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Computerized anal vector manometric analysis in patients treated by tailored lateral sphincterotomy for anal fissure

Abstract Tailored lateral sphincterotomy (TLS) was designed to preserve more sphincter by tailoring the vertical height of sphincter division to the length of the fissure. The aim of this study was to evaluate prospectively the effect of tailored lateral sphincterotomy on the anal sphincter function in patients with chronic anal fissure. Using a water-perfused 8-channel catheter, a computer-generated anal vector manometric study was performed (preoperatively, 1 and 5 weeks after tailored sphincterotomy) for 30 patients with chronic anal fissure and 20 controls. The mean resting anal pressure (MRAP) in patients with anal fissure was significantly higher (90.93 ± 20.48 cm H2O) than in controls (64.9 ± 11.90 cm H2O). Twenty-one patients (70%) had high MRAP (hypertensive) while 9 patients (30%) had normal MRAP (normotensive). Resting anal pressure at 1 cm from the anal verge (RAP-1 cm) in patients with chronic fissure was significantly higher than global RAP \((p=0.00358)\). There was no significant difference between mean RAP-1 cm of normotensives and hypertensives. Normotensive patients had significantly shorter functional anal canal length (FACL, 2.7 ± 0.26 cm) and shorter high pressure segment (HPS, 0.70 ± 0.26 cm), which is more distally located (D1/D2 ratio, 0.80 ± 0.17) than did hypertensive patients (FACL, 3.30 ± 0.25 cm; HPS, 1.05 ± 0.36 cm; D1/D2 =1.18 ± 0.46). The percent MRAP reduction was nearly constant after TLS, regardless of the type of patients (36.85 ± 15.04% in hypertensives, 30.48 ± 16.62% in normotensives). TLS resulted in hypotonia, which was more evident in females (MRAP = 57.00 ± 7.75 cm H2O) and normotensive patients (MRAP = 48.60 ± 9.08 cm H2O). Two patients (6.66%) had persistent fissure after TLS. Soiling and imperfect control of flatus were reported by two patients (6.66%). Following tailored lateral sphincterotomy, the anal physiology was significantly more preserved in hypertensive than in normotensive patients. The success rate of TLS closely approximated that of traditional lateral sphincterotomy with less incidence of continence disorders. A more careful preservation of the sphincter is required in normotensive patients.

Key words Fissure • Manometry • Pathophysiology • Sphincter

Introduction

Lateral internal anal sphincterotomy has been widely accepted as the treatment of choice for chronic anal fissures [1-6]. However, the traditional division of the internal sphincter up to the dentate line is sometimes followed by impaired continence [7], particularly in females with short anal canal [8-11]. Pharmacological techniques of inducing reversible chemical sphincterotomy have failed to gain wide acceptance, as their use is associated with considerable problems with patient compliance, healing rates and side effects [12].

Tailored lateral sphincterotomy, described by Littlejohn and Newstead [13] as adjusting the sphincterotomy height to the length of the fissure, produces clinically significant reduction in incontinence rates and has recognized unquoted conservative practice of many surgeons. In this computerized vector manometric study, we prospectively analyzed the effect of tailored lateral sphincterotomy on anal function in patients with chronic anal fissure.
Patients and methods

We performed a prospective study of 30 patients suffering from chronic anal fissure admitted, in the period from April 1998 to May 1999, to the Unit of Colon and Rectal Surgery, Alexandria Main University Hospital. Informed consent was obtained from each patient. The study protocol was registered and approved by the Committee of Postgraduate Studies and Medical Research, Faculty of Medicine, University of Alexandria. Patients were included in the study if their fissures had indurated fibrotic edges with or without skin tags. The duration of symptoms ranged between 2 and 18 months with a mean of 7.56 ± 5.04 months. Patients with inflammatory bowel disease, previous history of anorectal disorders or recent obstetric delivery were excluded from the study. The study included 20 volunteers as controls. Volunteers with anal or gastrointestinal disease were excluded. The mean age of the patients was 26.93 ± 7.84 years (range, 18-52 years). Six patients were males and 24 patients were females. The control group was comparable to the study group with regard to mean age (25.62 ± 8.77; range, 20-30 years) and sex distribution (60% females and 40% males).

Posterior fissure was found in 22 patients (73.33%) while combined anterior and posterior fissures were found in the remaining 8 patients (26.67%).

Anal manometry

A water-perfused catheter (Sandhill vectrogram catheter, part number AGS-108) has 8 side holes oriented at 45° to one another and arranged in two rows. The catheter was perfused using a pneumatic hydraulic pump (Mui Scientific, Mississauga, Canada). The station pull-through technique was used and pressures were recorded using Smart Lab (Sandhill Scientific, Denver, Colorado) with pressure amplifiers. The Analograph computer software (Sandhill Scientific, Inc., Denver, Colorado) creates a 3D vectrogram and automatically produces a numeric report of the mean resting anal pressure (MRAP), resting anal pressure at 1 cm from the anal verge (RAP-1 cm), functional anal canal length (FACL), high pressure segment (HPS) and vector symmetry index (VSI). The pre-operative manometric procedure was repeated 1 and 5 weeks following surgery.

Operative procedures

The patient was placed in the lithotomy position. The procedure was done under general anesthesia. After careful assessment of the fissure height, a Ferguson-Hill retractor was introduced into the anal canal. The intersphincteric groove was identified and a number 15 blade was introduced through the peri-anal skin at the mid-lateral aspect of the anus (3 o’clock). It was pushed cephalad with the flat of the blade sandwiched between the internal sphincter and the external sphincter. The cutting surface was redirected medially, and the internal sphincter muscle divided on a supporting left index finger inside the anal canal. The internal sphincter division was tailored exactly to the height of the fissure [13]. Pressure was applied to the site of the wound for 5 minutes to secure hemostasis. The stab wound was left open to allow drainage [14]. Large associated sentinel tags were excised. The vertical height of sphincter division ranged from 1.2 to 1.5 cm (mean, 1.4 ± 0.2 cm).

Data analysis and statistical methods

Comparison between subgroups was made using an unpaired t test. Analysis of variance was used to compare data before, and 1 and 5 weeks following surgery.

Results

The time required for healing of fissures following tailored lateral sphincterotomy (TLS) ranged between 2 and 4 weeks with a mean of 3.6 ± 0.6 weeks. Two patients (6.66%) had persistent fissure after TLS, which was treated by 0.2% glyceryl trinitrate. Soiling and imperfect control of flatus were reported by two patients (6.66%).

Mean resting anal pressure

Preoperative MRAP ranged from 61 to 138 cm H2O with a significant higher mean (90.93 ± 20.48 cm H2O) when compared to the control group (64.9 ± 11.90 cm H2O; range, 50-79 cm H2O) (Table 1). Twenty-one patients (70%) had high MRAP (hypertensive) while 9 patients (30%) had normal MRAP (normotensive). No difference in age was demonstrated between normotensive (26.21 ± 5.09 years) and hypertensive (26.95 ± 10.85 years, p=0.7785) patients. There was no significant difference in MRAP between males and females.

The normotensive group included 4 male and 5 female patients while the hypertensive group included 2 male and 19 female patients. Posterior fissure was found in 7 (77.77%) of 9 normotensive patients and in 15 (71.43%) of 21 hypertensive patients, while combined anterior and posterior fissures were found in the remaining 2 (22.23%) of 9 normotensive patients and 6 (28.57%) of 21 hypertensive patients.

Tailored lateral sphincterotomy resulted in reduction of MRAP 1 and 5 weeks after surgery with marginal insignificant increase over time (Fig. 1). The reduction in MRAP was nearly constant after TLS, regardless the type of patients (36.85 ± 15.04% in hypertensives, 30.48 ± 16.62% in normotensives, 37.25 ± 6.07% in males and 34.10 ± 17.23% in females) (Fig. 1a). TLS resulted in hypotonia, which was more evident in female and normotensive patients (MRAP = 57.00 ± 7.75 cm H2O, 48.60 ± 9.08 cm H2O respectively).

Soiling and imperfect control of flatus were reported by two patients with normotensive anal canal (1 male, 1 female), while two patients had persistent fissure after TLS (1 male normotensive, 1 female hypertensive).