

Influence of stapler haemorrhoidectomy on anorectal function and on patients' acceptance

Amedeo C. Fantin^a, Franc H. Hetzer^b, Andreas D. Christ^a, Michael Fried^a, Werner Schwizer^a

^a Division of Gastroenterology, Department of Internal Medicine, University Hospital of Zurich, Switzerland

^b Division of Abdominal Surgery, Department of Surgery, University Hospital of Zurich, Switzerland

Summary

Principles: Symptomatic haemorrhoids surgery has been shown to be the most successful and definite therapy. Recently a new method using a transanally inserted circular stapler has been presented for treatment of symptomatic prolapsing haemorrhoids. This prospective study investigated the influence of the stapling procedure on the anorectal function and patients' acceptance.

Methods: Eighteen consecutive patients (10 males, 8 females) mean age 44.7 years (range 18–66) with symptomatic second (n = 3), third (n = 14), and fourth degree (n = 1) haemorrhoids were included. All patients underwent the day before and 8 weeks after the operation a standardised anal manometry using a water perfused system. Mean resting (MRAP) and mean maximal squeeze anal pressures (MSAP) were recorded. Volumes of initial rectal sensation (VIRS), constant rectal sensation (VCRS), and maximal tolerable volume (MTV) of a rectal balloon were assessed. Anorectal symptoms (bleeding, pain, faecal incontinence)

were assessed in a standardised fashion preoperatively and 1, 8, and 12 weeks postoperatively.

Results: The stapling procedure led to no manometric or symptomatic change in anal sphincter function. Pre- and postoperative MRAP (91.7 mm Hg, SD 23.59 / 83.8 mm Hg, SD 14.53, p = 0.053), MSAP (162.6 mm Hg SD 78.68 / 173.9 mm Hg, SD 69.93, p = 0.162), VIRS (55.8 ml, SD 26.12 / 51.7 ml, SD 28.90, p = 0.410), VCRS (109.4 ml SD 41.67 / 96.4 ml, SD 38.44, p = 0.181), and MTV (204.7 ml SD 47.65 / 173.3 ml, SD 43.22, p = 0.053) were similar. No symptoms of rectal pain or faecal incontinence were registered during follow up. Patients' acceptance and satisfaction for the operation were high.

Conclusions: Stapling haemorrhoidectomy is a safe procedure which does not alter anorectal functions. Patients' acceptance and satisfaction are high.

Key words: haemorrhoids; haemorrhoidectomy; stapler; longo; manometry

Introduction

Various methods for treatment of symptomatic haemorrhoids have been presented in the past [1–7]. Non surgical modalities for therapy of symptomatic haemorrhoids have all been shown to be inferior to surgery for third and fourth degree haemorrhoids [1].

Haemorrhoidectomy can be a very painful procedure especially in the postoperative period, and faecal incontinence has been described [8]. This fact and the high prevalence of symptomatic haemorrhoids in the general population stimulated research in this field in the last years.

Recently Longo et al. [9] presented a circular stapled technique consisting in the reduction of rectal mucosa and haemorrhoidal prolapse, which seems to offer a significantly less painful alternative compared to established modalities of haemorrhoidectomy in terms of therapeutic success and patient satisfaction [10, 11]. Longo's technique consists in a circular low rectal mucosectomy associated with anopexy using a circular stapler.

Ho et al. [12] reported significant anal sphincter injuries from transanally introduced stapling devices. Significant reductions in mean resting

Abbreviations used in the text and figures

MRAP	mean resting anal sphincter pressure
MSAP	mean maximal anal squeeze pressure
VIRS	volume of initial rectal sensation
VCRS	volume of constant rectal sensation
MTV	maximal tolerable rectal volume
Pre	preoperative values
Post	postoperative values
SD	standard deviations

Disclosure statement: The authors do not have any financial or other interest in the manufacture or distribution of any device mentioned in the manuscript. This work represents a non funded study.

anal pressures and endosonographically documented sphincter lesions were reported by this study group.

This prospective study was designed to investigate the influence of the haemorrhoidectomy de-

scribed by Longo on anorectal function with special emphasis on anal sphincter function (resting and squeeze pressures pre- and postoperatively). In addition, overall patients' acceptance and satisfaction were investigated.

Patients and methods

Eighteen consecutive patients (10 males, 8 females) mean age 44.7 years (range 18-66) referred for surgical treatment of symptomatic haemorrhoids were included in the study after written informed consent. The local ethical committee approved the study design. All patients were first seen in the outpatient clinic by the operating surgeon. Three patients (17%) suffered of second degree haemorrhoids, 14 (78%) of third degree, and one patient (5%) of fourth degree haemorrhoids. Inclusion criteria for the study were symptomatic second to fourth degree haemorrhoids.

Exclusion criteria for the study were: lack of informed consent, age under 16 years, history of previous anorectal surgery or rubber band ligation, history of faecal incontinence, current oral anticoagulation or intake of other drugs influencing blood coagulation, current therapy with betamimetics, nitrates or calcium antagonists, diabetes mellitus, inflammatory bowel disease, and current anal fissures.

The patients underwent the day before the operation a standardised anal manometry. Patients were asked to empty their bowels before manometry. A bowel preparation was not routinely applied before the investigation. Patients had to respond to a standardised questionnaire about their proctological symptoms and bowel habits before starting manometry.

With the subjects in a right lateral position and flexed hips at 60 degrees, a water-perfused anorectal motility catheter with four pressure channels arrayed at 90 degrees to each other with a 5 cm long balloon at the tip (Zinetics™, Sydney, Australia) of the probe was introduced into the rectum. The probe was connected to a recorder. Pressure activity was displayed on a computer. After allowing the pressures (mm Hg) to stabilise for 10 minutes, the resting (MRAP) and the squeeze sphincter pressures (MSAP) were recorded on three separate occasions by motorized station pull through methods with a 5 minute rest between each manoeuvre. The mean of the three values was then calculated. Each patient was asked to bend down as if to defecate on three separate occasions, pressures were recorded analogously to the squeeze-studies. Next, anorectal inhibitory reflex was elicited by inflating 60 ml of air in the rectal balloon. Volumes (ml) of initial rectal sensation (VIRS) were registered by inflating 5 ml of air in the balloon at 15 seconds-intervals until balloon inflation was sensed by the patient for the first time. The smallest volume to which the patient responded was registered as the VIRS. Volumes of constant rectal sensation (VCRS) were registered in the same manner, continuing inflation

of 5 ml increments of air until the patient reported constant rectal sensation. The smallest volume which led to constant rectal sensation was registered as VCRS. Maximal tolerable volume (MTV) was defined as the amount of inflated air at which the patient perceived that additional inflation would be intolerable. Results were recorded on a standardised sheet. All measuring procedures were repeated three times consecutively with an interval of five minutes between each measuring process. Eight weeks after the operation all patients underwent a second anorectal motility study as described above. About 1, 8, and 12 weeks after the operation patients were investigated in a standardised manner (symptom-related questionnaire, clinical examination). At the end of the study overall satisfaction/acceptance with the operation method was assessed by each subject on a 10 cm visual analogue scale. Corresponding parameters which had to be considered by patients were degree of postoperative pain, frequency of defecations, and any symptoms of faecal incontinence.

The operating surgeon was not involved in the collection of the pre- and postoperative data.

Changes in anal manometry measurements (preoperative vs. postoperative) were evaluated based on the Wilcoxon signed rank test. All calculated p-values were two-sided and p-values less than 0.05 were considered statistically significant.

Description of the surgical procedure is not the subject of this article. Briefly, all operations were done in the lithotomy position, in 16 cases (n = 16) under general anaesthesia and in 2 cases (n = 2) under epidural anaesthesia. The operations were performed by the same surgeon (F. H.) having an experience of more than 20 stapler haemorrhoidectomies. The stapled haemorrhoidectomy was done according to the technique described by Longo et al.

In all cases the PPH01-Procedural-Set™ (Ethicon™ Endosurgery, Ohio, USA) was used. Positioning of a circular anal dilator (diameter 33 mm) with obturator for four minutes into the anal canal allowed subsequently a safe and easy introduction of the circular stapler. Next, a complete purse-string suture was done 4 to 5 cm above the dentate line by a Prolene™ 2-0-RB1-thread catching only mucosa and submucosa. The circular stapler (HCS 33) was then introduced in a ¾-opened position to avoid rectal perforations and fired. For better haemostasis the stapling instrument was kept closed for two minutes. After removing the device the staple line was examined proctoscopically.

Figure 1

Mean resting anal pressure. Figure 1-5:

The distribution of values is displayed by the box and whiskers diagram. The points indicate the minimum and maximum values, the whiskers indicate the 25th and 75th percentiles, the median is located in the center of the box, and the mean is depicted by the horizontal line within each box.

Pre = preoperative values;
Post = postoperative values.

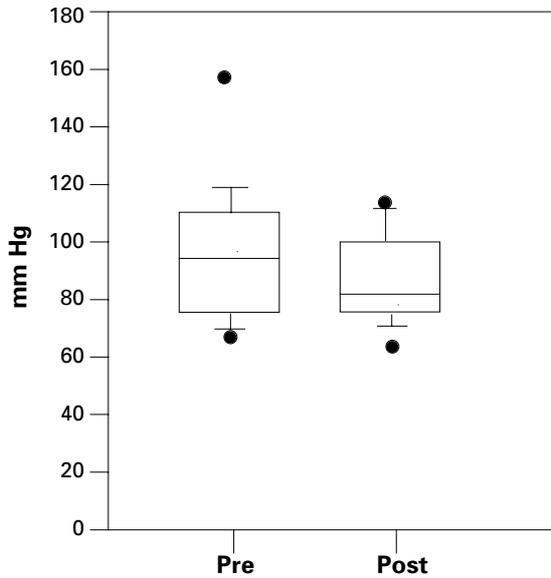


Figure 2

Mean maximal squeeze anal pressure.

(Legend: see fig. 1.)

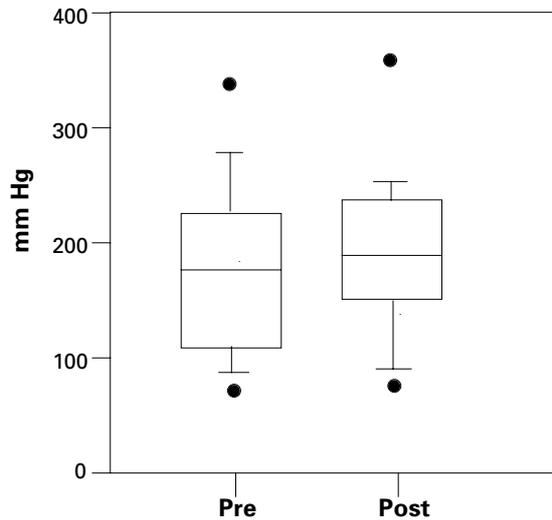
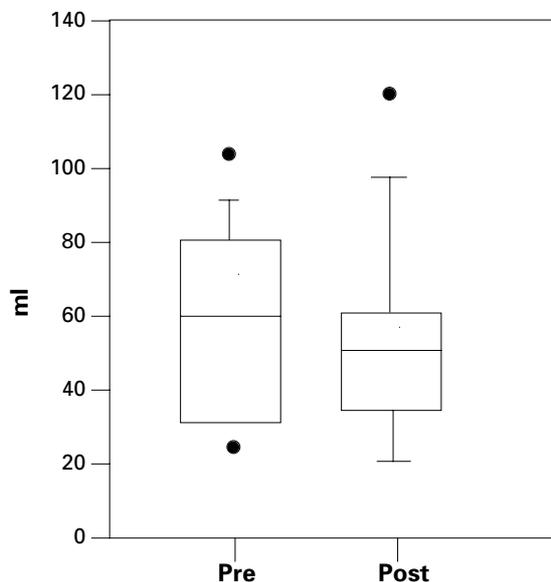


Figure 3

Volume of initial rectal sensation.

(Legend: see fig. 1.)



Results

No complications other than mild postoperative bleeding were registered during the study period in all patients. Twenty patients were asked to participate in the study, two refused, 18 entered the trial and 16 patients finally completed the study (2 patients were lost to follow up). Table 1 summarizes the major anorectal symptoms and complaints before and after the operation. The most frequently reported symptoms preoperatively were bleeding (n = 17, 94%), pain during defecation (n = 11, 61%), and sensation of anal swelling (n = 8, 44%). The most frequent complaints during the first week after the operation were intermittent anal bleeding (n = 8, 50%), and mild rectal pain (n = 11, 68%). Pain had disappeared completely 8 weeks postoperatively in all subjects, bleeding in all but one, who developed a cirrhosis-associated coagulopathy not related to the surgical intervention two weeks postoperatively. Recordings of the pre- and postoperative anorectal motility studies (fig. 1-5) showed no significant differences. Standard deviations (SD) for all values were calculated. The mean preoperative values were similar to the postoperative values for VCRS and MTV (MRAP 91.7 mm Hg, SD 23.59 vs. 83.8 mm Hg, SD 14.53, p = 0.053; MSAP 162.6 mm Hg, SD 78.68 vs. 173.9 mm Hg, SD 69.93, p = 0.162; VIRS 55.8 ml, SD 26.12, vs. 51.7 ml, SD 28.90, p = 0.410; VCRS 109.4 ml, SD 41.67 vs. 96.4 ml, SD 38.44, p = 0.181 and MTV 204.7 ml, SD 47.65 vs. 173.3 ml, SD 43.22, p = 0.053, respectively). No signs of faecal incontinence were registered during the whole study period. No significant differences between pre- and postoperative frequency of daily bowel movements in the subjects studied were registered. Three months postoperatively no signs of rectal pain, rectal urgency, bleeding or faecal incontinence were documented. Overall, patients' acceptance for the operation-method was high. All patients were highly satisfied with the result of the stapler-haemorrhoidectomy (visual analogue scale 0 to 10 cm; mean 8.8, range 5.1 to 10.0) and would give their consent for a second operation if necessary.

Table 1

Major pre- and postoperative symptoms.

	Preoperative	postoperative		
		1 week	8 weeks	12 weeks
Patients (n)	18	16	16	16
Anal bleeding	17	8	1	0
Pain during defecation	11	11	0	0
Rectal urgency	0	16	0	0
Incontinence	0	0	0	0
Anal swelling	8	1	0	0

Discussion

The stapler procedure for haemorrhoidectomy as described by Longo et al. [9] has been used successfully for treatment of symptomatic third and fourth degree haemorrhoids [10, 13, 14]. This operation method is safe, effective and rapid, causing no or only minimal postoperative pain [10].

Hitherto, its effect on anorectal function has been evaluated in a controlled trial. We found no statistically significant differences between pre- and postoperative anorectal functions in a short-term period of 12 weeks.

We could not confirm the concerns of Ho et al. [12] and Farouk et al. [15] who reported significant sphincter injuries by transanal introduction of stapling devices in patients who underwent sigmoid or low anterior resections for carcinoma. The authors showed significant postoperative reductions in resting anal pressures and endosonographically documented sphincter lesions in some

of their subjects. The explanation for these diverging results in comparison to our investigation is not clear. But when interpreting these conflicting data one has probably to take into account an operator dependence or perhaps different methods regarding the applied manometric procedures (not specified in the mentioned reports). Moreover, in our investigation only the stapler procedure was performed without any other surgical intervention like the low anterior resection mentioned above. The literature reports impairment of anal sphincter functions due to neural damage during rectal mobilisation after low anterior resections [16].

Although our patients did not undergo anal endosonography it seems improbable that significant sphincter injuries occurred during the study because of the normal values of the manometric findings pre- and postoperatively, and because of the absence of any symptoms related to faecal incontinence.

An important exclusion criterion in this investigation was any medication with calcium antagonists, betamimetics, and nitrates which were all shown to decrease resting anal pressures, which probably could have interfered with our measurements [17, 18].

In previous studies [19–21] elevated resting anal pressures in patients with symptomatic haemorrhoids were found. In this investigation those results could not be confirmed, since all patients had resting anal pressures in the normal range. The reasons for these diverging results remain obscure.

In the first postoperative week in almost all our patients intermittent mild anal bleeding, rectal urgency, and elevated frequency of defecations were manifest. This may be due to the use of the stapling instrument for excision of rectal mucosa and the fact that surgical clips are left in the rectal wall. Measuring of rectal compliance by inflating a rectal balloon with defined volumes of air as in our study gives only an estimate of real compliance which can be determined correctly only by use of a barostat. Comparison of the pre- and 8 weeks postoperative values of rectal compliance in our subjects showed no significant differences. According to this, in all our patients symptoms of rectal urgency had completely disappeared after 8 weeks.

Conventional haemorrhoidectomy as described by Milligan et al. [22] can be very painful in the postoperative period. In a recent report the Longo procedure showed a significant improvement in terms of postoperative pain control and earlier return to normal activity [10]. These findings were confirmed by our investigation.

Cheetham et al. [23] published recently the results of a study involving 22 patients who had been treated for symptomatic haemorrhoidal disease by the stapler procedure. In the postoperative 6-months follow-up period persistent severe rectal pain and faecal urgency were reported in a high proportion of the subjects studied. The pathophysiological mechanism behind those findings were un-

Figure 4
Volume of constant
rectal sensation.
(Legend: see fig. 1.)

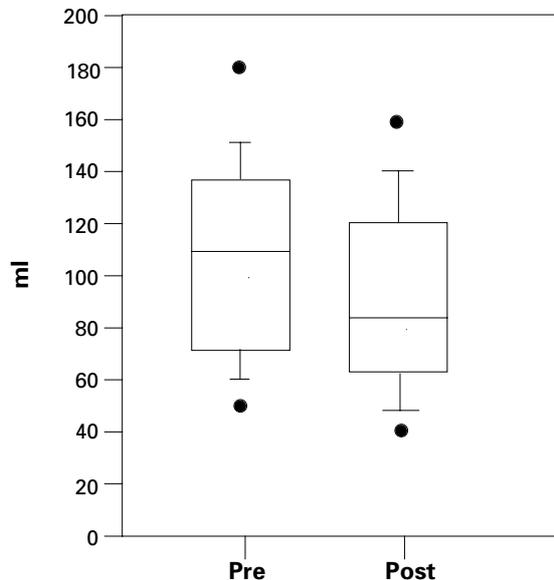
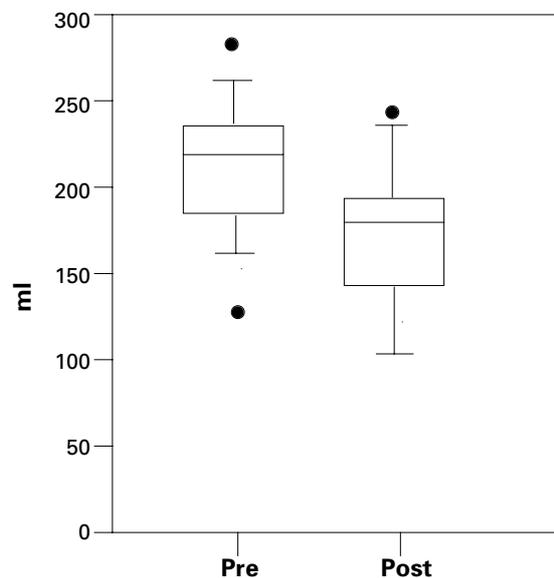


Figure 5
Maximal tolerable
volume.
(Legend: see fig. 1.)



clear. We could not support those results based on our data. The reasons for these differences remain speculative.

In our study overall patients' acceptance and satisfaction with the result of the stapler procedure were high, no complications related to surgery could be documented during a period of 3-months follow-up.

We emphasize the absence in our patients of any symptoms related to pain or faecal incontinence in the postoperative period.

In conclusion, haemorrhoidectomy using a stapling device as described by Longo is a safe and well

tolerated therapeutic surgical technique which does not alter anorectal functions. Patients' acceptance and satisfaction for this new therapeutic modality is high.

Correspondence:

Amedeo C. Fantin, MD

Division of Gastroenterology

University Hospital of Bern

Inselspital

CH-3010 Bern

E-Mail: dracfantin@bluewin.ch

References

- MacRae HM, McLeod RS. Comparison of hemorrhoidal treatment modalities. A meta-analysis. *Dis Colon Rectum* 1995; 38:687-94.
- Hood TR, Williams JA. Anal dilatation versus rubber band ligation for internal hemorrhoids. Method of treatment in outpatients. *Am J Surg* 1971;122:545-8.
- Varma JS, Chung SC, Li AK. Prospective randomised comparison of current coagulation and injection sclerotherapy for the outpatient treatment of haemorrhoids. *Int J Colorectal Dis* 1991;6:42-5.
- Andrews BT, Layer GT, Jackson BT, Nicholls RJ. Randomized trial comparing diathermy hemorrhoidectomy with the scissor dissection Milligan-Morgan operation. *Dis Colon Rectum* 1993;36:580-3.
- Senagore A, Mazier WP, Luchtefeld MA, MacKeigan JM, Wengert T. Treatment of advanced hemorrhoidal disease: a prospective, randomized comparison of cold scalpel vs. contact Nd:YAG laser. *Dis Colon Rectum* 1993;36:1042-9.
- Reis Neto JA, Quilici FA, Cordeiro F, Reis Junior JA. Open versus semi-open hemorrhoidectomy: a random trial. *Int Surg* 1992;77:84-90.
- Roe AM, Bartolo DC, Vellacott KD, Locke-Edmunds J, Mortensen NJ. Submucosal versus ligation excision haemorrhoidectomy: a comparison of anal sensation, anal sphincter manometry and postoperative pain and function. *Br J Surg* 1987;74:948-51.
- Read MG, Read NW, Haynes WG, Donnelly TC, Johnson AG. A prospective study of the effect of haemorrhoidectomy on sphincter function and faecal continence. *Br J Surg* 1982; 69:396-8.
- Longo A. Treatment of hemorrhoids disease by reduction of mucosa and hemorrhoidal prolapse with a circular suturing device: a new procedure. 6th world congress of endoscopic surgery. Rome. *Manduzzi* 1998:777-84.
- Rowell M, Bello M, Hemingway DM. Circumferential mucosectomy (stapled haemorrhoidectomy) versus conventional haemorrhoidectomy: randomised controlled trial [see comments]. *Lancet* 2000;355:779-81.
- Mehigan BJ, Monson JR, Hartley JE. Stapling procedure for haemorrhoids versus Milligan-Morgan haemorrhoidectomy: randomised controlled trial [see comments]. *Lancet* 2000;355: 782-5.
- Ho YH, Tsang C, Tang CL, Nyam D, EU KW, Seow-Choen F. Anal sphincter injuries from stapling instruments introduced transanally: randomized, controlled study with endoanal ultrasound and anorectal manometry. *Dis Colon Rectum* 2000;43: 169-73.
- Fazio VW. Early promise of stapling technique for haemorrhoidectomy [comment]. *Lancet* 2000;355:768-9.
- Kohlstadt CM, Weber J, Prohm P. Stapler hemorrhoidectomy. A new alternative to conventional methods (see comments). *Zentralbl Chir* 1999;124:238-43.
- Farouk R, Duthie GS, Lee PW, Monson JR. Endosonographic evidence of injury to the internal anal sphincter after low anterior resection: long-term follow-up. *Dis Colon Rectum* 1998; 41:888-91.
- Molloy RG, Moran KT, Coulter J, Waldron R, Kirwan WO. Mechanism of sphincter impairment following low anterior resection [see comments]. *Dis Colon Rectum* 1992;35:462-4.
- Carapeti EA, Kamm MA, Evans BK, Phillips RKS. Topical diltiazem and bethanechol decrease anal sphincter pressure without side effects. *Gut* 1999;45:719-22.
- Brisinda G, Maria G. Oral nifedipine reduces resting anal pressure and heals chronic anal fissure [letter; comment]. *Br J Surg* 2000;87:251.
- Hiltunen KM, Matikainen M. Anal manometric findings in symptomatic hemorrhoids. *Dis Colon Rectum* 1985;28:807-9.
- Lin JK. Anal manometric studies in hemorrhoids and anal fissures. *Dis Colon Rectum* 1989;32:839-42.
- el-Gendi MA, Abdel-Baky N. Anorectal pressure in patients with symptomatic hemorrhoids. *Dis Colon Rectum* 1986;29: 388-91.
- Milligan ETC MC. Surgical anatomy of the anal canal and operative treatment of haemorrhoids. *Lancet* 1937;2:1119-24.
- Cheetham MJ, Mortensen NJ, Nystrom PO, Kamm MA, Phillips RK. Persistent pain and faecal urgency after stapled haemorrhoidectomy. *Lancet* 2000;356:730-3.

The many reasons why you should choose SMW to publish your research

What Swiss Medical Weekly has to offer:

- SMW's impact factor has been steadily rising, to the current 1.537
- Open access to the publication via the Internet, therefore wide audience and impact
- Rapid listing in Medline
- LinkOut-button from PubMed with link to the full text website <http://www.smw.ch> (direct link from each SMW record in PubMed)
- No-nonsense submission – you submit a single copy of your manuscript by e-mail attachment
- Peer review based on a broad spectrum of international academic referees
- Assistance of our professional statistician for every article with statistical analyses
- Fast peer review, by e-mail exchange with the referees
- Prompt decisions based on weekly conferences of the Editorial Board
- Prompt notification on the status of your manuscript by e-mail
- Professional English copy editing
- No page charges and attractive colour offprints at no extra cost

Editorial Board

Prof. Jean-Michel Dayer, Geneva
 Prof. Peter Gehr, Berne
 Prof. André P. Perruchoud, Basel
 Prof. Andreas Schaffner, Zurich
 (Editor in chief)
 Prof. Werner Straub, Berne
 Prof. Ludwig von Segesser, Lausanne

International Advisory Committee

Prof. K. E. Juhani Airaksinen, Turku, Finland
 Prof. Anthony Bayes de Luna, Barcelona, Spain
 Prof. Hubert E. Blum, Freiburg, Germany
 Prof. Walter E. Haefeli, Heidelberg, Germany
 Prof. Nino Kuenzli, Los Angeles, USA
 Prof. René Lutter, Amsterdam,
 The Netherlands
 Prof. Claude Martin, Marseille, France
 Prof. Josef Patsch, Innsbruck, Austria
 Prof. Luigi Tavazzi, Pavia, Italy

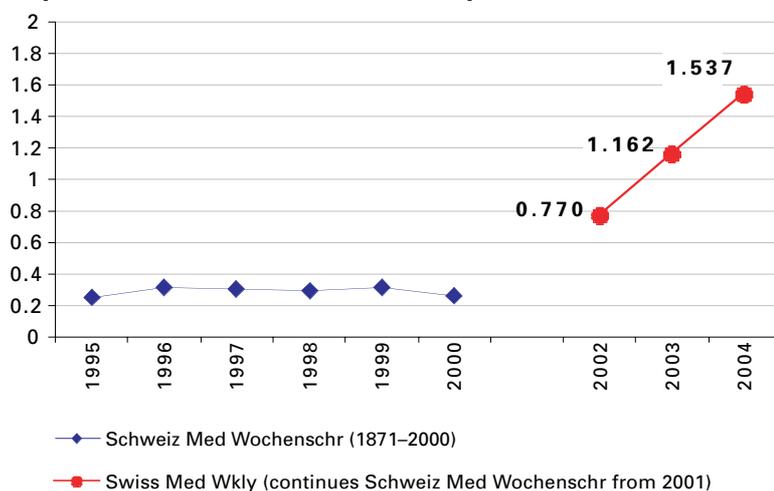
We evaluate manuscripts of broad clinical interest from all specialities, including experimental medicine and clinical investigation.

We look forward to receiving your paper!

Guidelines for authors:

http://www.smw.ch/set_authors.html

Impact factor Swiss Medical Weekly



All manuscripts should be sent in electronic form, to:

EMH Swiss Medical Publishers Ltd.
 SMW Editorial Secretariat
 Farnsburgerstrasse 8
 CH-4132 Muttenz

Manuscripts: submission@smw.ch
 Letters to the editor: letters@smw.ch
 Editorial Board: red@smw.ch
 Internet: <http://www.smw.ch>