

Combined approach in the treatment of chronic anal fissures

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Abstract This study was designed to evaluate the healing and complications rates in surgically and conservatively treated patients with chronic anal fissure. Conservative treatment consisted of nitrate or diltiazem ointment. In case of surgery, fissurectomy was performed. In total, 340 patients were included in the study. Among them, 162 patients had surgery and 178 patients had conservative treatment. The healing rate at surgically treated group of patients varied between 95 and 98 % depending on previous treatment. Group treated with nitrate ointment and group treated with diltiazem ointment showed, respectively 62 % and 52 % healing rates. Difference between ointments was not statistically significant. Average healing time was between 105 and 123 days and complication rates were between 1.7 and 5.4 %. The surgical treatment showed much higher healing rates and thus should be recommended as primary treatment option for the chronic anal fissure, especially if there are chronic secondary lesions already present. In case of conservative treatment, either nitrate or diltiazem ointment could be used with similar efficacy.

Keywords Anal fissure · Fissurectomy · Nitrate ointment · Glyceryltrinitrate · Diltiazem

Introduction

Anal fissure is a painful longitudinal tear of the anal mucosa. The definition of chronic anal fissure is a combination of morphological and chronological aspects [1, 2]. Lindsey et al. define the chronic anal fissure as fissure that after a conservative treatment over 6 weeks is not healed and thus differentiates itself from acute one.

The initiating event in development of anal fissure is a tear of anal mucosa. Once tear occurs, it starts a cycle leading to repeated injury. The mechanical theory explains the tear as a result of mechanical damage of hard stool masses passing during defecation [3]. However, in most of the cases, spontaneous healing is observed and thus trauma is considered to be only initiating factor [4]. Constipation is one of the symptoms in patients with chronic anal fissure only in 25 % of the cases [5, 6]. Thus, the mechanical damage of mucosa is not the only pathogenic mechanism leading to the development of anal fissure. Further aspects of fissure development could be explained by vascular theory [7, 8], infectious theory [9] and epithelial theory.

Transformation into chronic anal fissure begins with myositis of the internal sphincter muscle. This in turn leads to subfissural small abscesses which further lead to the development of hypertrophic anal papillae and sentinel pile [10].

Painful spasm of internal sphincter hinders the drainage of fissure, which can cause the additional anorectal fistulas. Hypertonus leads to constriction of arterial blood vessels and lower blood supply [4]. The patients with anal fissure showed higher maximal sphincter pressure than control group [11–13] as well as higher resting sphincter pressures [14].

Lower blood supply at posterior anal canal in combination with internal sphincter spasm is of critical

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importance for development of anal fissure [15]. Due to multifactorial etiology of anal fissure, there are several treatment approaches.

One of the surgical approaches is the resection of fissure with adherent sentinel pile and anal papillae [16]. First reports come from Gabriel [17]. Healing rate is reported up to 99 % [18]. Fissurectomy is facilitated only to the internal sphincter fascicles and thus no damage is exercised to sphincter muscle.

In United States and United Kingdom, the treatment of choice is the lateral internal sphincterotomy. The sphincter tone is reduced through cutting of parts of the internal sphincter muscle and the fissure itself is left mostly intact. The advantage of this method is the shorter healing time; however, it also has a higher risk of postoperative incontinence [19–27].

Conservative treatment of anal fissures includes topical application of corticosteroids, local anesthetics and laxatives with success rate up to 90 % [28]. Lund et al. [29] showed significantly higher healing rates in the treatment group using glycerin nitrate ointment. As a major side effect increased, headache was observed. Another multicentric study showed no significant difference between glycerin nitrate and placebo (49 vs. 52 %) [30]. Despite controversial study results, this treatment is still used in many centers with a reported failure rate from 20 to 70 % [31–34].

Another conservative therapy is oral and topical application of calcium channel blockers. 20 mg of nifedipine twice a day showed 36 % decrease in sphincter tone [35]. A further study showed 30 % decrease in sphincter tone [36]. Topical application of diltiazem showed even better reduction in sphincter tone with less side effects [37–39]. Diltiazem success rate ranges from 48 to 75 % at patients who did not respond to glycerin nitrate therapy.

The injections of botulin toxin show a constant reduction of the sphincter tone for the 2–3 months [40, 41]. This therapy is well tolerated and has only few side effects [42]. Botulin toxin showed significantly higher efficacy in comparison to glycerin nitrate in double-blind study with placebo control [43]. The only complications of the botulinum toxin up to now were 1st grade incontinence and subcutaneous hematoma [32].

Other conservative treatments published in small groups include alpha-receptor antagonists [44, 45], cholinergic agonist such as bethanechol [46], nitrate monoxide releasers [47, 48] and phosphodiesterase inhibitors [49].

The goal of this study was to compare surgical vs. conservative treatments and compare current treatments results with those of the other studies.

Methods

The patients were divided into two groups: conservative and surgical treatment. Conservative treatment consisted of diltiazem ointment, glyceryl trinitrate or their combination. Surgical group was divided into two subgroups: with and without previous conservative treatment.

The following criteria were analyzed: healing rate, duration of healing, recurrence rate, and incontinence (temporal and permanent). This study is a retrospective clinical study. Initially in the case of chronic anal fissure, conservative treatment was applied. In case of persistent symptoms and persisting fissure, surgical treatment was initiated. In case of significant secondary lesions (sentinel pile, hypertrophied anal fibroma, extensive surrounding scarring, laying open and/or sclerosed fibers of the internal sphincter), surgical treatment was initiated without any conservative attempt. For conservative treatment, local application of 2 % diltiazem ointment (Diltiazem HCl 1.0 in emulsificans ad 50.0) or nitrate ointment (0.2 %) as isosorbide trinitrate (Neos nitro opt 5.0 in Basic Cream DAC ad 50.0) is used. The initially used ointment was assigned by chance. In case of treatment failure or side effects, the ointment was switched by discretion of the surgeon.

The fissurectomy was done in regional or general anesthesia. During the operation, the whole fissure including surrounding scar tissue is excised down to the internal sphincter fibers, taking careful attention not to harm the muscle itself. In case of submucosal or intersphincteric fistula, these were excised in the same procedure.

In case of intraoperative hemorrhoids, we performed additionally hemorrhoidectomy in Milligan–Morgan technic, stapled hemorrhoidectomy technic, or rubber band ligation. In rare cases, additional treatment for condylomata, anal stenosis or intra-anal tumors was required. After the operation, all the patients used panthenol ointment for local wound care. Pain medication either local anesthetics or NSAIDs was administered on demand.

There were no diet recommendations applied. Hypergranulation was treated with silver nitrate ointment, if necessary after a few weeks.

All data were extracted from the EDZ Databank and questionnaires, which were filled out by the patients upon the admission in EDZ.

Totally 340 patients were included in this study. They were treated in EDZ from July 2002 till November 2003. The follow-up time for each patient was at least 8 months. The cumulative data of the patients are presented in Table 1.

Surgically treated patients were further evaluated concerning the following parameters: the patient with complete healing, patients with persistent fissure, patients with

newly diagnosed permanent postoperative incontinence, patients with temporal incontinence, and recurrence of fissure after the operation. Additionally, time until complete healing of fissure was documented.

Each of the three conservatively treated groups was also divided into similar subgroups for further analysis. Further subgroups included patients who needed surgery, who refused the surgical procedure or despite morphological signs of fissure had no symptoms. Statistical analyses were done using SPSS 13.0 software. Significance of results was proved using Chi Square test, Fisher Exact test and Kruskal–Wallis test.

Table 1 Patients’ demographics

Age (years)	16–84
Median age (years)	49
Gender	
Male	43.5 % (148)
Female	56.5 % (192)
Median duration of complaints (weeks)	36
Symptoms	
Rectal bleeding	59.4 % (202)
Pain during defecation	48.2 % (164)
Sensation of burning	46.2 % (157)
Pruritus	33.2 % (113)
Pain after defecation	11.2 % (38)
Fecal soiling	8.5 % (29)
Constipation	2.1 % (7)
Localization	
Posterior middle line	75 % (255)
Anterior middle line	15 % (51)
Both	5.3 % (18)
Other	4.7 % (16)
Surgically treated patients	47.6 % (162)
Conservatively treated patients	52.4 % (178)

Results

Surgically treated patients

The results’ summary for surgically treated patients is presented in Table 2. The patients were divided into two groups: with and without conservative treatment. No recurrences were observed in both of these groups.

Conservatively treated patients

Conservatively treated patients were divided into three groups: glycerine nitrate ointment treatment (101 patient), diltiazem ointment treatment (90 patients) and combined (72). Respectively 6, 4 and 6 patients quited the therapy despite successful intermediate results.

If no sufficient healing was observed, surgical treatment (fissurectomy) was proposed to the patient. The cumulative data are presented in Table 3.

Healing rates and incontinence

The patients treated only surgically without any previous conservative treatment show the highest healing rate of 98 % (Table 2). In only 1 case, the postoperative incontinence of the 1st grade was documented. The surgically treated patients with previous conservative treatment showed healing rate of 95 %. The difference in healing rates in these two groups, however, was not statistically significant ($p = 0.32$). Healing rate for conservative treatment was between 38 and 62 % which was also significantly lower than for surgically treated patient (95 and 98 %) ($p < 0.001$) (Fig. 1).

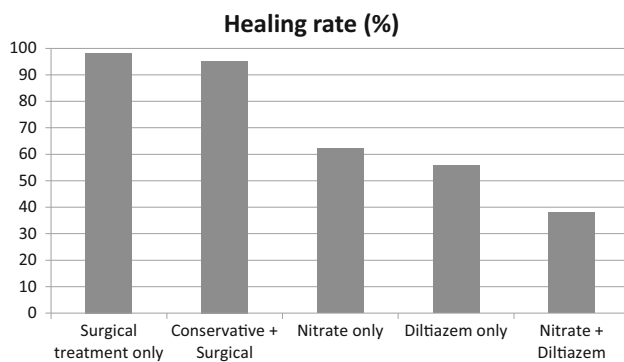
Comparing the healing rates among the conservatively treated patients showed significant difference between the groups: nitrate ointment vs. combined ($p = 0.002$), and diltiazem ointment vs. combined ($p = 0.028$). The difference is explained by treatment protocol. The patients were included in the combined

Table 2 Surgically treated patients with and without previous conservative treatment

	Number (% of total number of the patients)	
	Without previous conservative treatment	With previous conservative treatment
Number of the patients	65 (19 %)	97 (28.5 %)
Lost due to follow-up	6	14
Complete healing	58 (98.3 %)	79 (95.2 %) ($p = 0.322$)
Permanent incontinence of the 1st grade	1 (1.7 %)	1 (1.2 %)
Temporal incontinence of the 1st grade	0	2 (2.4 %)
Temporal incontinence of the 2nd grade	0	1 (1.2 %)
Healing time (days)	30–394	23–400 ($p = 0.822$)
Average (days)	105	123

Table 3 Results of conservative treatments with glycerine nitrate and diltiazem ointment

	Nitrate ointment	Diltiazem ointment	Nitrate and diltiazem ointment combined
Number of patients	95 (27.9 %)	86 (25.3 %)	66 (19.4 %)
Complete healing	59 (62.1 %)	48 (55.8 %)	25 (37.9 %)
Recurrence rate	9 (9.5 %)	8 (9.3 %)	5 (7.6 %)
Patients who needed a surgery after the conservative treatment	31 (32.6 %)	33 (38.4 %)	30 (45.5 %)
Patients who denied the surgical treatment	5 (5.3 %)	5 (5.8 %)	11 (6.7 %)
Incontinence	0 (0 %)	0 (0 %)	1 (1.5 %) temporal incontinence of the 1st grade
Healing time (days)	13–597 (mean 164)	59–467 (mean 179)	21–539 (mean 188)

**Fig. 1** Healing rates

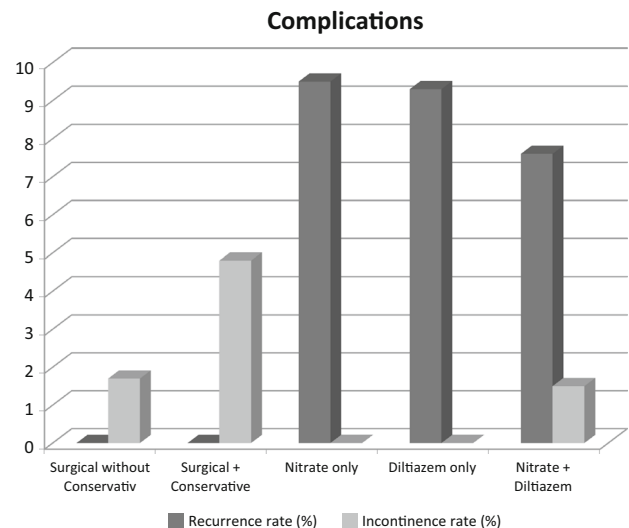
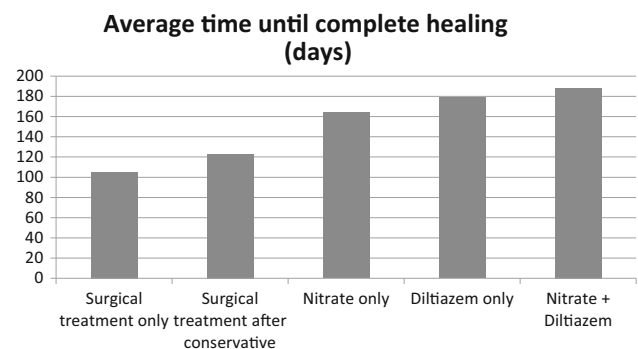
treatment group only if the treatment with either nitrate or diltiazem showed no positive dynamic and the ointment was switched. Thus, this group of patients represented the negative selection. The difference in healing rates between nitrate and diltiazem ointments group was not significant ($p = 0.39$).

Incontinence rate in surgically treated patients was between 1.2 and 4.8 %. The conservative plus surgical treatment group compared to surgical treatment group showed higher rate of postoperative incontinence, namely 4.8 % or 4 patients, including the incontinence of the 2nd grade. Only two patients developed the permanent incontinence of the 1st grade (Fig. 2).

The summary on the healing time for all the subgroups of the patients is presented in Fig. 3. The difference in duration was not statistically significant ($p = 0.822$). Surgically treated patients showed the highest healing rate and lowest recurrence rate with very few complications.

Discussion

When comparing the conservative therapies between each other, no preferable treatment regime could be found. Though treatment with nitrate ointment showed the best

**Fig. 2** Complications**Fig. 3** Healing time

results, there was no statistically significant difference ($p = 0.39$). At the moment, there are few randomized studies that compare the surgical vs. conservative approach in treatment of chronic anal fissure. Oettle in his study randomized 24 patients for treatment with nitrate ointment (three times daily over 4 weeks) and sphincterotomy. The

Table 4 Summary of healing rates in studies comparing conservative and surgical treatment

	Number of patients	Healing rates		Follow-up time (months)
		Surgical (%)	Conservative (%)	
Oettle et al.	24	100	81	22
Richard et al.	82	90	30	6
Evans et al.	65	97	61	5
Libertiny et al.	70	97	46	24

Table 5 Incontinence rates after fissurectomy

Author	Number of patients	Incontinence of 1st and 2nd grade (%)	Follow-up time	Healing rate (%)
Meier zu Eissen et al. [55]	470	3	2–6 years	97
Engel et al. [57]	17	0	29 months	100
Lindsey et al. [2]	30	7	6 months	93
Scholz et al. [58]	40	2.5	1 year	79
Schormagel et al. [56]	53	0	5 years	88
Pelta et al. [59]	109	0	1 year	98

study showed similar healing rates and no recurrence for both study groups [50].

Richard et al. [34] in a multicentric study in Canada had a total group of 82 patients. They were also randomized into two groups: treated with nitrate ointment (three times daily over 6 weeks) or operated (sphincterotomy). Surgically treated group showed much higher healing rates, namely 90 vs. 30 %. No fecal incontinence was observed during the follow-up of 6 months. Recurrence rates were not studied. Another study from Evans et al. [51] showed somewhat similar results with healing rates for surgical treatment 97 % and nitrate ointment 61 %.

Study from Libertiny et al. compared the internal sphincterotomy vs. nitrate ointment [52]. After 2-year follow-up, the healing rates were, respectively, 97 and 46 %. All the above-mentioned studies show much higher healing rates and no incontinence complications after sphincterotomy compared to conservative measures (Table 4). In our study, we found comparable results for the fissurectomy—without any harm to the sphincter.

There is only one randomized study, which compares the fissurectomy and lateral internal sphincterotomy. The study from Hancke et al. included 60 patients. All of them had previously unsuccessful conservative treatment. Both methods showed the same healing and complications' rates [53, 54]. The absence of incontinence complications after the surgical approach should be interpreted very carefully. There are few studies on fissurectomy which look at incontinence and healing rates after the fissurectomy. The cumulative results are presented in the Table 5 [2, 55–59]. The follow-up times varied from 6 months to 5 years. In our study, the minimum follow-up was 8 months and in some cases up to 18 months. The incontinence of

maximum 4.8 % was well within expected range. Increasing follow-up time might increase the rate of incontinence as shown on example of internal sphincterotomy [22, 23, 27].

It remains still unclear if surgery should be recommended as a primary approach in case of chronic anal fissure or only after failed conservative treatment. Christie et al. calculated the costs for conservative and surgical treatment (616 British pounds vs. 840 British pounds) and thus recommended the initial treatment attempt with nitrate ointment. Considering the high failure ratio (40 % according to our data) and the necessity of surgery for those patients, the final cost of the treatment would be 13 % higher [60].

Study from Kocher et al. compared the healing rates between nitrate and diltiazem (86 and 77 %, respectively) [39]. Despite the higher healing rates for nitrates, the complications' frequency was lower for diltiazem (42 vs. 72 %). The major complication was headache (17 out 29 patients in nitrate group). Recurrence rate for both ointments is at 9 %.

Study from Bielecki et al. shows similar healing rates (86 % for both groups) and fewer complications for diltiazem (0 vs. 33 %) [37]. Griffin et al. and DasGupta et al. researched the healing rates for diltiazem treatment after failure of glycerin nitrate (48 and 75 %) [48, 61]. Group of patients with a combined treatment could be only partly compared to those results and is at 38 %.

Based on these results the surgery should be recommended as a primary treatment option for the chronic anal fissure. In case the conservative therapy was already initiated and no improvement was achieved, the surgical

therapy should be preferred to another attempt at conservative therapy with the different medication.

Surgically treated patients showed the shortest healing time (on average 105 days). Not surprisingly the longest healing time showed the patients who had combined conservative therapy (188). The average healing time for conservatively treated patients was longer than for surgically treated patients. The difference in any of the group was, however, not significant due to very high individual variations.

Conflict of interest None.

Ethical standard All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent For this type of study formal consent is not required.

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