Anal Sphincteric Pressure in Fissure-in-Ano Before and After Lateral Internal Sphincterotomy*

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Cerdán FJ, Ruiz de León A, Azpiroz F, Martin J, Balibrea JL. Anal sphincteric pressure in fissure-in-ano before and after lateral internal sphincterotomy. Dis Colon Rectum 1982;198–201.

Resting anal canal pressure was measured in 15 patients with anal fissure before and after lateral internal sphincterotomy. This pressure was found to be significantly higher in these subjects (mean 95 ± 23.08 mm HG) than in the control group (mean 66.10 ± 14.28 mm Hg) before surgery ($P < 0.005$). After surgery, a normal anal canal pressure was produced. The authors maintain that anal canal spasm is responsible for chronicity of anal fissures. [Key words: Fissure, anal; Sphincteric pressure, anal; Sphincterotomy, lateral internal]

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It is generally agreed that chronicity of anal fissures is due to spasm or contraction of the internal anal sphincter. Consequently, therapy is aimed at elimination of the spasm.

Clinically, anal spasm can be observed upon digital rectal examination, and the introduction of a proctoscope or sigmoidoscope is often impossible.

However, there have been few studies aimed at evaluating the existence of an elevated basal anal canal pressure in patients with anal fissure as well as after therapy procedures, of which the authors believe lateral internal sphincterotomy (LIS) to be the technique of choice. The authors have therefore measured basal anal pressures in patients with chronic anal fissure before and after LIS.

Materials and Methods

Basal anal pressure was measured in 15 patients with chronic posterior anal fissure and ten normal subjects (control group).

The first group was comprised of eight men and seven women, between 19 and 66 years of age (average age: 36.13 ± 12.63).

LIS was performed on all patients. Anal pressure was measured one day before in all patients and seven days and one year after the procedure in ten patients.

The control group consisted of four men and six women, between 18 and 62 years of age (average age: 36.10 ± 13.96).

Anal pressure was measured with a scaled polyethylene tube (internal diameter 1.4 mm), with a lateral orifice as sensor. The total width of the tube was 2.5 mm.

Distilled water was perfused at a constant flow rate of 0.809 ml/minute, with a Harvard-apparatus perfusion pump. A Hewlett-Packard 1280-C pressure transducer, a Hewlett-Packard 8805-C amplifier, and a Hewlett-Packard 7754-A polygraphic register were used (pressure registered in mm Hg).

The registers were obtained while subjects were in the left lateral decubitus position, introducing the tube directly into the rectal ampulla, withdrawing it slowly centimeter by centimeter from the anal verge. None of the patients expressed pain or any other disagreeable sensation that might affect sphincter function. The mean pressure was recorded at each site, and the highest mean pressure recording at rest in any patient was defined as the maximal anal pressure.

Rectal ampulla pressure was used as reference, and the average of the maximum pressures found was used for statistical analysis by the Student t test.

Results

Mean values of pressures registered 5, 4, 3, 2 and 1 cm from the anal verge, respectively; mean maximum pressures and sphincter length in both groups are shown in Table 1.

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TABLE 1. *Mean Values of Pressures Registered 5, 4, 3, 2 and 1 cm Respectively from the Anal Verge, and Mean Maximum Pressures and Sphincter Length in the Control Group and in Patients with Anal Fissure*

	Distance from Anal Verge (cm)					Sphincter Length	Mean Maximum Pressures
	5	4	3	2	1		
Control Group	0	1.5 ± 3.20	21 ± 17	54.5 ± 19.8	66.1 ± 14.28	3.2 ± 0.4	73.6 ± 10.18
Preoperative values	4.66 ± 7.18	23.66 ± 18.48	71.8 ± 36.4	95 ± 23.08	76.06 ± 22.07	4.33 ± 0.59	105.33 ± 24.20
Immediate postoperative values	1.58 ± 2.58	15 ± 7.07	42.5 ± 15.47	60.83 ± 13.35	47.5 ± 10.7	4.33 ± 0.47	65 ± 10
Late postoperative values	0	9.28 ± 7.75	40.71 ± 12.93	57.85 ± 15.55	41.66 ± 17.2	3.71 ± 0.45	60 ± 14.63

Patients with anal fissures exhibited statistically significantly higher mean maximum anal pressures than did control subjects ($P < 0.005$) (Fig. 1).

Whereas in the control group the mean maximum pressure was observed in the distal cm (66.10 ± 14.28 mm Hg), patients with anal fissure had maximum values 2 cm proximal to the anal verge (means 95 ± 23.08 mm Hg).

Significant differences were also noted in sphincter length, the average being 4.33 ± 0.59 cm in patient group, as compared with 3.2 ± 0.4 cm in the control group.

LIS greatly reduced sphincter pressure, both seven days and one year after surgery ($P < 0.005$) (Fig. 2).

Tension particularly and proportionally decreased in the last 3 cm of the anal canal.

No statistical difference was found between values for control subjects and postoperative values for the patient group ($P > 0.05$) (Figs. 3 and 4).

Although anal pressures measured one year following surgery were lower than those registered seven days after surgery, the difference was not statistically significant.

Sphincter length was found to be shortened when measured one year after surgery (mean: 3.71 ± 0.45 cm).

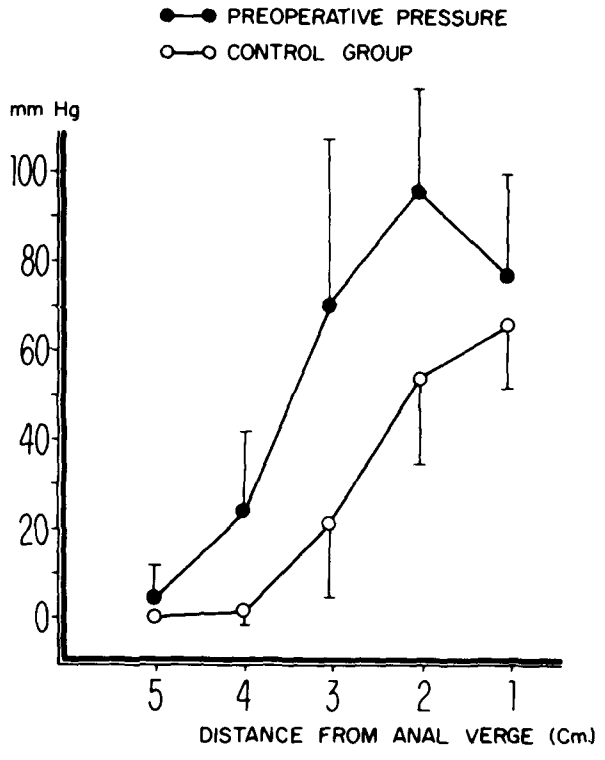

FIG. 1. Resting anal pressure in control group and in patients with anal fissure.

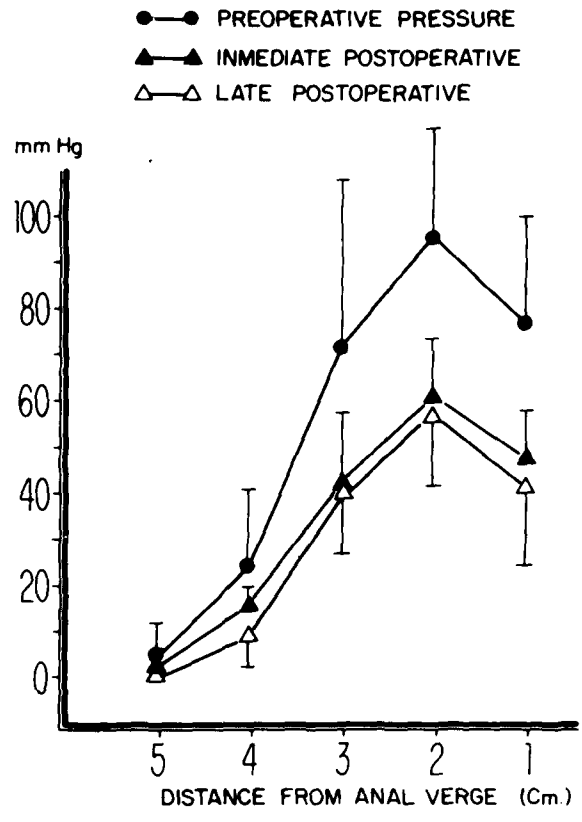

FIG. 2. Resting anal pressure in subjects with anal fissure before and after LIS (both seven days and one year postoperatively).

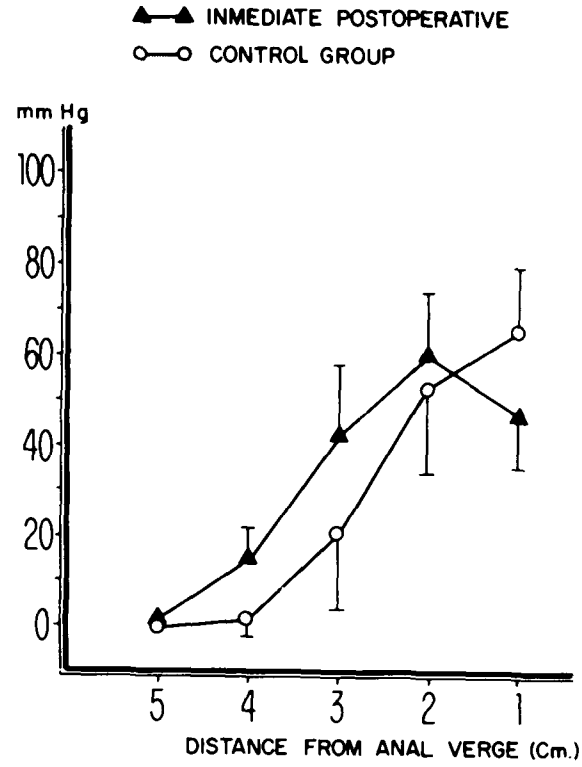

FIG. 3. Resting anal pressure in control group and seven days postoperatively in patients with anal fissure after LIS.

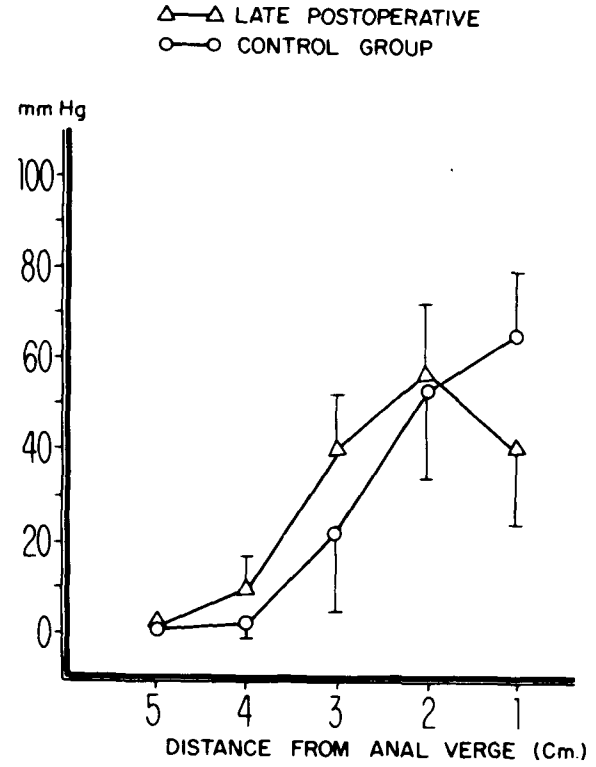

FIG. 4. Resting anal pressure in control group and one year postoperatively in patients with anal fissure after LIS.

Discussion

In spite of the belief held by most authors that chronic anal fissure is perpetuated by internal anal sphincter spasm and/or contraction,[1-3] anal measurements have not supported this hypothesis.

Thus, Graham-Stewart *et al.*[4] and Duthie and Bennett[2] did not observe elevated anal canal pressures in these patients, making the contribution of spasm to fissure chronicity dubious at best.

It seemed that sphincter spasm played an important role only during defecation or following rectal digital examination.

Nothmann and Schuster,[5] on the other hand, observed elevated resting anal pressure in patients with anal fissure, attributing their findings to artifacts in method.

Certainly, methodologic differences, such as tube or balloon diameters in the anal canal, can substantially influence results.[6] Gutiérrez *et al.*,[7] in fact, has found that the larger the diameter is, the higher the pressure registered, not observing important differences when the tube or balloon are narrower than 0.5 cm.

In this experiment a narrow catheter was used, with a lateral opening and continuous perfusion, a method that the authors believe does not introduce substantial error, as shown by the fact that patients did not experience disagreeable sensations.

In this study, in fact, significantly higher anal pressure was found in patients with fissure than in normal subjects, such as Hancock[8] and Arabi *et al.*[9] also observed, although their results were slightly lower than the present study's.

The higher anal pressure was found throughout the entire length of the anal canal and was particularly manifest 2 cm from the anal verge, causing a greater sphincter length than in normal subjects or recognized as normal by other authors.[1,7]

These results support the current therapy of anal fissures which, in most cases, is directed toward relief of spasm. The procedures most frequently used are anal dilatation and internal sphincterotomy. In fact, Duthie and Bennett[2] have found that anal stretching produces an initial decrease in sphincter pressure which, however, returns to prestretching levels eight days following surgery.

Bennett and Duthie[10] have shown that midline posterior internal sphincterotomy results in a clear reduction in anal pressure (up to 50 per cent), in spite of the absence of high presurgical levels. This finding could account for the elevated number of functional alterations that follow this procedure.

Hancock[8] observed, in a small group of patients, a normalization of the pressures both after anal dilatation and lateral subcutaneous sphincterotomy. The present authors performed LIS on all of their patients, a technique which is felt to be the procedure of choice in the treatment of chronic anal fissure.[11] Resting anal canal pressure was significantly lower both seven days and one year following surgery, as compared with pretreatment levels.

New levels were slightly lower than in control subjects, though this difference was not statistically significant. The authors believe that maintenance of adequate sphincter tone explains why there are no functional complications in these patients and therefore suggest that this procedure should not be performed on patients with low sphincter tone, as previously recommended by Eisenhammer.[1] In these cases, correction of local factors is indicated.

It is concluded that patients with anal fissures have high and maintained anal canal pressures, even in the absence of stimulus. It was also found that LIS corrects this defect and produces a short-term (seven-day) and long-term (one-year) normalization of anal pressure. This explains the excellent clinical results observed in these subjects following this procedure.[3,11–13]

It therefore is reasonable and logical to attribute anal fissure chronicity to anal sphincter spasm.

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