A Personal Experience in Comparing Three Nonoperative Techniques for Treating Internal Hemorrhoids

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Infrared photocoagulation therapy was used on a total of 302 patients. Approximately 20% of the patients experienced minor bleeding; however, two required surgery, and 30% of the patients experienced discomfort during a 14-day period following the procedure. Good results were obtained in patients with first- and second-degree hemorrhoids. Heater probe coagulation therapy was conducted in a total of 264 patients. Good results were achieved in 90% of patients with first- and second-degree hemorrhoids, minor pain and bleeding occurred in approximately 10% of these patients, and one patient with third-degree hemorrhoids who was treated with this technique failed to respond and required surgery. Ultroid d.c. current therapy was utilized in 192 patients, and follow-up results were good in 95% of these cases. Minor bleeding occurred in four patients. It is concluded that all three techniques, performed on an outpatient basis with little or no sedation, are effective modalities for first- and second-degree hemorrhoids, but that Ultroid therapy may yield good results in some patients with third- or even fourth-degree hemorrhoids.

INTRODUCTION

The anal canal in adults is approximately 3 cm long. At the level of the anal crypts (about 2 cm in) lies the dentate or pectinate line. This marks the transition between the dry, pale, stratified squamous epithelium of the anus and the moist, reddish columnar epithelium of the rectal mucosa. Somatic nerves supply the skin and mucosa below the pectinate line, and this is what accounts for the exquisite sensitivity of this region to painful stimuli, whereas autonomic nerves innervate the region above the pectinate line, making the rectal mucosa relatively insensitive to painful stimuli other than distention.

The dentate line also serves as the dividing point between the development of internal and external hemorrhoids. External hemorrhoids represent dilated terminal tributaries of the inferior hemorrhoidal veins draining below the dentate line. Contra-wise, internal hemorrhoids are not dilated varicosities, but instead are dilated sinusoids of the superior and middle hemorrhoidal veins and accompanying arteriolar systems. Whereas external hemorrhoids may be akin to varices, clearly, internal hemorrhoids are derived from these vascular cushions, and when bleeding occurs, it is primarily arteriolar rather than venous (1). Indeed the oxygen content of internal hemorrhoidal bleeding approaches that of arterial oxygen saturation. They primarily arise at one of three positions—the right anterior, right posterior, or left lateral position relative to the anorectal circumference. Not infrequently, they are accompanied by smaller, secondary hemorrhoids in the left posterior or anterior region.

Whereas nonoperative procedures for the treatment of hemorrhoids have been considered by some to be a stopgap measure, if in fact the symptoms of hemorrhoids are eliminated, even if the hemorrhoidal structures do not in and of themselves disappear, it should not be of concern to patients or their physicians.

Nonsurgical techniques for the treatment of hemorrhoids, in order to be effective, must produce a disturbance in the blood supply at the root of the hemorrhoidal complex. Several nonsurgical techniques have been utilized in the past, including elastic banding, sclerotherapy, combined sclerotherapy with elastic banding, laser therapy, cryotherapy and bi-cap electrocoagulation therapy.

MATERIALS AND METHODS

This study includes 758 patients with symptomatic hemorrhoidal disease in the form of bleeding, pruritus and pain, not responsive to several weeks or several years of conservative therapy in the form of a high-fiber diet. Three hundred and two consecutive patients were treated with infrared photocoagulation therapy, 264 consecutive patients were treated with heater probe coagulation therapy, and 192 consecutive patients were treated with Ultroid therapy. All patients were treated on an outpatient basis. Ninety percent of the patients were sedated with 50 mg of meperidine and 2 mg of midazolam intravenously and 76 patients (10%) received no medication.
All patients were evaluated prior to institution of treatment for hemorrhoids by either total colonoscopy or flexible sigmoidoscopy and barium enema for the purpose of excluding colonic disease such as inflammatory bowel disease, colon polyps, or colon malignancies.

The following tenets of therapy were utilized: 1) only internal hemorrhoids were treated, and 2) hemorrhoids were treated only if they caused symptoms.

Each form of therapy was directed toward the blood supply to the hemorrhoidal complex at the root of the hemorrhoid. In each of the three forms of treatment, therapy was administered at 2-wk intervals to 1-2 segments of the anal circumference bearing hemorrhoidal disease, rather than universal treatment to the entire circumference. This was done in an effort to prevent stricturing which might be anticipated to occur with the healing process. Treatment sessions varied between one and five per patient; however, most patients in any of the three forms of treatment appeared to require between two and three treatment sessions. It was deemed essential that accurate targeting of the root of the hemorrhoid be accomplished so that therapy could be directed toward the root of the hemorrhoid. Our experience has been that disposable anosopes and gooseneck lamps do not provide sufficient illumination or adequate visualization. Internal light sources such as is achieved with 12 cm long, 23 mm in diameter Welch-Allyn proctoscopes proved effective for infrared photocoagulation therapy and for heater probe coagulation therapy. The increased diameter of this type of endoscope permits excellent visualization and accurate targeting of the root of the hemorrhoid. A slightly longer, 15-cm, 23 mm in diameter scope is of value in those patients who are particularly obese, and depth becomes a factor in relationship to visualization. The narrower, 19-mm scope is of value in patients with some degree of anal stenosis, and was particularly applicable for use with heater probe coagulation therapy. The Microvasive transparent scope, when utilized with a headlamp for illumination, is very effective for Ultrad d.c. therapy because the slot allows for isolation of the hemorrhoidal complex facilitating the protracted application of d.c. current which is required (Fig. 1).

Infrared photocoagulation therapy (2, 3), produces infrared radiation from a 14-V Wolfram-Halogen projector bulb surrounded by a gold plate reflector and focused by a photo conductor (Fig. 2). The tip is protected by a polymer-coated cap or a sapphire tip which prevents adherence to tissues. A built-in timing device allows variation in the duration of radiation. The tip is slightly angled so as to permit coaptation with mild pressure. Our patients were treated with a 1.5-s pulse at the root of the hemorrhoid and on either side of the root of the hemorrhoid well above the dentate line. Three to five applications were utilized per treatment session, depending upon the size of the hemorrhoidal complexes.

The heater probe was developed by Dr. David Auth and has been used extensively for the control of upper gastrointestinal bleeding (4). It consists of a Teflon-coated metal tip that delivers a preset amount of energy as heat. The temperature is controlled at 160°C by means of an avalanche diode incorporated in the tip. Treatment was usually administered at 25 joules per pulse, as recommended by Auth. The mean number of pulses applied per patient was five (range, 2–7). To apply a coaptating effect, a specialized instrument was made with an angled tip and a battery driven handle that would permit rotation of the probe through 360° without removing the probe from the endoscope (Fig. 3).

Here, too, the root of the hemorrhoidal complex was isolated and treated using an energy commitment of 25 joules. Treatment intervals were at 10 days to 2 wk in the total of 264 consecutively treated patients.

Ultrad d.c. current therapy as developed by Dr. Daniel Norman (5) has been used in all four stages of hemorrhoids. We utilized this treatment on 192 con-
secutive patients. It employs the application of a d.c. current in relatively low amperage of 8–16 mA for a period of 8–10 min applied at the root of the hemorrhoid. After the hemorrhoid is isolated, the probes are applied to the root of the hemorrhoid and a gradual increase in the amperage is accomplished by finger control on the handle (Fig. 4). A popping sound is often heard during treatment, and an eschar develops, with subsequent contraction and shrinking of the hemorrhoidal complex as a consequence of the anopexy so produced.

RESULTS AND COMPLICATIONS

The total number of patients treated with infrared photocoagulation therapy was 302 (Table 1). Of the group, 152 patients had first-degree hemorrhoids, and they were followed for a period of 12–24 months. Good results were achieved in 148 patients (97%) and fair results in four patients (2.6%). Good results referred to those patients who experienced complete resolution of the symptomatology, whereas fair results referred to those who experienced marked improvement in symptoms, but still had minor discomfort or occasional spotting. Pain was experienced in approximately 30% of patients and minor bleeding in 20%. In some instances, the pain was sufficient to require the use of mild analgesics or sitz baths, but resolved in a few days. A mild degree of discomfort was experienced by several patients in the first 1–2 days following treatment, and the bleeding that was noted usually consisted of spotting within 7–10 days after infrared photocoagulation therapy. In two patients, however, the bleeding was more pronounced, requiring earlier revisitation. A third patient with second-degree hemorrhoids continued to bleed and have symptoms as did one with third-degree hemorrhoids, and both required surgical hemorrhoidectomy. One patient with fourth-degree hemorrhoids steadfastly refused any surgical therapy whatsoever. She experienced a significant reduction in pain, pruritis, and bleeding without complete resolution of her hemorrhoids.

Of the total of 264 patients who were treated with heater probe coagulation therapy, good results were achieved in 90% of patients with first and second degree hemorrhoids (Table 2). Pain and bleeding occurred in approximately 10% of patients. One patient with third-degree hemorrhoids who was treated with heater probe coagulation therapy failed to respond to treatment and required surgery.

### Table 1

<table>
<thead>
<tr>
<th>Stage</th>
<th>No. of Patients (Total, 302)</th>
<th>Follow-up (mo)</th>
<th>Good Results</th>
<th>Fair Results</th>
<th>Pain</th>
<th>Bleeding</th>
<th>No. of Patients Requiring Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-degree</td>
<td>152 (50.3%)</td>
<td>12–24</td>
<td>148 (97.4%)</td>
<td>4 (2.6%)</td>
<td>31 (19.7%)</td>
<td>29 (19.1%)</td>
<td>0</td>
</tr>
<tr>
<td>Second-degree</td>
<td>136 (45.0%)</td>
<td>8–24</td>
<td>131 (96.4%)</td>
<td>4 (2.9%)</td>
<td>52 (38.2%)</td>
<td>27 (19.9%)</td>
<td>0.7%</td>
</tr>
<tr>
<td>Third-degree</td>
<td>13 (4.3%)</td>
<td>6–24</td>
<td>3 (23.1%)</td>
<td>9 (69.2%)</td>
<td>5 (38.5%)</td>
<td>4 (30.8%)</td>
<td>1 (7.7%)</td>
</tr>
<tr>
<td>Fourth-degree</td>
<td>1 (0.4%)</td>
<td>24</td>
<td>0 (100%)</td>
<td>1 (100%)</td>
<td>1 (100%)</td>
<td>1 (100%)</td>
<td>0</td>
</tr>
</tbody>
</table>

FIG. 3. Heater probe apparatus.

FIG. 4. Ultroid.
Good results were achieved in all patients with first-degree hemorrhoids who were treated with Ultroid d.c. therapy and in better than 90% of patients with second-degree hemorrhoids. Eighty-five percent of patients with third-degree hemorrhoids achieved good results (Table 3). Pain and bleeding were minimal in patients with first- through third-degree hemorrhoids, the pain usually being described as minor discomfort within the first week after treatment, and bleeding manifesting itself by a slight amount of spotting on the toilet paper within 7–10 days after treatment.

Two patients required surgery, one with third-degree hemorrhoids with symptoms of pain and bleeding that failed to respond to treatment, and one with fourth-degree hemorrhoids. Good results, that is, complete resolution of the hemorrhoidal process, were not achieved in any of the four patients with fourth-degree hemorrhoids. However, fair results, that is, diminution in pain, itching, and bleeding to a significant degree, were experienced in three of the four patients so treated. One received no relief and required surgical hemorrhoidectomy.

**DISCUSSION**

When the anal canal is opened during the act of defecation, the increased intra-abdominal and intra-colonic pressure is opposed only by atmospheric pressure, so that a shearing force develops which causes progressive weakening of the scaffolding or support structures of the hemorrhoidal cushions (1). Should this be progressive, engorgement of the hemorrhoids and prolapsing of the hemorrhoidal complexes with the subsequent complications of bleeding, pain, and itching are likely to occur. Prolonged or excessive straining such as might be produced by faulty bowel habits or a diet low in fiber content contributing to constipation or diarrhea may all increase intra-colonic pressure and be responsible for progressive hemorrhoidal disease. With progressive aging, the connective tissue scaffolding or mooring weakens. Increased venous or arterial pressure, pregnancy, prolonged toilet experiences, the abuse of laxatives, and hereditary pre-disposition all may increase the tendency toward developing hemorrhoidal disease. A high-fiber diet which has the ability to reduce intracolonic pressure can prove effective in controlling symptomatology and, in many instances, produces resolution of first- or even second-degree hemorrhoids. Careful anal hygiene, instructing the patient to gently swab the peri-anal area after defecation with wet toilet paper or premoistened wipes, followed by gentle blotting will decrease peri-anal irritation and bacterial colonization. The importance of instructing the patient with hemorrhoidal disease regarding dietary fiber and peri-anal hygiene cannot be overemphasized.

The three forms of treatment under discussion must
produce a disturbance in the blood supply to the hemorrhoidal complex at the root of the hemorrhoid if they are to be effective. Anal ulceration is very common after any of these treatments and usually is of no consequence, most often, healing within 7 days to 2 wk. In other forms of nonoperative treatment such as elastic banding, pelvic sepsis (6), and even death (7, 8), has been reported. In the three forms of treatment under discussion, however, we experienced the complications of minor hemorrhage and mild-to-moderate pain only. However, it is true that five patients failed to respond to therapy and did require surgery because of continued symptoms.

Conclusion

Infrared photocoagulation therapy and heater probe therapy are satisfactory modalities for the treatment of first- and second-degree hemorrhoids. They are performed on an outpatient basis, can be performed quickly with little or no sedation, and are attended by only a few minor complications. Ultroid therapy, which is also performed on an outpatient basis with little or no sedation, appears to be associated with still less discomfort and complications than either infrared photocoagulation therapy or heater probe coagulation therapy. In addition, good results in the treatment of third-degree hemorrhoids and in some cases, fourth-degree hemorrhoids, can be achieved with Ultroid therapy.

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REFERENCES
