



# Postoperative Pain as a Decision-Making Tool in Treating Hemorrhoids on an In- or Out-Patient Basis After Stapled Mucosectomy (Longo Procedure)

D. Kovacevic<sup>1</sup>, G. Gubler<sup>1</sup>, M. Turina<sup>2</sup>, M. K. Muller<sup>3</sup>, A. Nocito<sup>2</sup>, N. Attigah<sup>1</sup>, M. Weber<sup>1</sup>

<sup>1</sup>Department of Visceral Surgery, Stadtspital Triemli Zurich, Zurich, Switzerland

<sup>2</sup>Department of Visceral Surgery, Universtitaetspital Zurich, Zurich, Switzerland

<sup>3</sup>Department of Visceral Surgery, Spital Frauenfeld, Frauenfeld, Switzerland

**Objective:** Stapled mucosectomy (Longo operation) is a frequently used procedure for the treatment of hemorrhoidal disease. It is a simple procedure yet similar to resective techniques for patients who frequently suffer from relevant postoperative pain. The aim of our present study is to examine patient satisfaction based on the operative setting (outpatient versus inpatient treatment) in patients undergoing the Longo operation for Grade III or IV hemorrhoids.

**Materials and methods:** Outcomes of all patients undergoing stapled mucosectomy for Grade III and IV hemorrhoids at 3 different Swiss public hospitals was analyzed retrospectively and compared with respect to in- or outpatient treatment. Patient satisfaction was recorded by subsequent telephone interviews.

**Results:** From a total of 213 patients with stapled mucosectomies, datasets of 144 patients (67.6%) were available for full analysis. A total of 124 patients (86.1%) were satisfied with the treatment and 110 (76%) would choose to undergo the Longo procedure again ( $P < 0.01$ ). Recurrence of recurrent hemorrhoidal symptoms is negatively correlated with the willingness of undergoing the Longo procedure again ( $r = -0.187$ ,  $P = 0.025$ ). Patient satisfaction was not associated with the operative setting (inpatient vs. out-patient setting). Postoperative pain increased the willingness to be hospitalized overnight ( $r = 0.227$ ,  $P < 0.01$ ).

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Corresponding Author: Dragoljub Kovacevic, MD, Fuerstenlandstrasse 32, CH-9500 Wil Switzerland.  
Tel.: +41 71 914 6382; E-mail: dragoljub.kovacevic@srft.ch

**Conclusion:** Patient satisfaction after stapled mucosectomy is mainly related to postoperative pain and recurrence of hemorrhoidal symptoms regardless of inpatient or outpatient treatment.

*Key words:* Hemorrhoids – Stapled mucosectomy – Outpatient procedure – Postoperative pain

Clinically relevant hemorrhoids are a common condition with a lifetime risk of 4.4%.<sup>1,2</sup> However, only 10% to 20% of affected patients will require surgical treatment.<sup>1</sup> Hemorrhoids are classified into 4 categories. Grades I and II are commonly treated conservatively, whereas Grades III and IV are usually an indication for surgery.<sup>2</sup> Due to economic considerations, surgical procedures are increasingly performed in an outpatient setting even in the elderly and in patients with considerable comorbidities.<sup>3</sup> In Switzerland, the Federal Office of Public Health has issued a list of operations that must be performed in an outpatient setting along with criteria (Swiss Appropriateness Evaluation Protocol) that allows for specific exceptions.<sup>4</sup> So far, there have been various publications comparing surgical techniques for hemorrhoids like the Milligan-Morgan procedure, stapled mucosectomy (Longo procedure), and hemorrhoidal arterial ligation. In terms of complication rates, recurrence, and patient satisfaction, stapled mucosectomy has been proven to be a reliable operation in Grade III and IV hemorrhoids despite a somewhat higher rate of recurrence.<sup>5–7</sup> Furthermore, the Longo procedure can safely be performed in an outpatient setting.<sup>8,9</sup> In most studies, however, clinical success was usually measured by the typical clinical endpoints (pain, recurrence rates, bleeding, *etc.*) in such studies, whereas eligibility for outpatient treatment was not a parameter of interest. Since the advent of the Diagnosis Related Groups in Switzerland for reimbursement in 2009, cost-effective case management has become mandatory.<sup>10</sup> Therefore, the aim of our study is to examine patient satisfaction after an outpatient Longo procedure for circular Grade III or IV hemorrhoids. Secondary endpoints were complications and readmission rate within 30 days.

## Methods and Materials

All patients having undergone stapled mucosectomy for Grade III and IV hemorrhoids at 3 different public hospitals (University Hospital Zurich, Triemli City Hospital, and Canton Hospital Frauenfeld) were recruited and followed for a total of 3 years.

The operation was performed as described first by Antonio Longo.<sup>11</sup> The decision whether a patient was treated in an out- or inpatient setting was based on patient preference and surgeon recommendation. All patients signed an informed consent before the operation, allowing for their data to be used for scientific research. A telephone questionnaire included questions concerning the hospitalization setting (in- or outpatient), operative complications, recurrence, and questions about satisfaction with the procedure, the perioperative course, and the operative results. Additionally, postoperative pain was queried using a visual analogue scale (VAS)<sup>12</sup> (range: 0–10, where 0 = no pain and 10 = worst possible pain) and 2 questions were intended for open statements. The phone calls were conducted by a designated medical staff member.

All patients received a letter prior to the phone call informing them about the intention of the study and the phone survey. Patients were asked for oral consent to participate in the study. All data were anonymized. Patients who could not be contacted or who denied participation were excluded. The study was approved by the local ethics committee (BASEC-Nr. 2016-01426).

## Statistical Analysis

Comparative analysis of overall satisfaction, complications, and pain intensity with respect to the hospitalization setting (in- or outpatient) were performed. All statistical analyses were performed using SPSS (version 19.0, IBM, Armonk, New York, USA). To evaluate the level of influence of the independent variables on the dependent variables, 2 types of analyses were conducted (Kendall rank correlation using the Tau-b statistic and chi-squared test of independence).

## Results

### *Demographics*

In total, 213 consecutive stapled mucosectomies were performed in the study period. From these, complete datasets of 144 patients (67.6%) were

Table 1 Overall satisfaction and complication rates

	Were there any complications?	
	Yes	No
Were you satisfied with the result of the operation?		
Yes	61 (42.3%)	63 (43.8%)
No	20 (13.9%)	0
TOTAL	81 (56.2%)	63 (43.8%)
Correlation coefficient		-0.354
<i>P</i> value		<0.001

available for final analysis [101 male (70.1%) and 43 female patients (29.9%)]. A total of 69 patients (32.4%) were excluded: 51 patients (73.9%) of these were excluded because their telephone interview could not be performed as these patients could not be contacted, which was mostly due to temporary residence in Switzerland; 14 patients (20.3%) denied participation; 3 (4.3%) were excluded due to communication problems; and 1 patient (1.5%) died for reasons not related to the hemorrhoid operation.

The average age at the time of operation was  $52.5 \pm 14.5$  years. For women, the average age was 56 years and for men, 50 years.

The patient collective of each hospital was comparable; dissimilarities were observed only in three variables (proportion of male-to-female patients, average age, and proportion of in-patient treatment), which did not affect the overall observations and correlations.

#### *Hospitalization setting (in- or outpatient) and readmissions*

A total of 50.7% of all patients were treated in an outpatient setting, and 49.3% were kept inpatient for at least one night. Further, 3 patients from the outpatient group were readmitted within 2 days. Two of them were due to bleeding, which could be managed in the emergency room, so re-hospitalization was not required. One readmission had to be hospitalized and re-operated. One patient required ostomy formation for perforation of the rectum.

#### *Patient satisfaction*

Overall, 124 patients (86.1%) were satisfied with the treatment [61 (86.1%) of the outpatient group and 61 (85.9%) of the inpatient group] and 110 patients (76%) would choose to undergo the Longo procedure again [54 (74%) of the outpatient group and 56 (78.9%) of the inpatient group]. There was a statistically significant ( $P < 0.01$ ) correlation be-

tween the level of satisfaction and the willingness to have the same procedure done again ( $r = 0.297$ ). There was no significant difference in satisfaction with the treatment between the out- and inpatient group ( $P = 0.49$ ). Neither was there a significant difference between the out- and inpatient group regarding the willingness of undergoing the Longo procedure again ( $P = 0.95$ ).

A total of 99 patients (68.8%) would have chosen the same hospitalization setting again ( $r = 0.376$ ,  $P < 0.01$ ). Aside from the experienced hospitalization setting (in- or outpatient), no other variable appeared to have a statistically significant impact on that choice.

Of the 71 patients (49.3%) treated in an inpatient setting, 20 (28.2%) would prefer an outpatient setting in case they needed to undergo the procedure again. Additionally, 25 (34.2%) of the 73 patients (50.7%) treated in an outpatient setting would opt for an inpatient setting.

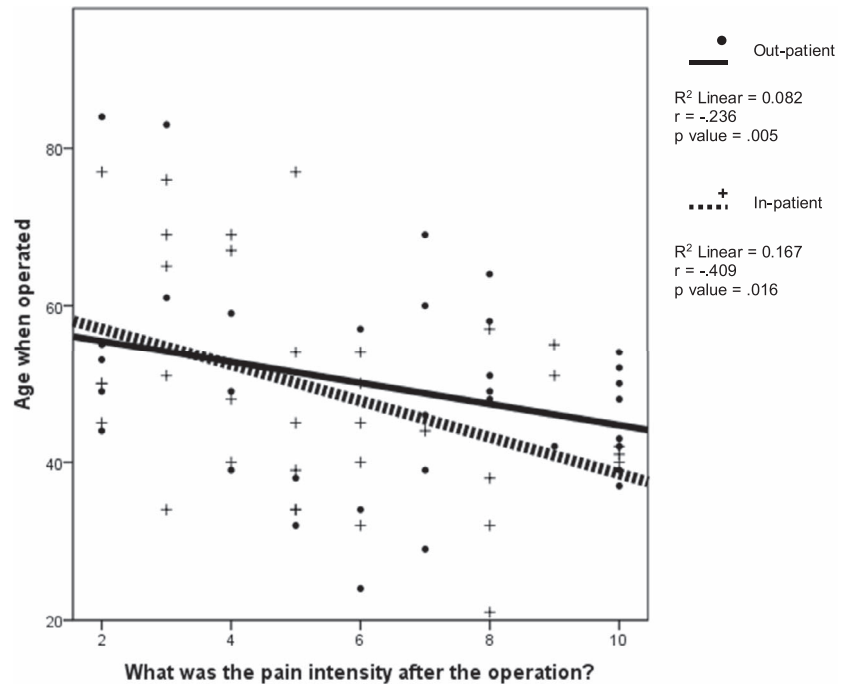
A total of 34 patients (24%) would not undergo the Longo procedure again irrespective of inpatient or outpatient treatment. All of them had a pain intensity score above 4, except one patient. Of these 34 patients, 23 (67.4%) were treated in an inpatient setting and 11 (32.4%) in an outpatient setting. In total, 20 patients (13.9%) were dissatisfied and reported that there were complications or recurrence of hemorrhoids ( $r = -0.354$ ,  $P < 0.001$ ) (Table 1).

Recurrence of hemorrhoids is negatively correlated with the willingness to undergo the Longo procedure again ( $r = -0.187$ ,  $P = 0.025$ ). The same applies to complications, with a slightly stronger effect ( $r = -0.227$ ,  $P < 0.01$ ).

In general, a significant correlation has been observed to favor an inpatient setting if one or more complications had occurred ( $r = 0.175$ ,  $P = 0.036$ ), yet no particular complication could be identified as a statistically significant factor influencing the preference for in- or outpatient treatment.

#### *Postoperative complications*

A total of 68 patients (47.2%) reported pain after the operation. Of these, 30 (45%) experienced an intensity level of 4 or more on the VAS after the operation. The mean reported pain level was  $5.98 \pm 2.7$ . The majority of patients reporting pain were male ( $n = 49$ , 72%). The average VAS score did not vary significantly with regard to gender. There was neither a difference nor a statistically significant correlation between postoperative pain intensity and the hospitalization setting (in- or outpatient).



**Fig. 1** Postoperative pain levels in correlation to age.

Generally, pain levels decreased with increasing age of the patients, and patients over 60 years of age never reported pain beyond VAS 8 (Fig. 1). When examined according to outpatient to inpatient setting there was no significant difference in the reported pain levels.

The Kendall tau-b correlation test described a statistically significant ( $P < 0.001$ ) relationship between the experienced pain intensity and the occurrence of complications ( $r = 0.269$ ). Over twice as many patients with a pain intensity level of  $\geq 5$  would choose inpatient hospitalization if they were to undergo the Longo procedure again (32 cases versus 13 cases), and there was a positive correlation between the perceived pain intensity and the willingness to stay overnight ( $r = 0.227, P < 0.01$ ).

A total of 81 patients (56.3%) reported further complications (Fig. 2). Of those, 34 patients (42%) reported more than one complication.

**Table 2** Most frequent complications according to hospitalization setting

Hospitalization setup	Complications		
	Bleeding	Recurrent hemorrhoids	Constipation
Outpatient	14 (9.7%)	11 (7.6%)	10 (6.9%)
Inpatient	13 (9%)	10 (6.9%)	7 (4.9%)
Correlation coefficient	No significant correlations ( $P$ value $> 0.1$ )		

The most common complications were postoperative bleeding and constipation (18.8% and 11.8% of patients, respectively). Recurrence of hemorrhoids was observed in 21 patients (14.6%) (Table 2).

Figure 2 shows the distribution of complications according to in- versus outpatient setting. Although some of the complications were reported only in an outpatient or inpatient setting, the numbers were not high enough to show a significant difference.

### Discussion

This study shows that outpatient stapled mucosectomy (Longo procedure) for Grade III and IV circular hemorrhoids is associated with low complication rates comparable to those carried out in an inpatient setting.

A number of studies on stapled mucosectomy examined potential advantages in operation times, blood loss, return to work, and postoperative pain compared with conventional hemorrhoidectomy (Ferguson, Milligan-Morgan). Other factors like feasibility, cost efficiency, and safety issues were also considered.<sup>5,7-9,13</sup> Fantin *et al* explained the high acceptance in patients as a result of appropriate postoperative function of the anorectal sphincter.<sup>14</sup> Esser *et al* concluded that a patient's satisfaction was linked to high safety of the procedure.<sup>15</sup>

To our knowledge, no study evaluated whether the patients' satisfaction was influenced by inpatient

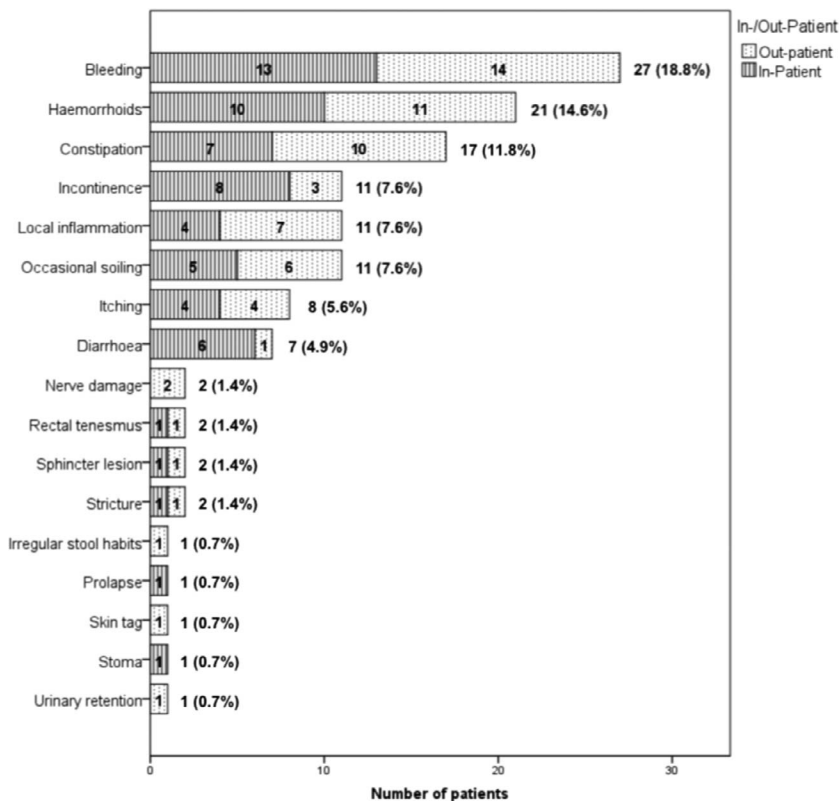


Fig. 2 Comparison of complication rates between in- and outpatients.

versus outpatient setting. Because postoperative pain is one of the most commonly reported complications, an inpatient setting would be an obvious choice for most patients as it offers the most effective pain management using intravenous analgesia.

Patient satisfaction in our present study was mostly related to postoperative complications, and less related to whether operations were performed as in- or outpatient. The strongest influence regarding patient satisfaction was postoperative pain. In our study, the average VAS score was 6, which is similar to the results of other studies.<sup>16</sup> In addition, the more pain a patient experienced postoperatively, the more likely he or she would be to choose an inpatient treatment for a potential future operation. As there were no differences regarding postoperative pain in in- or outpatient operations, no inferences can be made to predict which patients should be treated in which setting. In current practice the criteria issued by the Swiss health department serve as a guideline as to which patients can be triaged for an outpatient setting to an inpatient setting. Continuous need for intravenous or intermittent medication is a valid criterion.<sup>3</sup> However, these recommendations do not explicitly mention postoperative pain or offer an elevated VAS

score over 4 as a criterion for inpatient treatment. The high rate of VAS scores greater than 4 raises the question of whether insufficient postoperative analgesia was responsible for the results rather than the operational setting. Postoperative pain must be expected as a normal result after any operation, but even more so after proctologic operations.

Furthermore, the complication rate in this study is similar to those of other studies: In a review of postoperative complications, Karen *et al* described the rate of bleeding between 7% and 14%, rate of urinary retention between 0 and 4%, and rate of recurrent hemorrhoids between 2% and 4%.<sup>17</sup> We found similar percentages in our postoperative complications. Especially in cases of recurrence, patients would be more likely to choose an inpatient setting if the operation was to be performed again. Nevertheless, the difference of reported complications was not significant between groups and does not allow for meaningful conclusions about the preference for inpatient treatment.

Conclusion

Stapled mucosectomy can be performed in an inpatient and outpatient setting without compro-

missing patients' satisfaction. It is a safe procedure, and overall satisfaction is high regardless of the operative setting. However, according to the data of our study, a patient experiencing a VAS score over 4 in the postoperative setting should be kept overnight to increase patient satisfaction with the procedure. This approach, however, creates a need for additional inpatient capacity that must be available on short notice.

#### *Research involving human participants and or animals*

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. This article does not contain any studies with animals performed by any of the authors.

#### *Informed consent*

Informed consent was obtained from all individual participants included in the study.

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