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Early rectal stenosis following stapled rectal mucosectomy for hemorrhoids

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Abstract

Background: Within the last years, stapled rectal mucosectomy (SRM) has become a widely accepted procedure for second and third degree hemorrhoids. One of the delayed complications is a stenosis of the lower rectum. In order to evaluate the specific problem of rectal stenosis following SRM we reviewed our data with special respect to potential predictive factors or stenotic events.

Methods: A retrospective analysis of 419 consecutive patients, which underwent SRM from December 1998 to August 2003 was performed. Only patients with at least one follow-up check were evaluated, thus the analysis includes 289 patients with a mean follow-up of 281 days (± 18 days).

For statistic analysis the groups with and without stenosis were evaluated using the Chi-Square Test, using the Kaplan-Meier statistic the actuarial incidence for rectal stenosis was plotted.

Results: Rectal stenosis was observed in 9 patients (3.1%), eight of these stenoses were detected within the first 100 days after surgery; the median time to stenosis was 95 days. Only one patient had a rectal stenosis after more than one year. 8 of the 9 patients had no obstructive symptoms, however the remaining patients complained of obstructive defecation and underwent surgery for transanal strictureplasty with electrocautery. A statistical analysis revealed that patients with stenosis had significantly more often prior treatment for hemorrhoids ($p < 0.01$). According to the SRM only severe postoperative pain was significantly associated with stenoses ($p < 0.01$). Other factors, such as gender ($p = 0.11$), surgical technique ($p = 0.25$), revision ($p = 0.79$) or histological evidence of squamous skin ($p = 0.69$) showed no significance.

Conclusion: Rectal stenosis is an uncommon event after SRM. Early stenosis will occur within the first three months after surgery. The majority of the stenoses are without clinical relevance. Only one of nine patients had to undergo surgery for a relevant stenosis. The predictive factor for stenosis in the patient-characteristics is previous interventions for hemorrhoids, severe postoperative pain might also predict rectal stenosis.

Background

Within the last years, stapled rectal mucosectomy (SRM) has become a widely accepted procedure for second and third degree hemorrhoids. In comparison to conventional hemorrhoidectomy, the reduction of postoperative pain and the shorter hospital stay made SRM a recommended surgical procedure. Although a recently published review showed data that there is no conclusive evidence for the benefit of stapled procedure patients acceptance is high [1,2]. Stapled hemorrhoidectomy can be regarded as a well-established procedure with relatively low complication rates. However, these complications might be severe [3]. Stricture of the lower rectum is regarded as an uncommon complication after SRM [4]. However, when a stenosis occurs this causes prolonged treatment and eventually additional surgery.

In order to evaluate the results we reviewed our prospective data with special respect to rectal stenosis and potential predictive factor for its occurrence.

Methods

Between December 1998 and December 2002, a total of 419 patients were treated surgically for second and third grade hemorrhoids at the Department of General and Abdominal Surgery at the Dresden-Friedrichstadt Hospital. Patients were observed three months and one year after surgery. 130 patients (31%) were lost to follow-up, including 57 patients, who's follow-up was a telephone questionnaire, and 73 patients, which were not seen at the follow-up examinations. Consequently, for this study we reviewed the data of the 289 patients who underwent stapled mucosal resection and who had at least completed the first follow-up appointment. The mean follow-up was 281 days (± 18 days).

SRM was regularly performed under general anesthesia; patients were placed in lithotomy position. Single shot antibiotics was not given routinely. According to the surgeons assessment one or two pursestring sutures were carried out and the PPH 33 mm Ethicon Endosurgery® stapler device was used. Additional stitches for hemostasis were performed regularly at the stapled ring using monofilament resorbable sutures. Patients left the hospital as soon as they felt comfortable; no day-surgery was performed.

Patients were invited for follow-up checks after a three-month and a one-year interval. Stenosis was defined as stricture of the lower rectum that cannot be passed by the finger.

Statistical methods

Statistical analysis was performed using the SPSS 10.0.7 software package (SPSS Inc., USA). Pearson chi-square-test compared the incidence of variables for the groups

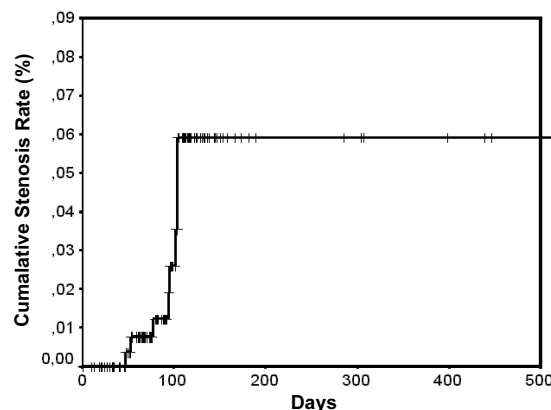


Figure 1
Lower rectal stenosis after SRM: actuarial complication curve calculated and plotted by the Kaplan-Meier life-table method.

with or without stenosis. The actuarial complication-curve was calculated and plotted according to the Kaplan-Meier life-table method. Variables with p-value less than 0.05 were considered to be significant.

Results

Rectal stenosis was observed in 9 patients (3.1%), eight of these stenoses were detected within the first 100 days after surgery. The time to stenosis ranged from 47 to 1596 days, the median time to stenosis was 95 days. Only in one patient the rectal stenosis was observed after 1596 days (Figure 1). 8 of the 9 patients had no obstructive symptoms, however the patient who complained of obstructive defecation underwent surgery for transanal strictureplasty with electrocautery.

Patient characteristics

In the group of patients with complete follow-up there were 105 women and 184 men with a mean age of 54 years. The higher incidence of stenoses in male was insignificant in statistical analysis ($p = 0.11$) (Table 1). 211 of 289 patients (73%) had no previous interventions, however 5 of the 9 patients (55%) with stenotic events had previous interventions, in contrast only 73 of 280 patients (27%) without stenoses had interventions, which was statistically significant ($p < 0.01$).

Procedure related characteristics

All patients underwent SRM (Table 2). As a variable for the details of the surgical technique the question whether one or two string sutures were used, were included into

Table 1: Patient characteristics.

Variable		Stenosis group (n = 9)	No stenosis group (n = 280)	p value
Age		55.4 ± 15.5	54.4 ± 12.7	0.55
Gender	Male	8 (88.9%)	176 (62.9%)	0.11
	Female	1 (11.1%)	104 (37.1%)	
Prior treatment	None	4 (44.4%)	207 (73.9%)	<0.01
	One or more	5 (55.6%)	73 (26.1%)	

Table 2: Surgery-related details.

Variable		Stenosis group (n = 9)	No stenosis group (n = 280)	p value
Pursestring suture technique	1	6 (66.7%)	96 (34.3%)	0.25
	2	3 (33.3%)	184 (65.7%)	
Histology	Squamous cells	0	22 (7.9%)	0.69
	Smooth muscle	5 (55.6%)	97 (34.6%)	
Revision	None	9 (100%)	251 (89.6%)	0.79
	One or more	0	29 (10.4%)	
Severe pain		2 (22.2%)	5 (1.8%)	<0.01

the analysis. Two string sutures were used less often in the stenosis-group but no significance was shown ($p = 0.25$). The histological examination of the resected mucosa specimen revealed evidence of squamous skin in 22 specimens. Although this difference reached no significant level, none of the specimens in patients in the stenosis-group showed squamous cell skin in the histology ($p = 0.69$). For different reasons a second operative procedure was carried out in 29 patients (10%), none of these patients had a rectal stricture ($p = 0.79$). In contrast, it was remarkable that 2 of the 9 patients (22%) from the stenosis-group had severe postoperative pain but only 5 of 280 patients (2%) without stenosis experienced severe pain. This difference was statistically significant ($p < 0.01$).

Discussion

Rectal stricture is a rare but one of the most disabling complications of anorectal surgery [5-7]. Although strictures of the anorectal junction are known as a result of all kinds of anal operations this specific complication became a focus of interest after introduction of SRM [8]. Accordingly, some basic questions concerning stenotic events following SRM need to be discussed. First is the question whether the stricture can be regarded as rectal stenosis or whether the stenosis is more likely located in the anal canal? According to the classification for postsurgical stenosis, which was published by Milsom et al., the stenoses would be described as high anal stenosis [6]. From our understanding stenoses caused by SRM are presumably rectal stenoses, since the causing event was a resection of rectal mucosa. However, according to technical failure of

the procedure, the stapled ring might be placed too deep in the rectum. Thus, although being theoretically regarded as rectal stenosis, the complication might appear as anal stenosis. Secondly, the designation of stenosis is not well defined, while some used an approximate description of the term, Burke defined rectal stenosis as inability to pass a 19 mm sigmoidoscope effortlessly through a rectal anastomosis [9,10]. In this study stenosis was defined as a stricture, which caused difficulty to be passed by a finger. More importantly is probably a definition of the stenosis according to its symptoms. In this respect it was remarkable that in this study only one of nine patients had obstructed defecation. The data presented here give evidence that, according to symptoms, early stenosis of the anal canal or the rectum is not a considerable problem in hemorrhoid surgery using the PPH device.

Since it has been known for years, that intestinal stenosis is a function of time we evaluated the incidence of rectal stenosis by actuarial Kaplan-Meier statistics [11]. The crude incidence of stenosis following SRM is 3.1% in the presented study, which is comparable to the stenosis-rate published by other authors. A few studies reported no stenotic events after SRM [1,12-18], however the stenosis rate following stapled mucosectomy generally ranges from 0.8 – 5.0% [9,19-23] (Table 3). The calculated actuarial one-year stenosis rate is 6%, which is higher than the above-mentioned published stenosis-rates.

Anorectal stenosis is not a specific problem of SRM but a considerable problem after all anal interventions [5]. In

Table 3: Published data on stenosis after SRM.

Author	Year	Patients	Follow-up (Months)	Stenosis n (%)
Beattie and Loudon [13]	2001	50	6	0
Boccasanta et al. [19]	2001	40	20	2 (5%)
Correa-Rovelo et al. [9]	2002	42	32	1 (2.4%)
Fantin et al. [1]	2002	16	3	0
Hetzer et al. [14]	2002	20	12	0
Ho et al. [20]	2000	57	7	2 (3.5%)
Khalil et al. [15]	2000	20	6	0
Kirsch et al. [21]	2001	150	6	3 (2%)
Mehigan et al. [16]	2000	20	4	0
Pavlidis et al. [17]	2002	40	12	0
Ravo et al. [22]	2002	1107	n.s.	9 (0.8%)
RowSELL et al. [12]	2000	14	22	0
Shalaby and Desoky [23]	2001	100	12	2 (2%)
Singer et al. [18]	2002	68	n.s.	0

direct comparison in prospective randomized trials there was not a significant difference in stenosis rate between conventional hemorrhoidectomy and SRM [19,24]. Nevertheless, the most substantial rate of stenoses was observed following conventional hemorrhoidectomy and probably the highest stenosis rate was described after Whitehead hemorrhoidectomy [5,6,9,21,23].

One potential mechanism that might cause a stenosis following SRM is ring dehiscence followed by submucous inflammation. Another theoretical cause is that the stapled ring is placed too deep in the anal canal and that the squamous skin cell reacts by scaring and shrinking. In this study no events of severe postsurgical infection were observed, thus no conclusion about inflammatory events and rectal stenosis can be drawn from these data. One major aspect of the potential risk of developing a stenosis is the distance to the anal verge. Burke et al. reported of two groups of 24 patients each undergoing prior resection and stapled anastomosis for rectal carcinoma. Three patients developed stenoses in the group of coloanal anastomoses, whereas only one patient experienced a stenosis in the colorectal anastomosis group [10]. In our series the effect of stapling anal skin as a cause for anal stenosis could not be verified. In 22 patients (8%) squamous cells were observed in the stapled specimen. However, in the stenotic group none of the histologic samples showed squamous cells. Brisanda considered a full thickness excision of the rectal wall another potential cause for stenosis after SRM [25]. According to full thickness excision of the wall, our data provide no conclusive evidence that this point directly caused strictures. The predictive factors presented in this study are previous interventions and severe postsurgical pain. The interpretation of these findings is complex. One potential explanation would be that, although not shown in the histology, the staples ring was

too deep in the anal canal, which causes severe pain. The higher rate of prior treatments in the stenosis group, as a potential cause of stenosis, is basically unexplained. Probably, there is already scaring tissue in the high anal canal that increases the stenosis rate.

So the essential question should be addressed, what to do with anal canal stenosis following SRM? The first therapeutic approach is to treat conservatively using a dilatation device [7,8,11]. This was also the most commonly used treatment in our study. In eight of the nine patients, this procedure was sufficient to enlarge the stenosis. The observation that dilatation is successful in majority of cases, especially in short strictures, is in good agreement with other publications [6,7,22]. However, a small proportion will not profit from dilatation, which was the case in one of nine described stenosis in this series. Although, there is also the potential option to treat a patient using medication, for these cases with persisting scaring stricture surgery seems the only alternative [9,11]. A large variety of surgical approaches are available for persisting anorectal stenosis. One of the theoretical approaches is to improve the situation using the mucosal advancement flap [26]. Some authors recommended the so-called Y-V anoplasty or the so-called Diamont-flap [5,6,27,28]. Other surgical options are the so-called House-flap or the Island-flap [29,30]. Nevertheless, it remains questionable whether the above-mentioned techniques are suitable for rectal stenosis as well as for strictures of the anal canal. In the one case with persisting stenosis after dilatation we decided to carve the scaring ring longitudinally. So far the patient developed no stenotic recurrence and defecation was normalized. Another option for the treatment of intestinal strictures is the endoscopic transanal stricturoplasty using a linear cutter device, however there are no reports published where these techniques became neces-

sary for SRM related stenosis [31-33]. Colostomy is necessary in a minority of cases and fortunately there are no papers published on this procedure associated with SRM [11].

Conclusion

Although, conclusion drawn from a retrospective analysis are of limited value, especially when the follow-up is incomplete, the data presented here provide evidence that symptomatic rectal stenosis is an uncommon event after SRM. Early stenosis will occur within the first three months after surgery. However, due to a short follow-up of less than a year, no conclusion according late stenotic events can be made. The majority of the stenoses are without clinical relevance. Only one of nine patients had to undergo surgery for a relevant stenosis. The predictive factors for stenosis in the patient-characteristics are previous interventions for hemorrhoids and severe postoperative pain. Patients, who wish to undergo the SRM method must know that there are not only striking advantages from the SRM method but also potential serious complications [34].

List of abbreviations

SRM – stapled rectal mucosectomy

Competing interests

None declared.

Authors' contributions

SP was responsible for the statistical analysis and the draft of the manuscript, GH created the study and initiated the prospective analysis and the follow-up, DS participated in the data collection, AS participated in the preparation of the manuscript, KL provided the scientific and logistic background.

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