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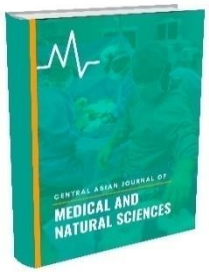

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Evaluation of the Quality of the Early Postoperative Period with the Use of the Hemostatic Agent Chemoben in Combination with Laser Influence in Thyroid Surgery

1. **Mansurov Sh. Sh.**
2. **Kasymov A. L.**

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[1,2] Andijan State Medical Institute

Key words: goiter, thyroidectomy, subtotal thyroidectomy, hemithyroidectomy, bipolar coagulation, local hemostasis, chemobene, laser irradiation.

Abstract: The article presents the results of clinical application of the method of local intraoperative hemostasis and improvement of reparative processes during operations on the thyroid gland. For clinical evaluation of the effectiveness of the proposed method, two study groups were formed for 237 patients with mixed, nodular and diffuse toxic goiter. The main group consisted of 98 patients, and the comparison group - 139. In the main group of operated patients, hemostasis was carried out according to the method developed by us, and in the comparison group, by traditional methods. Surgery included thyroidectomy, hemithyroidectomy, and subtotal thyroidectomy. In the main group of patients, for the purpose of hemostasis, Hemoben powder crystals with a size of 25-50 microns were used at the rate of 200 mg per area of 8-9 cm2, which was applied over the wound with a thin layer until a thin translucent film was formed, followed by irradiation of the wound with low-energy laser radiation (Sogdiana apparatus) with a wavelength of 0.89 microns, a frequency of 500 Hz for 2 minutes at a distance of 5 cm from the wound; then, for 5-7 days, percutaneous irradiation sessions with the same laser at a frequency of 80 Hz were performed daily in the projection of the surgical wound. The study showed that the use of the domestic hemostatic agent Hemoben provides complete hemostasis, and the addition of the technique by treating the surgical field with low-intensity laser radiation enhances the reparative properties of the drug. The proposed method of local hemostasis and improvement of reparative processes during operations on the thyroid gland is characterized by a quick, effective and stable stop of bleeding, and also due to intra- and postoperative laser exposure, the course of the early postoperative period improves.

INTRODUCTION

According to the World Health Organization, “in the world, more than 750 million people are affected by the pathology of the thyroid gland (TG), while in 64-84% of cases these are nodular formations.” “The prevalence of this pathology is 0.8-1.3% among men, while among women this figure reaches 5.3-6.4%, increasing to 20% over the age of 50.” Operations on the thyroid gland always require an individual approach, are characterized by extreme technical complexity and a high rate of complications [9]. This is due to the presence of rough scars and a pronounced adhesive process, as well as increased intraoperative bleeding of scar tissue [5,6]. When performing repeated surgery, the frequency of specific complications always increases: the probability of damage to the recurrent nerve increases to 11-15%, hypothyroidism - up to 3-3.8%, bleeding - from 3% to 9% or more [1,10]. With DTG, the own capsule fuses with the tissue of the thyroid gland, which makes its separation very traumatic, time-consuming and, in some cases, leads to damage to the laryngeal nerve and diffuse bleeding. The frequency of intraoperative bleeding according to the literature ranges from 0.1 to 4.3% [1].

Postoperative hematoma occurs from 0.1% to 9.1% and is diagnosed mainly in the first hours after the intervention [1]. Reliable hemostasis in thyroid surgery is the key to a successful surgical intervention with a minimum number of complications [2,4,7]. The use of new technologies allows to reduce intraoperative blood loss, reduce the time of surgery and the length of stay of the patient after surgery, reduce pain in the intervention area, thereby reducing the number of early postoperative complications. [3,6,8]. The use of hemostatic agents in thyroid surgery is widely described in the literature, but their effectiveness in preventing postoperative bleeding remains controversial, so it is important to find ways to reduce the risk of postoperative complications by improving the method of intraoperative hemostasis.

However, experimental and clinical studies on the use of various hemostatic substances in thyroid surgery are not a large number.

The issue of clear indications for the use of local hemostatic agents in thyroid surgery also remains unresolved. In this connection, the development and use of highly effective domestic hemostatic agents of local importance is an urgent task of modern clinical medicine.

The aim of the study is to improve the results of surgical interventions on the thyroid gland by reducing the risk of early postoperative complications by improving the method of achieving hemostasis and enhancing reparative activity**.**

MATERIALS AND METHODS

General characteristics of clinical material

For clinical evaluation of the effectiveness of the proposed method of supplementing the hemostatic and anti-inflammatory effect of various operations on the thyroid gland, two study groups were formed from 237 patients with thyroid pathology requiring surgical treatment. All patients were operated on at the clinic of the Andijan State Medical Institute and at the Endocrine Surgery Department of the Andijan Regional Endocrinological Dispensary for the period from 2020 to March 2023. All patients were divided into two groups. The main group included 98 patients operated on from 2022 to March 2023. using the proposed method of operation. The comparison group consisted of 139 patients who were operated on in 2020-2021. according to the traditional scheme of operations. Taking into account the fact that this study is aimed at evaluating the effectiveness of the intraoperative use of the domestic drug "Hemoben" in interventions on the thyroid gland, the criterion for inclusion in the analysis was only the presence of a benign pathology with the need for resection or total removal of the organ. Patients with diseases such as mixed goiter, nodular goiter and diffuse toxic goiter are included.

Our experimental studies on laboratory animals - white b / p male rats weighing 320-350 g in the amount of 24 individuals made it possible to identify the main advantages of the intraoperative use of the domestic hemostatic agent Hemoben. To assess the effect of hemostasis, an extended resection was performed not only of the left lobe of the thyroid gland, but also of the left and lower submandibular lymphatic and salivary glands. This contributed to causing profuse bleeding, and also created the possibility of assessing the inflammatory and adhesive process in this area in the experiment. In the control group of animals, intraoperative hemostasis was carried out by bipolar electrocoagulation, and in the experimental group, for the purpose of hemostasis, the hemostatic agent Hemoben was used in combination with laser irradiation. Hemoben hemostatic powder retains its hemostatic properties for a long time when incisions are made in the experimental area of the neck. This, in turn, allows for the management and prevention of bleeding during operations on organs and tissues with a high risk of bleeding in the neck. It has been proven that this drug contributes to the achievement of stable hemostasis. At the same time, the addition of the operation with low-energy laser irradiation of the intervention area enhances local reparative processes. In turn, the combined action of these two agents, namely chemical - Hemoben powder and physical - laser exposure, against the background of accelerated regeneration processes, reduces the risk of a rough adhesive process. These factors made it possible to determine directions for the development of a method for use in clinical practice.

RESULTS AND DISCUSSION

Surgical interventions included total thyroidectomy (TTE), hemithyroidectomy (TTE), and subtotal thyroidectomy (STTE) (Table 1).

Table 1. Distribution of patients into groups for research, depending on the pathology of the thyroid gland and the type of operation

The volume of surgical interventions	Mixed goiter		nodular goiter		DTG		Total	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Comparison group								
Thyroidectomy	59	42,4%	34	24,5%	15	10,8%	108	77,7%
Hemithyroidectomy	0	0,0%	17	12,2%	0	0,0%	17	12,2%
Subtotal thyroidectomy	12	8,6%	0	0,0%	2	1,4%	14	10,1%
Total	71	51,1%	51	36,7%	17	12,2%	139	100,0%
Main group								
Thyroidectomy	41	41,8%	24	24,5%	11	11,2%	76	77,6%
Hemithyroidectomy	0	0,0%	12	12,2%	0	0,0%	12	12,2%
Subtotal thyroidectomy	9	9,2%	0	0,0%	1	1,0%	10	10,2%
Total	50	51,0%	36	36,7%	12	12,2%	98	100,0%
All patients								
Thyroidectomy	100	42,2%	58	24,5%	26	11,0%	184	77,6%
Hemithyroidectomy	0	0,0%	29	12,2%	0	0,0%	29	12,2%
Subtotal thyroidectomy	21	8,9%	0	0,0%	3	1,3%	24	10,1%
Total	121	51,1%	87	36,7%	29	12,2%	237	100,0%

The task is to develop a method of local hemostasis, which involves achieving effective hemostasis, reducing the inflammatory process and preventing the development of adhesions.

In the comparison group, during operations on the thyroid gland, intraoperative hemostasis was carried out by traditional methods, and in the main group, according to the method of local intraoperative hemostasis developed by us.

The method of local intraoperative hemostasis

The method is distinguished by the following technical points after performing the main stages of the operation on the thyroid gland:

- for intraoperative hemostasis to stop bleeding, crystals of domestic hemostatic powder Hemoben 25-50 microns in size were used at the rate of 200 mg per area of 8-9 cm2, which is applied over the wound in a thin layer until a thin translucent film is formed;
- further, the wound was irradiated with low-energy laser radiation (domestic apparatus "Sogdiana") with a wavelength of 0.89 microns, a frequency of 500 Hz for 2 minutes at a distance of 5 cm from the wound;

then, for 3-7 days (depending on the volume of the surgical intervention), daily sessions of irradiation with the same laser at a frequency of 80 Hz were performed percutaneously over the projection of the surgical field.

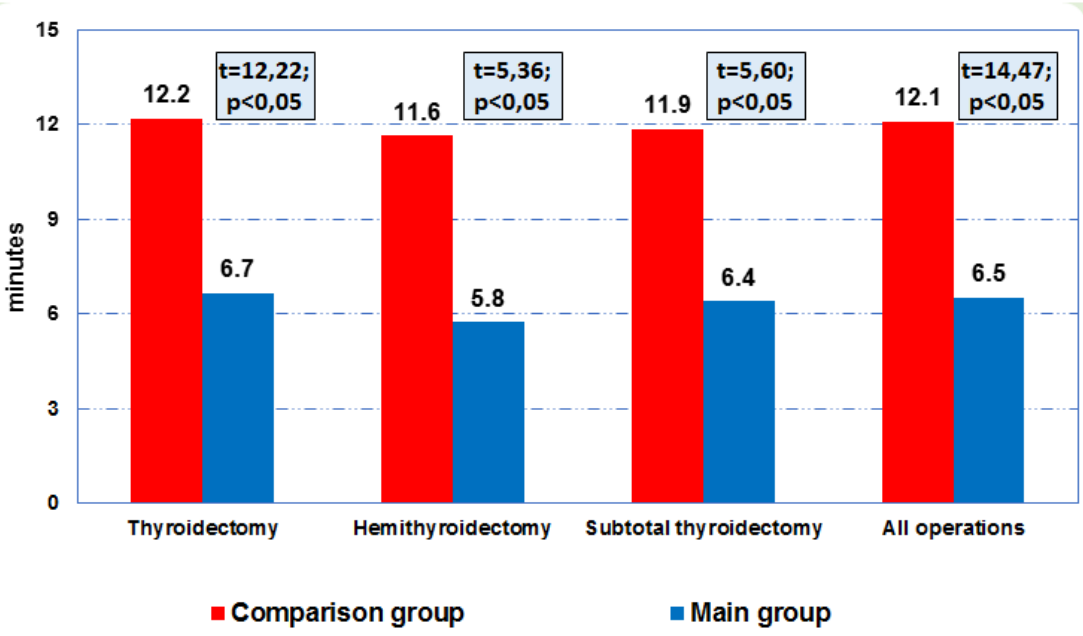
The following advantages of using this method are highlighted:

- fast, effective and stable hemostasis;
- minimal damage to the tissues of the parenchyma of the gland, including electrocoagulation;
- prevention of lymphorrhea and accumulation of seroma in the wound;
- no need to remove excess hemostatic Hemoben from the wound;
- reduction of the inflammatory process during laser exposure with a frequency of 500 Hz;

prevention of connective tissue growth and scar formation under laser exposure with a frequency of 80 Hz.

To assess the quality of the course of the early postoperative period in the study groups, we traced some intraoperative indicators: the duration of the period of intraoperative hemostasis, the duration of the operation, as well as the intensity of the pain syndrome according to VAS, the volume and indicator of hemoglobin by drainage and the timing of their removal.

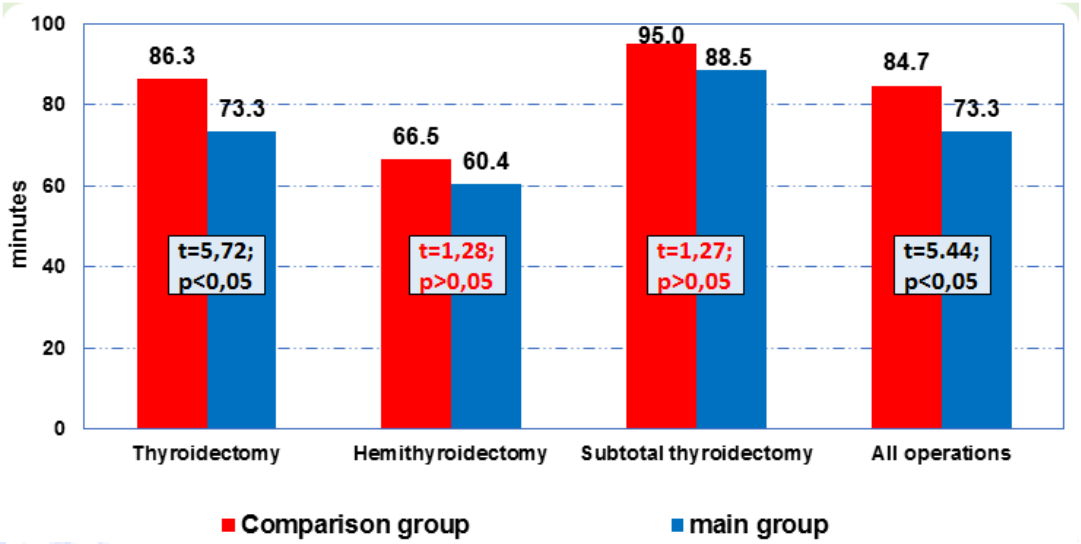
The diagram shows the average duration of the period of intraoperative hemostasis (Pict. 1).



Pict. 1. The duration of the period of intraoperative hemostasis (minutes: M±δ)

If there are practically no differences in time between the types of operations, then a significant significant difference in the periods of hemostasis was noted between the groups. So, with TTE in the main group, due to the use of a new method of hemostasis, the time to stop bleeding decreased from 12.2±4.1 minutes to 6.7±2.0 minutes (t=12.22; p<0.05). A similar picture was observed with GTE: in the comparison group - 11.6±4.0 minutes, in the main group - 5.8±1.8 minutes (t=5.36; p<0.05). With STTE: in the comparison group - 11.9±3.1 minutes, in the main group - 6.4±1.6 minutes (t=5.60; p<0.05). To summarize, it turns out that due to the use of the hemostatic agent Chemoben in combination with low-energy laser exposure during operations on the thyroid gland, the average time of hemostasis during surgery was reduced from 12.1±3.9 minutes to 6.5±1.9 minutes (t=14,47; p<0,05).

Accordingly, this somehow affected the duration of the entire operation (Pict. 2). With GTE and STT the difference was insignificant, but with TTE there was a significant difference in the reduction in the duration of the operation from 86.3±19.5 minutes to 73.3±11.2 minutes (t=5.72; p<0.05). The analysis of all operations also revealed a significant difference with a decrease in the operation time from 84.7±19.5 minutes to 73.3±12.9 minutes (t=5,44; p<0,05).



Pict. 2. Duration of the whole operation (minutes): M±δ)

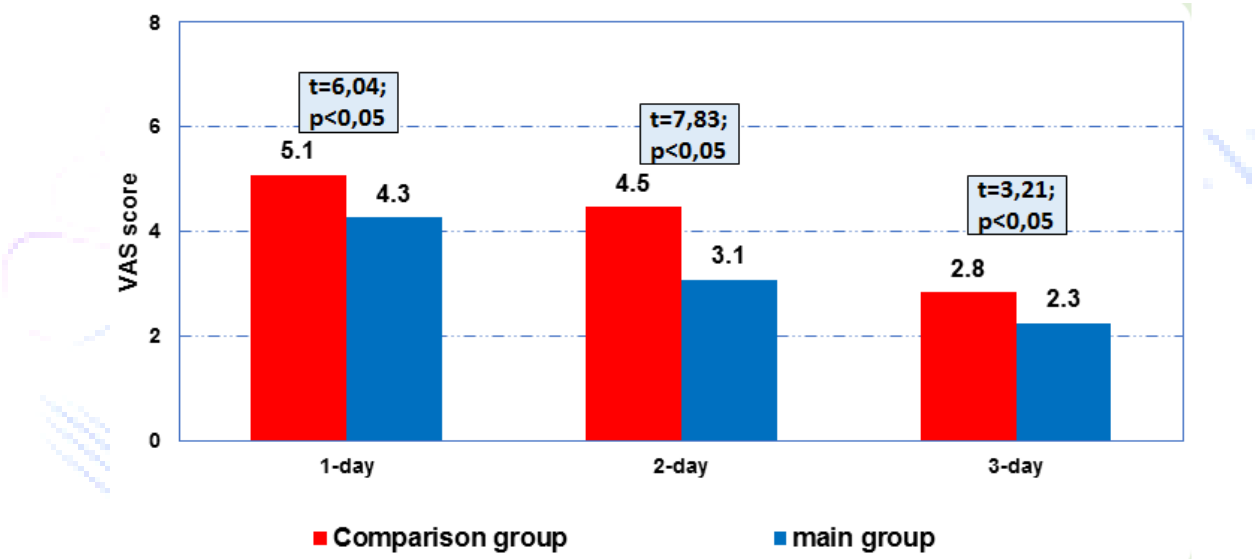
Thus, clinical studies have shown that the use of the proposed method in operations on the thyroid gland made it possible to reduce the intraoperative time to achieve hemostasis from 12.1±3.9 to 6.5±1.9 minutes (t=14.47; p<0 .05), the total duration of surgery from 84.7±19.5 to 73.3±12.9 minutes (t=5.44; p<0.05). This fact confirms the good and rapid hemostatic effect of the domestic drug Hemoben in interventions on the thyroid gland, which makes it possible to recommend it with confidence for widespread use in these types of operations.

When analyzing the intensity of the pain syndrome after surgery, there was a significant difference in the groups throughout the postoperative period, both in TTE, and in GTE and STTE (Table 2).

We combined the indicators of all operations and obtained average data on the intensity of the pain syndrome (Fig. 3). Already on the first day of the postoperative period, there was a significant difference in the reduction of pain from 5.1±0.9 points to 4.3±1.1 points (t=6.04; p<0.05). A similar picture was observed in the second: decrease in pain from 4.5±1.2 points to 3.1±1.5 points (t=7.83; p<0.05); and on the third day: decrease in pain syndrome from 2.8±1.5 points to 2.3±1.4 points (t=3,21; p<0,05).

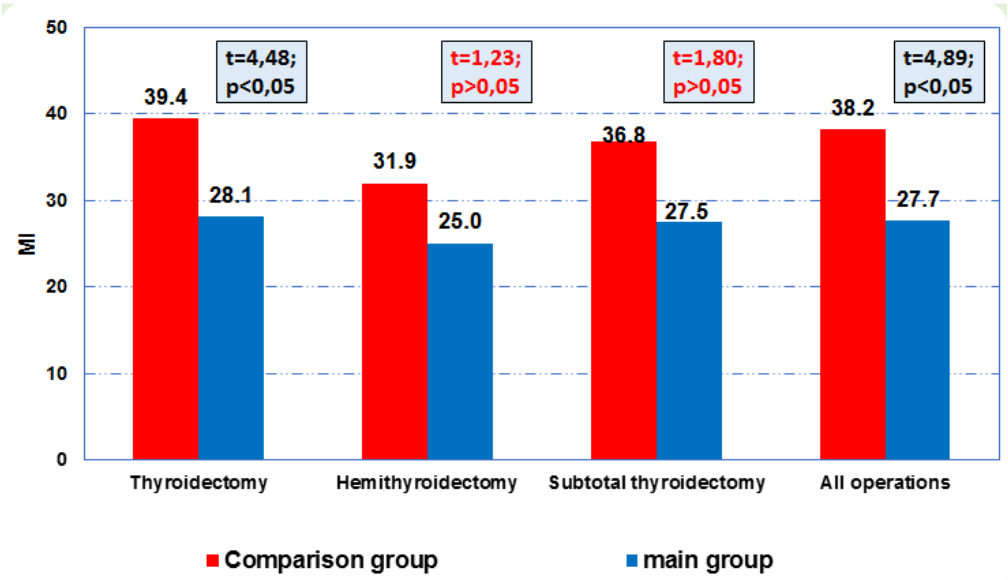
Table 2. Intensity of pain syndrome after various operations according to VAS (points: M±δ)

Day	Comparison group		Main group		Reliability	
	M	δ	M	δ	t	P
TTE						
1 day	5,2	0,9	4,3	1,1	5,39	<0,05
2 day	4,6	1,2	3,1	1,4	7,63	<0,05
3 day	2,9	1,5	2,4	1,3	2,33	<0,05
HTE						
1 day	4,7	0,8	3,9	0,7	2,76	<0,05
2 day	3,9	0,7	2,9	0,9	3,38	<0,05
3 day	2,7	1,1	1,8	0,7	2,57	<0,05
STTE						
1 day	4,9	0,9	4,2	0,5	2,56	<0,05
2 day	4,1	0,9	3,0	0,9	2,91	<0,05
3 day	2,9	0,9	1,8	1,3	2,25	<0,05



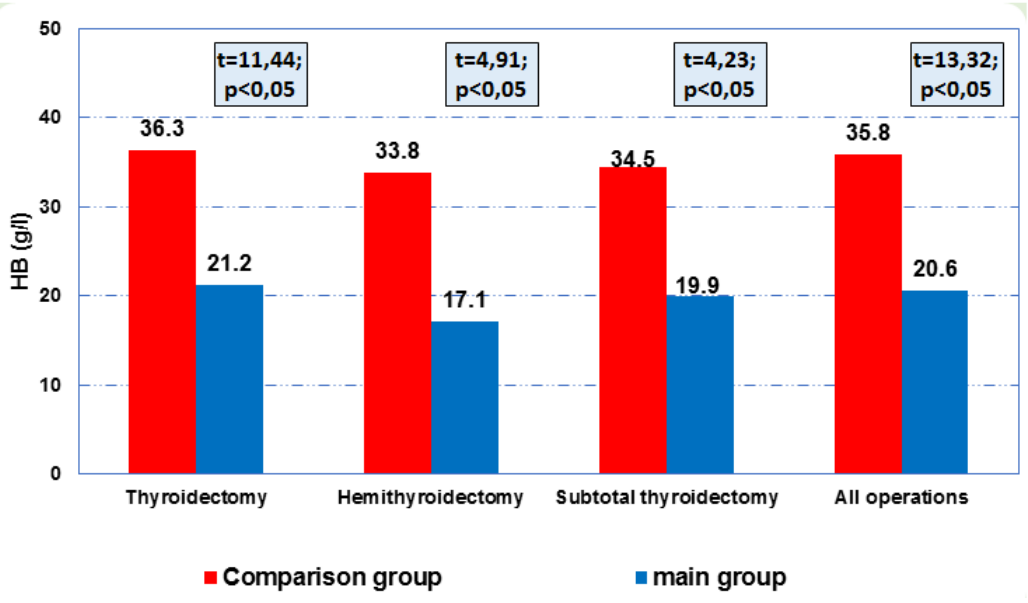
Pict. 3. Pain syndrome intensity after all operations according to VAS (points: M±δ)

Undoubtedly, good hemostasis inversely affects the amount of discharge from the drainage. The introduction of our processing method significantly reduced the amount of discharge, which subsequently made it possible to remove the drains earlier (Fig. 4). A significant significant difference was noted in TTE with a decrease in discharge during the first day from 39.4±18.5 to 28.1±15.5 ($t=4.48$; $p<0.05$) and in the analysis of all types of operations from 38 .2±18.1 to 27.7±15.0 ($t=4.89$; $p<0.05$).



Pict. 4. The volume of discharge through the drainage (ml) during the first day (ml: M±δ)

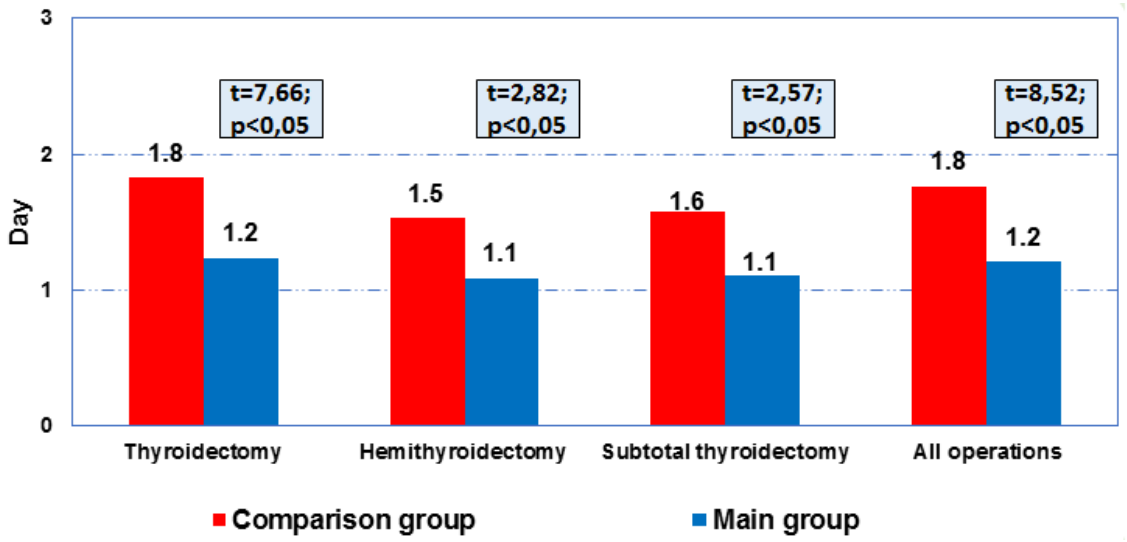
The surgeon should pay attention not only to the quantity, but also to the quality of the discharge, since even with the same volume of discharge, the level of hemoglobin in one of the samples can be several times higher (Pict. 5). The hemoglobin index in the drainage discharge for all types of surgery in the comparison group was often almost 2 times higher than in the main group: with TTE 36.3±10.7 versus 21.2±7.2, respectively (t=11.44 p<0.05); with GTE 33.8±11.2 versus 17.1±7.0, respectively (t=4.91; p<0.05); with STTE 34.5±12.5 versus 19.9±2.9, respectively (t=4.23; p<0.05). The summary data of all operations show that if in the comparison group the average hemoglobin in the drains was 35.8±10.8, then in the main group this value was 1.7 times lower - 20.6±6.8, respectively (t= 13.32; p<0.05);



Pict. 5. The indicator of hemoglobin in the discharge through the drainage (g / l: M±δ)

As noted above, the amount of discharge and the hemoglobin index affected the timing of drain removal. The following graph clearly demonstrates a significant decrease in the average drainage time (Pict. 6). In the comparison group with TTE, the terms of drainage removal averaged 1.8±0.6 days, in the main group - 1.2±0.4 days (t=7.66; p<0.05); with GTE 1.5±0.5 days, in the main group - 1.1±0.3 days (t=2.82; p<0.05); with STTE 1.6±0.5 days, in the main group - 1.1±0.4 days (t=2.57; p<0.05). In

the analysis of all operations, the timing of drainage removal decreased by 1.5 times from 1.8±0.6 days in the comparison group to 1.2±0.4 days in the main group (t=8.52; p<0.05) .



Pict. 6. Drainage removal time (days): M±δ)

Thus, the combined use of the hemostatic agent Hemoben and low-energy laser exposure intraoperatively on the wound surface area after intervention on the thyroid gland and percutaneously in the early postoperative period made it possible to provide a good hemostatic effect, which was manifested by a decrease in the volume of discharge through the drainage in the early stages with 38,2±18,1 до 27,7±15,0 ml (t=4,89; p<0,05), with the level of hemoglobin in the discharge 35,8±10,8 g/l in the comparison group versus 20.6±6.8 g/l in the main group (t=13,32; p<0,05) and to reduce the drainage period from 1.8±0.6 to 1.2±0.4 days (t=8.52; p<0.05), and the combined chemical (Chemoben) and physical (laser irradiation) exposure ensured a decrease activity of the postoperative inflammatory process, in particular, there was a more pronounced decrease in the intensity of the pain syndrome in dynamics according to VAS from 5.1±0.9 to 4.3±1.1 points on the first day (t=6.04; p<0.05) and from 2.8±1.5 to 2.3±1.4 points on the third day (t=3,21; p<0,05).

CONCLUSIONS:

1. Clinical studies have shown that the use of the proposed method in operations on the thyroid gland provided a reduction in the intraoperative time to achieve hemostasis from 12.1±3.9 to 6.5±1.9 minutes (p<0.05), the total duration of the surgical intervention from 84.7±19.5 to 73.3±12.9 minutes (p<0.05), respectively, the proven good and rapid hemostatic effect of the domestic drug Hemoben allows us to recommend it for widespread use in these types of operations.

2. The combined use of the hemostatic agent Hemoben and low-energy laser exposure during operations on the thyroid gland made it possible to provide a good hemostatic effect, which was manifested by a reduction in the intraoperative time to achieve hemostasis from 12.1±3.9 to 6.5±1.9 minutes (p< 0.05), a decrease in the volume of discharge through drainage in the early stages from 38.2±18.1 to 27.7±15.0 ml (p<0.05), with a hemoglobin level in the discharge of 35.8±10.8 g/l in the comparison group versus 20.6±6.8 g/l in the main group (p<0.05) and a decrease in drainage time from 1.8±0.6 to 1.2±0.4 days (p <0.05).

3. A comparative analysis of the results of operations on the thyroid gland showed that the proposed method is characterized not only by a good hemostatic, but also by an anti-inflammatory effect, which manifested itself in a decrease in the overall incidence of complications from 29.5% to 10.2% (p<0.001), while the proportion of surgical lympho-hemorrhagic complications decreased from 11.5%

to 3.1% (p=0.019), and the improvement in the quality of postoperative rehabilitation made it possible to reduce the postoperative observation period from 6.0±1.1 to 4.9±0.8 days (p<0.05).

LITERATURE

1. Grintsov A. G., Matiytsiv A. B., Akhrameev V. B., Grintsov G. A., Pilyugin G. G. Measures to prevent intraoperative bleeding in large and giant benign neoplasms of the thyroid gland // Tauride Medical and Biological Bulletin 2021 , Vol. 24, No. 2 p.35-39
2. Zemlyanoy A.B. The agent of local hemostasis is a fluid active hemostatic matrix. Surgery. Journal them. N.I. Pirogov. 2019;5:104-115. https://doi.org/10.17116/hirurgia2019051104 ongwei,
3. Kvachenyuk A.N. , Gulko O.N. , Suprun I.S. , Negrienko K.V. The use of electric welding technology as the main method of dissection and hemostasis in endocrine surgery // Endocrinology' 2017, TOM 22, № 3 p. 262-266
4. Lipatov V.A., Ershov M.P., Sotnikov K.A., Ushanov A.A., Novikova N.V., Konstantinova Yu.E., Current trends in the use of local application hemostatic agents \\ Scientific electronic journal «INNOVA»; - 2016; №2 (3)p. 64-69
5. Totoeva Z.N. Analysis of complications after various surgical interventions on the thyroid gland. Endoscopic surgery. 2014;20(6):33-37.
6. Shidlovsky A. V., Deikalo I. N., Shidlovsky V. A., Osadchuk D. V., Peleshok O. I. Comparative evaluation of the results of operations on the thyroid gland performed by the traditional method and using liga sure technology. technologies, № 3, 2013 c/ 235-237
7. Khadra H, Bakeer M, Hauch A, Hu T, Kandil E. Hemostatic agent use in thyroid surgery: a meta-analysis. Gland Surg. 2018;**7**:S34–S41. doi:10.21037/gs.2018.03.02.
8. Polychronidis G., Hüttner F. J., Contin P., Goossen K., Uhlmann L., Heidmann M., Knebel P., Diener M. K., Büchler M. W., Probst P. Network meta-analysis of topical haemostatic agents in thyroid surgery. British Journal of Surgery. 2018;**105**(12):1573–1582. doi:10.1002/bjs.10975.
9. Patel KN, Yip L, Lubitz CC, et al. Executive Summary of the American Association of Endocrine Surgeons Guidelines for the Definitive Surgical Management of Thyroid Disease in Adults. Ann Surg. 2020 Mar;271(3):399-410. doi: 10.1097/SLA.0000000000003735.
10. Zhang X, Du W, Fang Q. Risk factors for postoperative haemorrhage after total thyroidectomy: clinical results based on 2,678 patients. Sci Rep. 2017;**7**:7075. doi:10.1038/s41598-017-07334-1.