



Laser Therapy for Grade II and III Hemorrhoids: Three-year Clinical Experience

II. ve III. Derece Hemoroidlerde Lazer Tedavisi: Üç Yıllık Klinik Deneyim

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ABSTRACT

Aim: Hemorrhoids are difficult to treat. Multiple treatment options are available, supported by heterogeneous evidence. In our study, we aimed to analyze laser therapy's clinical outcomes and effectiveness.

Material and Method: Our study was conducted on 1096 patients who underwent Hemorrhoidal Laser Procedure (HeLP) and were diagnosed with grade II and III hemorrhoids in our general surgery clinic between 2018 and 2021. The patients pre- and post-operative clinical data were obtained from patient files, electronic records, and telephone interviews.

Results: Bleeding and urinary retention were the most common complications in the early period. In the long term, the anal fissure was found to be the most common complication. We detected hemorrhoidal diseases 1.25 times more frequently in males. The patients presented to our clinic with the most common complaints of bleeding and hemorrhoidal syndrome.

Conclusion: The use of laser therapy is an appropriate procedure for grade II and grade III hemorrhoids that do not respond to conservative approaches, which require minimal analgesic use, less need for wound care and very short duration of pain and discomfort, with high patient satisfaction.

Key words: hemorrhoids; laser therapy; prognosis

Introduction

Hemorrhoids affect millions of people around the world. The reported prevalence of hemorrhoids varies between 13–36%, depending on the research method. The most common symptoms are rectal bleeding, pain, anal irritation, and anal mass prolapse¹. Hemorrhoids are difficult to treat. Multiple treatment options are available, supported by heterogeneous evidence. Evidence is conflicting for newer surgical techniques that are claimed to be less painful.

ÖZET

Amaç: Hemoroidlerin tedavisi zordur. Heterojen kanıtlarla desteklenen birden fazla tedavi seçeneği mevcuttur. Çalışmamızda lazer tedavisinin klinik sonuçlarını ve etkinliğini analiz etmeyi amaçladık.

Materyal ve Metot: Çalışmamız, 2018–2021 yılları arasında genel cerrahi kliniğimizde evre II ve III hemoroid tanısıyla Hemoroidal Lazer Prosedürü (HeLP) uygulanan 1096 hasta üzerinde gerçekleştirildi. Hastaların ameliyat öncesi ve sonrası klinik verileri hasta dosyalarından, elektronik kayıtlardan ve telefon görüşmelerinden elde edildi.

Bulgular: Kanama ve idrar retansiyonu erken dönemde en sık görülen komplikasyonlardı. Uzun vadede anal fissürün en sık görülen komplikasyon olduğu bulundu. Hemoroidal hastalıkları erkeklerde 1,25 kat daha sık olduğu tespit edildi. Hastalar kliniğimize en sık kanama ve hemoroidal sendrom şikâyetleriyle başvurdu.

Sonuç: Lazer tedavisinin kullanımı, konservatif yaklaşımlara yanıt vermeyen, minimal analjezik kullanımı, daha az yara bakımı ihtiyacı ve çok kısa süreli ağrı ve rahatsızlık gerektiren, yüksek hasta memnuniyeti sağlayan II. ve III. derece hemoroidler için uygun bir prosedürdür.

Anahtar kelimeler: hemoroidler; lazer tedavisi; prognoz

Conservative medical management, non-surgical treatments, and various surgical techniques are used in the treatment of symptomatic hemorrhoids. Traditionally, the most common open surgery is hemorrhoidectomy and the closed variant technique. These two methods are associated with a high risk of complications, post-operative pain and discomfort². Because of these, clinicians have turned to less invasive solutions for less pain, better control of symptoms, and rapid recovery.

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Non-excisional laser treatments are emerging treatment modalities for Grade II and III hemorrhoidal disease. It is particularly useful in Grade I-II hemorrhoids where prolapse is less important³. It was reported in previous studies that the improvement of symptoms in Grade II and III hemorrhoids with laser treatments varies between 83.6% and 100%. The recurrence rates were reported as 5–11.3%⁴. In this context, non-excisional laser treatments are safe and effective in cases resistant to conservative treatments and Grade I, II, and III hemorrhoids^{4,5}. The success rate of non-excisional laser treatments is low in Grade IV hemorrhoids, with a recurrence rate of 59.3%. Surgical methods are recommended for these cases. Conventional hemorrhoidectomy continues to be the main treatment for Grade IV hemorrhoids because of the presence of inductive prolapse and hypertrophic skin findings^{6,7}.

The hemorrhoidal laser procedure (HeLP) is a minimally invasive and painless procedure in which a special laser device diminishes and shrinks the terminal branches of the superior hemorrhoidal artery to treat symptomatic grade II and grade III hemorrhoids⁸. In our study, we aimed to analyze laser therapy's clinical outcomes and effectiveness.

Method

Our study was conducted on 1096 patients who underwent Laser hemorrhoidoplasty (LHP) diagnosed with grade II and III hemorrhoids in our general surgery clinic between January 2018 and December 2021. The patient's pre- and post-operative clinical data were obtained from patient files, electronic records, and telephone interviews. The inclusion criteria of the patients were determined as symptomatic grade II and grade III hemorrhoids whose symptoms persisted or recurred despite medical treatment. In our clinic, managing hemorrhoids depends on the type and severity of hemorrhoids, the preference of the patient and our clinical experience. It is primarily diet, lifestyle change, medical and conventional treatment for Grade I-II hemorrhoids. We primarily use local analgesics, anesthetic pomades and steroid-containing creams, suppository and laxative drugs in acute hemorrhoidal symptoms. Traditional methods are 15-minute hot water sitz baths 3–4 times daily and cleaning the perianal area with soapy water. Most commonly, oral flavonoids are used in our clinic [(Diosmin 450 mg+Hesperidin 50 mg), (Daflon[®], Servier, France)] combined to control acute hemorrhoid symptoms 3000 mg/day for 4 days, 2000

mg/day for 3 days or calcium Dobesilate 1000 m/day. Our main target is to control the symptoms. The cases in which we failed with these treatment methods and Grade II and Grade III cases who failed with medical and conventional treatment in other clinics were included in the study. The LHP Procedure was applied to these cases. Low-grade hemorrhoids resistant to medical and conventional treatment, treatment non-compliance because of treatment duration and length of recovery (3–4 weeks), and relapse cases after medical treatment were determined as conservative treatment failure. Patients with liver cirrhosis, bleeding diathesis, chronic liver disease, inflammatory bowel disease, perianal abscess, patients younger than 18 years of age and those diagnosed with colorectal cancer and other malignancies were excluded from the study.

All patients were admitted on the morning of the operation day. Patients were allowed to eat and drink 8–10 hours before the operation. Bowel preparation was not deemed necessary. Two enemas were administered 2 hours before the intervention. The laser procedure was performed as a 1-day surgical procedure. After the detailed physical examination and proctoscopy, the LHP was performed using a 1470 nm diode laser. All surgical procedures were performed by the same surgeons experienced in coloproctological surgery. Spinal and/or local anesthesia was administered according to the clinical conditions of the patients. The LHP was performed in the lithotomy position. A disposable proctoscope was inserted into the anal canal. Standard five-six shots were made to each hemorrhoid pack with a 1470 diode laser probe. A hemorrhoid probe (a conical glass-tipped optical fiber) treats hemorrhoid pile with LHP. The glass tip of this probe provides energy transmission, while the distal, sharp tip helps to enter the hemorrhoidal tissue easily. Disposable optical fiber is used in these processes. The optical fiber is first connected to the laser unit (NeoLaser, HaEshel 7, 3088900, Caesarea Business Park, Israel). The laser unit is 980–1470 nm, 30–45J, 7–15.0 W/1–3 sec in this laser device. The tissues are energized homogeneously in 5–6 blows into each hemorrhoid pile. The energy dose for each pile of hemorrhoids was 50–100 J/cm in our clinic. In this way, each pile of hemorrhoids is sealed thermally. The hemorrhoid pile is cooled externally after the procedure, during which hemorrhoidal artery ligation is not performed simultaneously. The execution of the LHP process is shown in Figure 1. The patients were discharged 12–18 hours after the procedure. 1–3 months of follow-up data were analyzed regarding recovery, pain, return to normal

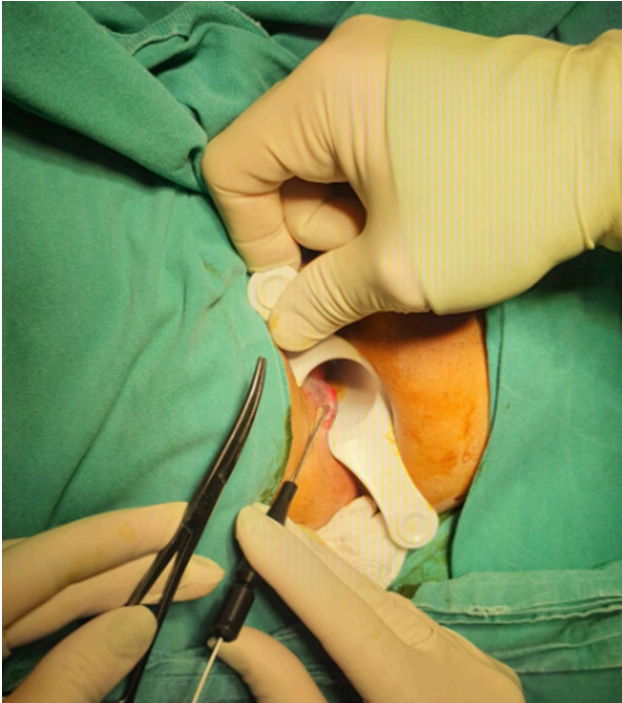


Figure 1. The LHP process.

life, and early complications. The patients were followed up for an average of 1.3 ± 0.7 years regarding the success of the LHP method and late complications. The data were analyzed with statistical tests and presented with related tables and graphs. The present study was conducted in line with the ethical rules and the decision of the Medicana International Samsun Hospital Clinical Research Ethics Committee, dated 04.10.2021, with the number 7154.

Statistical Analysis

Data were expressed as mean \pm standard deviation (SD). We compared chi-square statistics for categorical data, categorical variables (n) as percentages, and unpaired Student's t-test for continuous variables. Normally distributed variables were compared by the independent sample t-test, while non-normally distributed variables were compared by the Mann-Whitney test. The value of $p < 0.05$ was considered statistically significant. Data were analyzed using SPSS program software (IBM Statistical Package for the Social Sciences, version 22.0, Chicago).

Results

A total of 1096 (486 females, 610 males) patients were included in the study. The age of the patients was 48 ± 11.4 years. We detected hemorrhoidal diseases 1.25 times more frequently in males. The most common clinical finding in the patients was found to be bleeding. The clinical complaints that brought the patients to the hospital were bleeding 77.5% ($n=850$), prolapse of the anal mucosa 39.5% ($n=433$), hemorrhoidal syndrome (pain, anal itching, discharge, anal fullness) 23.2% ($n=255$). Clinical complaints were not one single complaint, but these symptoms were present in many cases. The most common risk factors for hemorrhoids were constipation and pregnancy. Before the LHP, 16.1% of the patients needed analgesics. Demographic and pre-operative clinical data of the patients with grade II and III hemorrhoids are presented in Table 1.

Table 1. Demographic and pre-operative clinical data of patients with grade II and III hemorrhoids

Parameters	n (%) / Mean \pm SD	
Sociodemographic information	Sex, female	504 (45.9)
	Age (years)	48 ± 11.4
	Number of patients	1096
	Length of follow-up	1.3 ± 0.7
Hemorrhoid symptoms of patients	Grade II hemorrhoids	Grade III hemorrhoids
	262 (23.9%) n (%)	834 (76.0%) n (%)
Bleeding	167 (63.7)	683 (81.8)
Hemorrhoidal syndrome	47 (17.9)	208 (24.9)
Prolapsed hemorrhoid	0	433 (51.9)
Thrombosed hemorrhoid	0	85 (10.1)
Early pre-operative period analgesic need (nonsteroidal anti-inflammatory drugs, paracetamol)	11 (4.1)	166 (19.9)
Epidemiology and risk factors of hemorrhoids		
Constipation	148 (56.4)	522 (62.5)
Pregnancy	64 (24.4)	209 (25.0)
Diarrhea	5 (1.9)	17 (2.0)
Others (nutrition, socioeconomic level)	45 (17.1)	86 (10.3)

* whole cohort-n (%); SD: standard deviation.

Table 2. Intra- and post-operative clinical data of patients with grade II and III hemorrhoids

Parameters	Mean \pm SD	
Duration of surgery, minutes \pm SD	16.8 \pm 7.8	
Return to regular activity, days \pm SD	11.2 \pm 4.8	
Distribution of patients according to grade II and III hemorrhoids	Grade II hemorrhoids 262 (23.9%)	Grade III hemorrhoids 834 (76.0%)
	n (%) / Mean \pm SD	n (%) / Mean \pm SD
Length of hospital stay (hours)	14.3 \pm 4	16.3 \pm 2
Need for blood transfusion	0	0
Early post-operative period analgesic need (nonsteroidal anti-inflammatory drugs, paracetamol, opioids) (days)	0–3	0–7
Relapse or recurrence	8 (3.0)	56 (6.7)
Urinary retention	6 (2.2)	42 (5.0)
Early complications		
Abscess	0	8 (0.9)
Bleeding	21 (8.0)	86 (10.3)
Long-term complications		
Anal fissure	4 (1.5)	32 (3.8)
Stenosis	0	2 (0.23)
Incontinence	0	2 (0.23)

* whole cohort-n (%); SD: standard deviation.

The LHP treatment time was 16.8 \pm 7.8 hours. The duration of analgesic use in all patients in the early post-operative period was 0–7 days. In the early period, bleeding was detected at 9.7%. Clinical follow-up of the patients was performed at 6-month intervals. The recurrence and/or recurrence rate during the follow-up was 5.8% (n=64). The mean time to relapse was 15.4 \pm 8.6 months. Recurrence was determined by considering the patient's examination and symptoms. Bleeding again was found in 16 of these patients, bleeding and prolapse in 24 patients, only prolapse in 14 patients, and hemorrhoidal syndrome findings in 10 patients. The predictive factor for recurrence was a thrombosed external hemorrhoid attack. The most common risk factors are constipation and inability to maintain a diet (intensive use of spices in meals). The relapse and/or recurrence rate at follow-up was 5.8%. Bleeding and urinary retention were the most common complications in the early period. In the long term, the anal fissure was found to be the most common complication. Intra- and post-operative late clinical data of the patients are shown in Table 2.

Discussion

Hemorrhoid disease is usually classified by the classic Goligher staging⁹. We used the Goligher staging in our study. We conducted the study on grade II and grade III hemorrhoids. Hemorrhoids can manifest with various symptoms, such as rectal bleeding and prolapse, anal

pain, and anal itching. Rectal bleeding, usually painless and associated with defecation, is the most common symptom¹⁰. In our study, the most common complaint at admission to our clinic was rectal bleeding.

Risk factors for hemorrhoids are factors associated with excessive straining and/or increased intra-abdominal pressure (constipation, hard stools, pregnancy)¹¹. Constipation and/or hard stools are believed to be the most common cause of hemorrhoids¹². Some studies did not show a significant relationship between hemorrhoids and constipation¹³. Some reports asserted that diarrhea was a risk factor for the development of hemorrhoids¹⁴. It may predispose to symptomatic hemorrhoids during pregnancy. Many dietary factors were also blamed, including a low-fiber diet, spicy foods, and alcohol intake¹¹. In our study, we determined that the risk for hemorrhoids was constipation and pregnancy, and less frequently, nutritional and dietary factors, socioeconomic level, and diarrhea.

Studies showed that laser hemorrhoid treatments were safe. Bleeding was reported to be the most common complication in the early period. It was shown in many different studies that bleeding occurred at 5.5–16.7% in treatment with the LHP. Total post-operative complications after the LHP were found to be 23.3%¹⁵. In our study, complications after the HeLP approach are consistent with the literature data. Bleeding was common in the early period at a rate of 9.7%. We found that all post-operative complications were 14.1%. In studies, relapse and/or recurrence rates were reported

as 5–9.4% in short-term follow-ups^{16,17}. In long-term follow-up, the recurrence rate was 34% during a mean follow-up of 5.4 years¹⁸. Our study found a recurrence rate of 5.8% after 1.3 ± 0.7 years of follow-up. It is observed in the studies that the complication rates of the HeLP method decrease, and the success performance increases as the clinical experience increases.

Urinary retention, one of the morbidities after the LHP, was found at a rate of 4.1–20.1% (18,19). In the early period, infection and/or abscess was 1%¹⁹. Our study found the frequency of urinary retention to be 4.3%. We showed that infection or abscess developed at a rate of 0.9% among the early complications. Among the long-term complications, it was shown in studies that anal fissure occurred at a rate of 1–2.6%, anal stenosis at a rate of 1%, and anal incontinence at a rate of 0.4%³. In our study, we found the frequency of long-term complications to be 3.2% for anal fissure, 0.2% for anal stenosis, and 0.2% for anal incontinence. When the literature is reviewed, short and long-term complications are observed to be very rare, as in our study. Our study and other studies show that the LHP method is new, non-excisional, mini-invasive, safe, and successful in patients with grade II and III hemorrhoids. It can be preferred as the first method when conservative treatments are unsuccessful.

Studies indicated the advantages of rapid return to normal life and low post-operative pain after the LHP²⁰. It is known that there are significant differences between post-operative analgesia studies^{19,20}. In our study, the duration of post-operative analgesic use was 0–7 days, and many of our patients did not receive any analgesics. Return to regular activity after the LHP was 11.2 ± 4.8 days.

The LHP technique is a minimally invasive, painless, safe and fast procedure with high efficacy, as in our study, in patients affected by grade II and III hemorrhoid disease. When our findings are compared with other methods in the literature, we think that the use of this technique is an appropriate procedure for grade II and grade III hemorrhoids that do not respond to conservative approaches, which requires minimal analgesic use, less need for wound care and very short duration of pain and discomfort, with high patient satisfaction.

Ethical Approval

This study was conducted in accordance with the ethical rules with the approval of Medicana International

Samsun Hospital clinical research ethics committee (decision no 7154, 04.10.2021).

Patient's Consent

The study was carried out retrospectively by examining patient records with the approval of the institution.

Conflict of Interest

The authors declared no conflict of interest.

References

1. Ram E, Bachar GN, Goldes Y, Joubran S, Rath-Wolfson L. Modified Doppler-guided laser procedure sort he treatment of second- and third-degree hemorrhoids. *Laser Ther.* 2018;27(2):137–142. Doi: 10.5978/islm.18-OR-14. PMID: 30087534; PMCID: PMC6062676.
2. Gerbershagen HJ, Aduckathil S, van Wijck AJ, Peelen LM, Kalkman CJ, et al. Pain intensity on the first day after surgery: a prospective cohort study comparing 179 surgical procedures. *Anesthesiology.* 2013;118(4):934–44. Doi: 10.1097/ALN.0b013e31828866b3. PMID: 23392233.
3. Weyand G, Theis CS, Fofana AN, Rüdiger F, Gehrke T. Laser hämorrhoidoplastie mit dem 1470-nm-Diodenlaser in der Behandlung des zweit- bis viertgradigen Hämorrhoidalleidens - eine Kohortenstudie mit 497 Fällen [Laser hemorrhoidoplasty with 1470 nm Diode Laser in the Treatment of Second to Fourth Degree Hemorrhoidal Disease - a Cohort Study with 497 Patients]. *Zentralbl Chir.* 2019;144(4):355–363. German. doi: 10.1055/s-0043-120449. Epub 2017 Nov 29. PMID: 29186745.
4. El Nakeeb AM, Fikry AA, Omar WH, Fouda EM, El Metwally TA, et al. Rubber band ligation for 750 cases of symptomatic hemorrhoids out of 2200 cases. *World J Gastroenterol.* 2008;14(42):6525–30. doi: 10.3748/wjg.14.6525. PMID: 19030206; PMCID: PMC2773340.
5. Karahaliloglu AF. "First results after laser obliteration of first-and second-degree hemorrhoids. " *Coloproctology* 29. 6(2007):327–336.
6. Altomare DF, Giuratrabocchetta S. Conservative and surgical treatment of haemorrhoids. *Nat Rev Gastroenterol Hepatol.* 2013;10(9):513–21. doi:10. 1038/nrgastro. 2013. 91. Epub 2013 Jun 11. PMID: 23752820.
7. Giordano P, Overton J, Madeddu F, Zaman S, Gravante G. Transanal hemorrhoidal dearterialization: a systematic review. *Dis Colon Rectum.* 2009;52(9):1665–71. doi: 10.1007/DCR.0b013e3181af50f4. PMID: 19690499.
8. De Nardi P, Tamburini AM, Gazzetta PG, Lemma M, Pascariello A, et al. Hemorrhoid laser procedure for second- and third-degree hemorrhoids: results from a multicenter prospective study. *Tech Coloproctol.* 2016;20(7):455–9. Doi: 10.1007/s10151-016-1479-6. Epub 2016 May 11. PMID: 27164931.

9. Rubbini M, Ascanelli S. Classification and guidelines of hemorrhoidal disease: Present and future. *World J Gastrointest Surg.* 2019;11(3):117–121. Doi: 10.4240/wjgs.v11.i3.117. PMID: 31057696; PMCID: PMC6478596.
10. Hardy A, Chan CL, Cohen CR. The surgical management of haemorrhoids—a review. *Dig Surg.* 2005;22(1–2):26–33. Doi: 10.1159/000085343. Epub 2005 Apr 14. PMID: 15838168.
11. Lohsiriwat V. Hemorrhoids: from basic pathophysiology to clinical management. *World J Gastroenterol.* 2012;18(17):2009–17. Doi: 10.3748/wjg.v18.i17.2009. PMID: 22563187; PMCID: PMC3342598.
12. Loder PB, Kamm MA, Nicholls RJ, Phillips RK. Haemorrhoids: pathology, pathophysiology and aetiology. *Br J Surg.* 1994;81(7):946–54. Doi: 10.1002/bjs.1800810707. PMID: 7922085.
13. Pigot F, Siproudhis L, Allaert FA. Risk factors associated with hemorrhoidal symptoms in specialized consultation. *Gastroenterol Clin Biol.* 2005;29(12):1270–4. Doi: 10.1016/s0399-8320(05)82220-1. PMID: 16518286.
14. Johanson JF, Sonnenberg A. Constipation is not a risk factor for hemorrhoids: a case-control study of potential etiological agents. *Am J Gastroenterol.* 1994;89(11):1981–6. PMID: 7942722.
15. Longchamp G, Liot E, Meyer J, Toso C, Buchs NC, Ris F. Non-excisional laser therapies for hemorrhoidal disease: a systematic review of the literature. *Lasers Med Sci.* 2021;36(3):485–496. doi: 10.1007/s10103-020-03142-8. Epub 2020 Sep 10. PMID: 32914275; PMCID: PMC7952353.
16. Giamundo P, Salfi R, Geraci M, Tibaldi L, Murru L, et al. The hemorrhoid laser procedure technique vs rubber band ligation: a randomized trial comparing 2 mini-invasive treatments for second- and third-degree hemorrhoids. *Dis Colon Rectum.* 2011;54(6):693–8. Doi: 10.1007/DCR.0b013e3182112d58. Erratum in: *Dis Colon Rectum.* 2012;55(4):497. PMID: 21552053.
17. Naderan M, Shoar S, Nazari M, Elsayed A, Mahmoodzadeh H, Khorgami Z. A Randomized Controlled Trial Comparing Laser Intra-Hemorrhoidal Coagulation and Milligan-Morgan Hemorrhoidectomy. *J Invest Surg.* 2017;30(5):325–331. doi: 10.1080/08941939.2016.1248304. Epub 2016 Nov 2. PMID: 27806213.
18. Giamundo P, De Angelis M, Mereu A. Hemorrhoid laser procedure with suture-pexy (HeLPexx) : a novel effective procedure to treat hemorrhoidal disease. *Tech Coloproctol.* 2020;24(2):199–205. doi: 10.1007/s10151-020-02152-6. Epub 2020 Jan 28. PMID: 31993838.
19. Rubber band ligation versus excisional haemorrhoidectomy for haemorrhoids. *Cochrane Database Syst Rev.* 2005;(3): CD005034. doi: 10.1002/14651858.CD005034.pub2. PMID: 16034963.
20. Faes S, Pratsinis M, Hasler-Gehrer S, Keerl A, Nocito A. Short- and long-term outcomes of laser haemorrhoidoplasty for grade II-III haemorrhoidal disease. *Colorectal Dis.* 2019;21(6):689–696. doi: 10.1111/codi.14572. Epub 2019 Feb 20. PMID: 30702197.