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Minimally invasive techniques in stage I–II chronic hemorrhoids: outcomes and prioritization

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Various minimally invasive techniques are widely used in the treatment of stage I–II chronic hemorrhoids (CH), including rubber band ligation (RBL), transanal hemorrhoidal dearterialization (THD), laser vaporization (LV), among others. Bipolar vaporization (BPV) is a novel and promising method of thermal tissue destruction using the EK-300M (*Svarmed*, Ukraine) bio-welding generator. Its effectiveness compared to other techniques remains insufficiently studied.

Objective – to compare the outcomes of treating complicated stage I–II CH using four minimally invasive techniques (BV, LV, THD, RBL) and to determine their priority ranking.

Materials and methods. The study included 118 patients (67 men and 51 women, aged between 19 and 70 years; the mean age was 43.1 ± 12.5 years) with symptomatic stage I–II CH resistant to conservative therapy. Patients were divided into four groups according to the applied method: BPV (n = 32), LV (n = 21), THD (n = 23), and RBL (n = 42). The following parameters were assessed: duration of the procedure, frequency of intraoperative complications, dynamics of symptoms (pain, prolapse, bleeding, itching, soiling), recurrence rate, and patient satisfaction at 12-month follow-up.

Results. All techniques demonstrated an adequate level of effectiveness and safety. The 12-month recurrence rates were BPV – 3.1 %, LV – 4.8 %, THD – 13 %, and RBL – 26.2 %. The highest satisfaction level (8–9 points) was observed in the BPV and LV groups (> 90 % of patients). BPV and LV showed the best clinical efficacy and stability of outcomes. THD ranked third in terms of effectiveness, while RBL had the lowest priority due to the high recurrence rate.

Conclusions. Considering clinical outcomes, availability, and cost, bipolar vaporization can be recommended as a priority method for the treatment of stage I–II CH. Further multicenter studies are needed to confirm its long-term efficacy.

Keywords
chronic hemorrhoids, bipolar vaporization, minimally invasive techniques, transanal dearterialization, laser vaporization, rubber band ligation, treatment outcomes.

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Chronic hemorrhoidal disease (CH) remains one of the most common anorectal conditions worldwide. According to a national epidemiological study in China, the standardized detection rate of hemorrhoids was 17.7 % among men and 43.7 % among women [17]. The prevalence varies across different countries: in the USA, recent data indicate a rate of 13–16 % of the population [9, 12, 20], while in Austria it reaches 39 % [30]. The highest incidence is observed in the 45–65 age group; up to 50 % of individuals over 50 years old have experienced symptoms of hemorrhoidal disease [15, 30]. Additionally, screening colonoscopies detect hemorrhoids in 38–39 % of patients, with more than half of these cases (55 %) being asymptomatic [27, 30].

According to the Goligher classification [7, 16], the majority of patients present with stage I (72.89 %) or stage II (18.42 %) CH, while stages III and IV are much less frequent, accounting for 8.16 % and 0.53 % of cases, respectively [30].

It is well known that the current treatment strategy for CH is based on a stepwise approach – from

conservative to surgical interventions [5, 10, 12, 34]. While conservative therapy remains a mandatory component for all stages of CH, most patients with stage I–II disease who fail to achieve stable results with medical management require minimally invasive procedures.

Among the most commonly used minimally invasive techniques are rubber band ligation (RBL) [29], sclerosing injections (SI) [14], transanal hemorrhoidal dearterialization (THD) [35], endovascular embolization of the superior rectal artery (Emborrhoid therapy) [6], and various thermal tissue destruction methods, including infrared photocoagulation [32], laser coagulation [22, 23], radiofrequency ablation [21, 22], and bipolar coagulation [31].

These techniques aim to reduce the vascularity of hemorrhoidal tissue, remove excess tissue, and minimize prolapse through ablation or fixation of hemorrhoidal cushions to the rectal wall. Despite their proven clinical efficacy, most of these techniques have certain limitations, including the potential for postoperative pain, the need for repeat procedures, risk of recurrence, technical complexity (particularly in THD and Emborrhoid therapy), and high equipment costs [5, 9, 10, 13, 33].

The lack of consensus regarding the optimal treatment modality for stage I–II CH necessitates further clinical research in this area.

Among new approaches, tissue vaporization techniques have attracted growing interest. They are already widely used in urology [8, 18], gynecology [3], and in the treatment of lower limb varicose veins [1]. Due to their technical characteristics and method of energy delivery, this approach could potentially be effective in the treatment of hemorrhoidal disease. However, according to the available literature, experience with the use of vaporization specifically in proctology has not yet been documented, which underscores the relevance of further research in this area.

Objective – to compare the outcomes of treatment for complicated stage I–II chronic hemorrhoidal disease using minimally invasive techniques, including bipolar vaporization, and to determine the priority ranking of these methods.

Materials and methods

The study included 118 patients with complicated chronic hemorrhoidal disease (CH) resistant to conservative treatment: 41 patients with stage I CH (34.7 %) and 77 patients with stage II CH (65.3 %). The cohort consisted of 67 men and 51 women, aged between 19 and 70 years; the mean age was 43.1 ± 12.5 years. The distribution of patients by treatment method and CH stage is shown in Table 1.

There were no statistically significant differences between the study groups in the distribution of CH stages ($p = 0.586$).

An original method for bipolar vaporization of hemorrhoidal nodes was applied in this study, using the EK-300M bio-welding generator developed in Ukraine («Svarmed») [5].

Inclusion criteria:

- symptomatic stage I–II chronic hemorrhoidal disease according to Goligher's classification [7, 16], resistant to conservative treatment;
- age ≥ 18 years;
- absence of severe comorbidities (ASA class IV);
- signed informed consent for surgical treatment and outpatient follow-up during the postoperative period.

Exclusion criteria:

- history of infectious or undifferentiated colitis within the last 6 months prior to screening;
- malignancies of the rectum or anal canal;
- inflammatory diseases of the rectum; exacerbation of other chronic gastrointestinal diseases (pancreatitis, cholecystitis, hepatitis, gastritis, colitis) or acute surgical conditions;
- logistical issues (missed follow-up appointments), non-compliance with the planned diagnostic and treatment schedule.

The effectiveness of bipolar vaporization of hemorrhoidal nodes was assessed based on parameters defined for hemorrhoidal disease treatment in the international Delphi study [34].

The **primary endpoint** was the «Hemorrhoid Symptoms» domain, which included pain, prolapse, itching, soiling (minor discharge of mucus, liquid stool, or perianal skin soiling), and bleeding (presence of blood in the stool during defecation).

Secondary endpoints included «Complications» (fecal incontinence, abscess, urinary retention, anal stenosis, and fistula), «Recurrence», and «Satisfaction» (patient satisfaction with surgical outcomes).

Table 1. **Distribution of patients by treatment method and CH stage**

Group	Stage I CH	Stage II CH	Total
Bipolar vaporization	10 (31.3 %)	22 (68.8 %)	32
Laser vaporization	6 (28.6 %)	15 (71.4 %)	21
Rubber band ligation	18 (42.9 %)	24 (57.1 %)	42
Transanal hemorrhoidal dearterialization	7 (30.4 %)	16 (69.6 %)	23
Total	41 (34.7 %)	77 (65.3 %)	118

The «Hemorrhoid Symptoms» domain was assessed using a 0–9 point scale (0 – no symptoms, 9 – maximum severity), as well as by the frequency of occurrence in the study groups. In the baseline characteristics (preoperative), both the symptom score and frequency were presented. During follow-up, only the frequency was reported due to the low incidence of symptoms at later time points, which made it inappropriate to calculate mean scores.

The «Complications» domain was assessed as follows: fecal incontinence – using the Wexner Scale [19]; abscess and anal stenosis – based on physical examination findings; urinary retention – diagnosed by ultrasound; fistula – diagnosed by MRI in cases of inconclusive physical examination.

The «Satisfaction» domain was evaluated on a 0 to 9-point scale (0 – no satisfaction with the surgery, 9 – maximum satisfaction with surgical outcomes).

The «Recurrence» domain was defined as the reappearance of the patient's initial symptoms.

The timing of assessments for the «Symptoms» and «Satisfaction» domains was preoperatively (baseline) and at 7 days, 6 months, and 12 months post-procedure. Abscess and urinary retention were assessed at 7 days post-procedure; anal stenosis, fecal incontinence, and fistula – at 12 months. The «Recurrence» domain was evaluated at 6 and 12 months post-procedure.

Statistical analysis was performed using IBM SPSS Statistics 22.0.

For comparison of two independent samples, Student's t-test was used for normally distributed variables, and the Mann–Whitney U test was used for non-normally distributed variables. For paired (dependent) samples, the Wilcoxon signed-rank test was used. For comparison of quantitative variables across more than two groups, analysis of variance (ANOVA) was applied. Categorical variables were compared using the chi-square (χ^2) test or Fisher's exact test, as appropriate.

The null hypothesis was rejected when $p < 0.05$.

Results

The baseline characteristics of the patients were compared across the study groups. No statistically significant differences were found in age, sex, BMI, disease duration, history of thrombosed hemorrhoids, or severity of hemorrhoid-related symptoms (all $p > 0.05$), confirming the homogeneity of the groups at baseline (Table 2).

Table 2. **Baseline characteristics of patients with stage I–II chronic hemorrhoidal disease**

Parameter	BPV (n = 32)	LV (n = 21)	RBL (n = 42)	THD (n = 23)	Total (n = 118)
Age, years	43.3 ± 14.7	45.0 ± 8.8	41.0 ± 11.5	44.7 ± 13.9	43.1 ± 12.5
Male	19 (59.4 %)	11 (54.4 %)	23 (54.8 %)	14 (60.9 %)	67 (56.8 %)
Female	13 (40.6 %)	10 (47.6 %)	19 (45.2 %)	9 (39.1 %)	51 (43.2 %)
BMI, kg/m^2	27.4 ± 3.8	23.7 ± 3.3	25.7 ± 7.6	25.3 ± 5.4	25.7 ± 5.8
Disease duration, years	6.8 ± 4.5	9.0 ± 3.9	7.6 ± 3.1	9.3 ± 4.4	7.9 ± 3.9
History of thrombosed hemorrhoids	14 (43.8 %)	6 (28.6 %)	16 (38.1 %)	11 (47.8 %)	71 (60.2 %)
Hemorrhoid symptoms domain					
Pain	18 (56.3 %)	16 (76.2 %)	31 (73.8 %)	15 (65.2 %)	80 (67.8 %)
Pain score	2.7 ± 1.4	2.8 ± 1.3	2.6 ± 1.3	2.7 ± 0.9	2.7 ± 1.2
Prolapse	22 (68.8 %)	11 (52.4 %)	30 (71.4 %)	13 (56.5 %)	76 (64.4 %)
Prolapse score	4.6 ± 1.3	3.5 ± 0.5	4.3 ± 1.3	4.5 ± 1.3	4.3 ± 1.2
Itching	9 (28.1 %)	5 (23.8 %)	11 (26.2 %)	7 (30.4 %)	32 (27.1 %)
Itching score	2.8 ± 0.7	3.2 ± 0.8	3.5 ± 0.7	3.1 ± 0.7	3.2 ± 0.7
Soiling	8 (25.5 %)	6 (28.6 %)	12 (28.6 %)	6 (26.1 %)	32 (27.1 %)
Soiling score	3.1 ± 0.8	3.3 ± 0.8	3.3 ± 0.6	3.4 ± 0.6	3.3 ± 0.6
Bleeding	32 (100.0 %)	21 (100.0 %)	42 (100.0 %)	23 (100.0 %)	118 (100.0 %)
Bleeding score	4.7 ± 1.1	4.3 ± 1.1	4.6 ± 1.2	4.7 ± 1.4	4.6 ± 1.2

Note. Categorical variables are presented as the number of cases and percentage, while quantitative indicators are presented as M ± SD.
Symptom scores were calculated for patients with the respective symptoms.
No statistically significant differences were observed between groups for any baseline parameters (all $p > 0.05$).

Analysis of key intraoperative and postoperative indicators revealed certain specific features associated with each of the four surgical techniques (Table 3).

The duration of surgery was significantly shorter in the RBL group (8.5 ± 7.2 min), which is expected given the technical simplicity of this procedure. For the other techniques (BPV, LV, THD), the average duration ranged from 41.1 to 44.3 minutes, with no significant differences between these groups ($p < 0.001$ vs. RBL).

Intraoperative blood loss was also minimal in the RBL group (1.6 ± 1.4 mL) due to the absence of tissue dissection and the controlled mechanical effect on hemorrhoidal tissue. BPV, LV, and THD showed comparable blood loss levels (6.5–8.3 mL), which were not clinically significant and did not require additional hemostatic measures ($p < 0.001$ vs. RBL).

The incidence of submucosal hematomas ranged from 9.5 % to 34.8 %, with no statistically significant differences between groups ($p = 0.115$), indicating a favorable safety profile for all techniques when performed with proper technique.

Postoperative analgesic requirements were moderate across all groups. The number of ketorolac doses administered during the first and second postoperative days did not differ significantly between groups ($p > 0.26$), indicating comparable levels of postoperative pain.

It is noteworthy that both the average length of hospital stay and the duration of temporary disability were significantly lower in the RBL group (0.4 ± 0.5 days and 2.6 ± 0.5 days, respectively), consistent with the outpatient nature of this procedure. In the BPV, LV, and THD groups, these values were approximately 2.1–2.3 days for hospitalization and 5.6–5.8 days for temporary disability ($p < 0.001$ vs. RBL).

Thus, the analysis of intraoperative and postoperative outcomes demonstrates that all techniques offer a favorable safety and low-trauma profile. RBL ensures the shortest intervention time and fastest recovery of work capacity, although further evaluation is needed regarding its long-term outcomes.

A comparative analysis of the dynamics of the «Hemorrhoid Symptoms» domain revealed certain differences between the treatment groups (Table 4).

Thus, in the long term, bipolar vaporization and laser vaporization provided the best control of this key symptom of chronic hemorrhoids, showing more stable results in preventing recurrent bleeding compared to RBL and THD.

The dynamics of the «Satisfaction» domain indicators demonstrated a clear positive trend in all groups (Figure).

At one week post-treatment, mean satisfaction scores were comparable across all groups (6.7–7.1 points, $p = 0.084$), reflecting minor between-group differences in the early postoperative period.

At 6 months, a clear trend toward increasing satisfaction was observed in all groups, with the highest mean scores recorded in the LV group (8.7 ± 0.5 points) and the BPV group (8.3 ± 0.7 points), significantly exceeding the scores in the RBL group (7.7 ± 1.5 points, $p = 0.010$). The distribution of scores showed that in the BPV group, 43.8 % of patients rated their satisfaction at the maximum level (9 points), with an additional 46.9 % rating it at 8 points, whereas in the RBL group, only 33.3 % of patients gave a score of 9 points.

At 12 months, this dynamic remained stable: the highest scores were again observed in the BPV group (8.3 ± 0.7 points) and the LV group (8.2 ± 1.0 points), with significantly lower scores in the RBL

Table 3. **Comparison of key intraoperative and postoperative parameters in patients with stage I–II chronic hemorrhoidal disease according to surgical technique**

Parameter	BPV (n = 32)	LV (n = 21)	RBL (n = 42)	THD (n = 23)	p (overall)
Duration of surgery, min	44.3 ± 7.1*	42.4 ± 6.5*	8.5 ± 7.2	41.1 ± 3.8*	< 0.001
Intraoperative blood loss, mL	8.3 ± 3.7*#	8.1 ± 3.0*	1.6 ± 1.4	6.5 ± 3.2*	< 0.001
Submucosal hematomas	7 (21.9 %)	5 (23.8 %)	4 (9.5 %)#	8 (34.8 %)	0.115
Number of ketorolac doses					
Day 1	1.4 ± 0.9	1.8 ± 0.5	1.9 ± 1.7	1.5 ± 0.5	0.268
Day 2	1.8 ± 0.8	1.9 ± 0.6	2.0 ± 0.8	1.7 ± 0.5	0.310
Hospital stay, days	2.3 ± 0.5*	2.1 ± 0.4*	0.4 ± 0.5	2.2 ± 0.7*	< 0.001
Duration of temporary disability, days	5.8 ± 0.7*	5.6 ± 0.7*	2.6 ± 0.5	5.7 ± 0.8*	< 0.001

Note. p-value (overall) – based on ANOVA or chi-square test.
* The difference from the RBL group is statistically significant ($p < 0.05$).
# The difference from the THD group is statistically significant ($p < 0.05$; Bonferroni correction).

Table 4. **Frequency of «Hemorrhoid Symptoms» domain indicators over time (by treatment group and control time points), %**

Symptom	BPV (n = 32)	LV (n = 21)	RBL (n = 42)	THD (n = 23)	p
Pain					
Preoperative	56.3	76.2	73.8	65.2	0.334
1 week	65.6	61.9	69.0	60.9	0.904
6 months	0.0*	4.3*	14.3	4.3*	0.034
12 months	0.0*	4.3*	26.2	13.0*	0.018
Prolapse					
Preoperative	68.8	71.4	57.1	69.8	0.568
1 week	0.0	0.0	0.0	0.0	1.000
6 months	0.0*	4.8	14.3	4.3*	0.034
12 months	3.1	4.8	26.2	13.0	0.018
Itching					
Preoperative	28.1	23.8	26.2	30.4	0.964
1 week	9.4	14.3	16.7	17.4	0.802
6 months	0.0*	0.0*	21.4	4.3	0.002
12 months	9.4	14.3	31.0	13.0	0.080
Soiling					
Preoperative	25.0	28.6	28.6	26.1	0.985
1 week	31.3	33.3	35.7	26.1	0.883
6 months	3.1*	4.8	14.3	4.3	0.245
12 months	3.1*	4.8	26.2	13.0	0.018
Bleeding					
Preoperative	100.0	100.0	100.0	100.0	1.000
1 week	0.0*	0.0*	2.4	0.0*	0.610
6 months	0.0*	0.0*	16.7	8.7*	0.026
12 months	3.1	4.8	21.4	8.7	0.054

Note. p-values between groups calculated using χ^2 test or Fisher's exact test.
* The difference from the RBL group is statistically significant ($p < 0.05$).

Table 5. **Recurrence rate by groups at 6 and 12 months post-procedure**

Time point	BPV	LV	RBL	THD	p
6 months	0	0	6 (14.3 %)	1 (4.3 %)	0.034
12 months	1 (3.1 %)	1 (4.8 %)	11 (26.2 %)	3 (13.0 %)	0.018

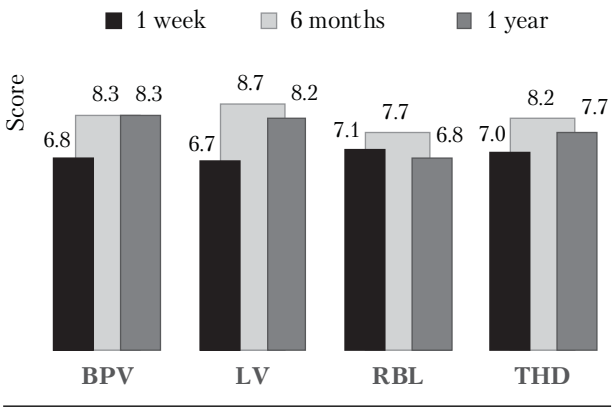

Figure. **Mean «Satisfaction» scores over time in the study groups**

group (6.8 ± 2.0 points, p = 0.001). The analysis of score distribution further confirmed these trends: in the BPV group, 43.8 % of patients maintained the maximum satisfaction score (9 points), and another 46.9 % rated their satisfaction at 8 points, while in the RBL group, only 28.6 % of patients gave a score of 9, and more than 30 % of patients reported scores of ≤ 6 points.

Thus, the analysis of patient satisfaction demonstrates that bipolar vaporization and laser vaporization provide the highest and most stable level of subjective satisfaction in the long-term follow-up period. Despite the rapid recovery of work capacity after RBL, a significant proportion of patients reported lower satisfaction scores, which is likely associated with the higher rate of symptom recurrence. Analysis of hemorrhoid recurrence rates at 6 and 12 months post-treatment revealed clear intergroup differences (Table 5).

At 6 months, no recurrences were observed in the BPVP and LV groups (0 %), while the THD group had 1 case (4.3 %), and the RBL group had a recurrence rate of 14.3 % (p = 0.034 between groups).

At 12 months, the trend remained consistent: the lowest recurrence rates were seen in the BPVP (3.1 %) and LV (4.8 %) groups, with the THD group showing 13.0 % and the RBL group demonstrating the highest rate at 26.2 % (p = 0.018 between groups). Thus, RBL showed the highest recurrence rate, reflecting the lower long-term clinical stability of this technique for treating stage II hemorrhoids.

Overall, the results confirm that bipolar vaporization and laser vaporization provide the most durable effect in preventing symptom recurrence, while THD delivers intermediate results, and RBL carries a significantly higher risk of recurrence in the long-term follow-up. It should be noted that no complications specified in the corresponding domain were recorded in any of the groups during the study.

Discussion

Chronic hemorrhoids remain a significant medical and social issue due to their high prevalence and considerable impact on patients' quality of life [12, 17, 30]. The majority of patients present with stage I (72.9 %) or stage II disease (18.4 %), while stage III–IV cases are relatively rare [30]. Patients with persistent symptomatic stage I–II CH who are refractory to conservative therapy typically require minimally invasive treatment [5, 35].

In modern clinical practice, methods such as RBL, SI, THD, and emborrhoid therapy are commonly employed for stage I–II CH [11, 24, 28, 35]. While these techniques show high efficacy, they are associated with certain limitations, including postoperative pain, recurrence risk, need for repeated procedures, and, in some cases, the requirement for advanced technical equipment (THD, emborrhoid therapy) [11, 24, 28, 35].

Thermal destruction techniques – laser coagulation, radiofrequency ablation, and bipolar coagulation – achieve good outcomes in reducing prolapse and vascularization of hemorrhoidal tissue but require costly equipment and carry risks of complications such as scarring and stenosis [10, 23, 25]. Infrared photocoagulation demonstrates relatively modest long-term efficacy (75–80 % at 1 year) [4, 26].

A novel thermal destruction technique – BVP using the EK-300M – was recently introduced for the treatment of stage I–II CH [5]. In the present study, we conducted a comparative analysis of BPV versus other popular techniques: LV, THD, and RBL.

All studied methods demonstrated an acceptable safety profile. Procedure time was shortest in the RBL group, while the most stable symptom dynamics were observed in the BPVP group. At 12 months post-treatment, residual pain, prolapse, itching, and bleeding were less frequent in the BPV group than in the THD and RBL groups and comparable to LV. Recurrence rates were lowest in the BPV group (3.1 %) and LV group (4.8 %), whereas higher rates were observed in the THD group (13 %) and especially in the RBL group (26.2 %), consistent with published data on the elevated recurrence risk following RBL [24].

Patient satisfaction was highest in the BPV and LV groups, with more than 90 % of patients reporting scores of 8–9 at 12 months. Compared to literature reports on other thermal destruction methods [10, 23, 25], the outcomes for BPV were comparable or superior, with minimal blood loss (8.3 ± 3.7 mL), short postoperative recovery, and sustained symptom resolution.

Importantly, in terms of clinical efficacy, BPV is at least equivalent to LV, and given the lower cost of equipment and consumables, as well as the simplicity of the technique and availability of devices, it offers a higher potential priority for wider clinical implementation.

According to our findings, THD ranks third in priority, providing good clinical results but at a higher cost and technical complexity. In contrast, among the techniques analyzed, RBL demonstrated the lowest priority for stage I–II CH due to the highest recurrence rate, despite its technical simplicity and brief procedural duration.

Conclusions

The data obtained support the potential of BPV as an effective and safe method for treating stage I–II CH. In our study, BPV appears highly suitable for broader clinical use due to its balance of efficacy and accessibility.

All evaluated minimally invasive methods (BPV, LV, THD, RBL) provided an adequate level of efficacy and safety for stage I–II CH. BPV and LV showed the best clinical outcomes, with low recurrence rates and high patient satisfaction. Considering its lower cost, ease of use, and availability, BPV can be recommended as a first-line option for the treatment of stage I–II CH. THD ranks third in priority based on our data.

RBL should be considered a lower priority method for this patient category due to its higher recurrence rate. It should be noted that this study has limitations – a relatively small sample size per group, a single-center design, and a 12-month follow-up period. Further multicenter studies with larger patient cohorts and longer follow-up are required to definitively establish the role of BPV in the comprehensive management of CH.

Declaration of interests

The authors declare no conflict of interest.

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Authors contributions

L. S. Bilianskyi: conception and design, critical revision of the manuscript; I. V. Voloshyn: acquisition, analysis and interpretation of data, statistical analysis, drafting, critical revision of the manuscript.

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Малоінвазивні методики лікування хронічного геморою I—II стадії: результати застосування та пріоритетність

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У сучасній клінічній практиці застосовують такі малоінвазивні методики лікування хронічного геморою (ХГ) I—II ступеня, як лігування латексними кільцями (ЛК), трансанальна гемороїдальна деартеріалізація (ТГД), лазерна вапоризація (ЛВ) тощо. Біполярна вапоризація (БПВ) є новою перспективною методикою термічної деструкції тканин із застосуванням біозварювального генератора «ЕК-300М» («Свармед», Україна). Її ефективність порівняно з іншими методами досі недостатньо вивчена.

Мета — порівняти результати лікування ускладненого ХГ I—II ступеня за допомогою чотирьох малоінвазивних методик (БПВ, ЛВ, ТГД, ЛК) і визначити їхній ранг пріоритетності.

Матеріали та методи. У дослідження було залучено 118 пацієнтів (67 чоловіків і 51 жінка віком від 19 до 70 років, середній вік — (43,1 ± 12,5) року) із симптоматичним ХГ I—II ступеня, резистентним до консервативної терапії. Пацієнтів розподілили на чотири групи залежно від застосованої методики: БПВ (n = 32), ЛВ (n = 21), ТГД (n = 23), ЛК (n = 42). Оцінювали тривалість втручання, частоту інтраопераційних ускладнень, динаміку симптомів (біль, пролапс, кровотеча, свербіж, забруднення), частоту рецидивів, рівень задоволеності лікуванням через 12 міс.

Результати. Усі методики забезпечили достатній рівень ефективності та безпечності. Частота рецидивів через рік становила: у групі БПВ — 3,1 %, у групі ЛВ — 4,8 %, у групі ТГД — 13 %, у групі ЛК — 26,2 %. Рівень задоволеності був найвищим (8—9 балів) у групах БПВ і ЛВ (> 90 % пацієнтів). Методи БПВ та ЛВ продемонстрували найкращу клінічну ефективність і стійкість результатів. За ефективністю ТГД посіла третє місце, а ЛК — найнижче через високу частоту рецидивів.

Висновки. З урахуванням клінічних результатів, доступності та вартості біполярна вапоризація може бути рекомендована як пріоритетна методика для лікування ХГ I—II ступеня. Необхідно провести багатоцентрові дослідження для підтвердження тривалої ефективності.

Ключові слова: хронічний геморой, біполярна вапоризація, малоінвазивні методики, трансанальна дезартеріалізація, лазерна вапоризація, лігування латексними кільцями, результати.

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