978 by Dr Nelyer of Berne, Switzerland and Dr Peter Kiefhaber of Munich, West Germany. Although the instrument is being widely promoted as effective for all grades of hemorrhoids, it is primarily beneficial for grades I and II. There is some controversy as to its usefulness for grade III hemorrhoids.

Several studies have been carried out comparing infrared coagulation to sclerotherapy, rubber banding, the BICAP heater probe and ultroid. In defence of infrared coagulation, it is a technique that is easy to master, rapid, safe and well tolerated. Two British studies, one from Birmingham (15) and the other from Nottingham (7), concluded that infrared coagulation compared favorably to rubber band ligation for grades I and II hemorrhoids, with assessments being carried out at three to 12 months following the procedure. Leicester and Mann at St Mark's Hospital (16) felt that infrared coagulation compared favorably to banding and sclerotherapy for grade II hemorrhoids.

In a study from the United States (17), in a small number of patients with grade III hemorrhoids, it was felt that

infrared coagulation could be useful in control of bleeding, although the patients continued to prolapse. The recommendation from a British study (15) was that infrared coagulation be used for grades I and II, and failures should be treated by rubber band ligation. Weinstein (6) felt that rubber band ligation in a single session was superior to infrared coagulation for prolapsing bleeding hemorrhoids. Zinberg of California in 1989 (18) found better than 85% excellent results in grade I and II. In grade III only, 23% had good results and 70% only fair results.

The Division of Gastroenterology at the Wellesley Hospital acquired the first infrared coagulator in North America in 1979. It has been found to be generally effective in the treatment of grades I and II hemorrhoids, but is not particularly useful in grade III. Infrared coagulation can also be used for coagulation of radiation-induced angiodysplasia.

BIPOLAR PROBE

The bipolar probe is manufactured by CIRCON/ACMI (Connecticut). It is a coaptive cautery device which has a disposable tip and plugs into a basic ACMI 50 W generator used for endoscopy.

The tip is applied in a similar mode as with infrared coagulation, with some pressure at the apex of the hemorrhoidal column, and anywhere from two to six areas of cautery are produced. Published studies have come from England where the probe has been com-



Figure 4) Ultroid probe with plastic proctoscope

pared with infrared coagulation. Denison (19) concluded that BICAP was better for grades I and II hemorrhoids than infrared, perhaps related to the larger area of burn, and that in grade III patients it was of marginal benefit. Another paper from Newcastle (20) found that in grades I and II BICAP was comparable to rubber band ligation.

HEATER PROBE

This also is a gun-like probe which is an accessory to a standard heater probe power generator marketed by Olympus Corp. It has a Teflon-coated tip which minimizes tissue adhesion. Zinberg (18) compared infrared coagulation with the heater probe and the ultroid. The heater probe was found to be successful in 95% of grade I hemorrhoids, 85% of grade II and 6% of grade III. In this Californian study, 95% of patients were sedated with pethidine hydrochloride or intravenous midazolam (Versed; Roche). The follow-up period was 12 to 24 months.

ULTROID

This is a machine (Figure 4) which has recently generated interest, and if further trials support the initial enthusiasm, it will be a great advance in the treatment of patients with significant hemorrhoid disease (grades III and IV). It was developed by Dr Norman from Nevada and the Microvasive Corporation.

The treatment involves the application of a direct current of low amperage (8 to 16 mA) for 8 to 10 mins per

hemorrhoidal column. After the column is identified, the two probe tips are applied to the root of the hemorrhoid, and gradually increasing amperage is applied by finger control on the handle. After the probe is placed on the column and the current is increased to 2 mA, the probe is advanced perhaps 1 to 2 mm into the submucosa, and the current gradually increased to 16 mA. During the treatment a popping sound may be heard, which is thought to be hydrogen gas escaping from the tissue. The mechanism of action is not well understood. It seems that this treatment is well tolerated. A minor disadvantage is that each column may take up to 10 mins per sitting. In advanced cases, more than one treatment will be required.

Only two studies have so far been published (18,21) – both in the May 1989 issue of the *American Journal of*

Gastroenterology. Norman (21) reported almost 100% relief of symptoms in grades III and IV patients. Zinberg (18) shows excellent response for grades I and II hemorrhoids (over 90%), and for 85% of grade III (18 of 21 patients). In grade IV hemorrhoids (four patients), none had good results but 75% had fair results. These results must be expanded to compare ulroid with rubber banding. Further trials are necessary to document its effectiveness.

THE YAG LASER

The YAG laser is used to coagulate hemorrhoidal tissue in either noncontact or contact mode. In noncontact mode it is used through a flexible endoscope in the rectum. It would seem that this is suitable for grades I and II hemorrhoids and perhaps for grade III. It is unlikely to be useful for grade IV. As in all thermal modes it is important to

avoid excessive heat delivery to the sphincter. The YAG laser has also been used through a proctoscope in a contact mode for patients with grade III and IV hemorrhoids. No controlled trials have been published.

The carbon dioxide laser has also been reported as being beneficial, both by itself and in combination with the YAG laser. The author personally has no experience with the carbon dioxide laser. It is usually used with general anesthesia.

Endoscopists now have several good modalities from which to choose for eradication of hemorrhoidal disease. Can one machine be cost effective and do it all? The ulroid has potential, on the basis of preliminary reports, but much more must be documented in the literature. All modalities are effective for grades I and II. Rubber banding is the most effective modality and the best buy.

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