
The Frequency of Specific Complications Depending on the Method of Surgical Treatment for Diffuse Toxic Goiter

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Abstract: The authors analyze the frequency of specific complications and the main causes of the complicated course of the early and late period after surgical treatment of DTG.

The authors conclude that the use of an improved method of surgical access to the thyroid gland and a program of postoperative rehabilitation made it possible to reduce the frequency of specific complications, which in general ensured an increase in the proportion of good and satisfactory results from 84.7% to 97.3% with a decrease in the probability of an unsatisfactory outcome from 15.3% to 2.7%.

Keywords: strumectomy, thyroid gland, hypothyroidism, hypoparathyroidism, diffuse toxic goiter.

Relevance. In world practice, there is currently an emphasis on several aspects in the field of research aimed at improving the results of treatment of benign and malignant pathology of the thyroid gland, in particular, this is the study of normal and pathological biochemistry in the regulation of thyroid activity, histomorphological assessment of the iodinating activity of thyroid follicular and papillary cells, experimental modeling of dyshormonogenesis with the identification of possible points of application of thyroid-stimulating hormone in relation to key features of the development of the body, molecular genetic studies are ongoing in the aspect of malignant transformation of thyroid cells, the possibilities of using synthetic hormonal complexes to regulate and mitigate the systemic effect of thyrotoxicosis are being investigated, which in general, as expected, will allow revising the goals of conservative and surgical treatment of DTG.

Target. Optimization of tactics by factor analysis of the development of complications after surgical treatment of diffuse toxic goiter.

Materials and methods. The work is based on the results of treatment of diffuse toxic goiter (DTG) in 291 patients operated on for the period from 2011 to 2020. All patients were divided into 2 groups, the main group included 124 patients who received improved tactical and technical aspects of the surgical treatment of DTG treated over the period from 2016 to 2020. The comparison group included 167 patients who for the period from 2011 to 2015. performed standard operations on the thyroid gland (TG).

During the collection of anamnesis, it was revealed that the majority of patients, 43.7% (73 out of 167) in the comparison group and 43.5% (54 out of 124) in the main group, had DTG disease duration from 3 to 5 years. A more than 5-year history of DTG was registered in 25.1% (42 out of 167) of cases in the comparison group and 29.8% (37 out of 124) in the main group of patients. An anamnesis of DTG up to 1 year was detected only in 4 (2.4%) patients from the comparison group and 6 (2.1%) from the main group.

Results and its discussion. In the comparison group, the overall incidence of cases with early postoperative complications was 43.4% (23 out of 53 patients) after TTE and 21.9% (25 out of 114) after CCC (Table 1).

Table 1 The frequency of early postoperative complications in the comparison group

Complications	TTE (n=53)		SSS (n=114)	
	quantity	%	quantity	%
hypocalcemia	12	22,6%	9	7,9%
Bleeding	3	5,7%	3	2,6%
Tracheomalacia	1	1,9%	0	0,0%
Dysphonia	18	34,0%	19	16,7%
Suppuration of the wound	2	3,8%	2	1,8%
Patients with complications	23	43,4%	25	21,9%
χ^2	8,140; Df=1; p=0,005			

In this structure, the following postoperative events after TTE were noted: hypocalcemia (22.6%; 12 cases), bleeding (5.7%; 3 patients), tracheomalacia (1.9%; 1 case), dysphonia (34.0% ; 18), which had the highest percentage, and 2 patients with suppuration of the postoperative wound (3.8%). Moreover, after CCC, each of these complications was observed with a lower frequency and a significant statistical difference ($\chi^2=8.140$; Df=1; p=0.005). For example, the frequency of dysphonia was 16.7% (19 out of 114), hypocalcemia - 7.9% (9 out of 114) and no cases of tracheomalacia were noted.

In the structure of complications noted from the vocal cords in the early period after surgery. Thus, it can be seen that vocal fold edema was most often detected, both in the TTE group (20.8%; 11 out of 53) and after CCC (11.4%; 13 out of 114) with a statistically significant difference in favor of CCC ($\chi^2 =6.275$; Df=1; p=0.013).

The next most common is laryngeal paresis, which occurred in 13.2% (7 of 53) of cases after TTE and 5.3% (6 of 114) after CCC. At the same time, paresis of both vocal cords was noted in 3.8% (2 of 53) of cases in the TTE group and 0.9% (1 of 114) in the CCC group. In total, vocal fold complications were observed in 18 (34.0%) patients after TTE and 19 (16.7%) patients after CVS.

According to the severity of the course, swelling of the vocal folds was noted in 20.8% (11 out of 53) of cases after TTE and 11.4% (13 out of 114) after CCC. Unilateral damage stopped in the early p/o period was detected in 1 (1.9%) patient in the TTE group and 2 (1.8%) in the CCC group. Unilateral damage, not stopped in the early p / o period, was noted with a higher frequency, both in the TTE group (7.5%; 4 of 53) and in the CCC group (2.6%; 3 of 114). There were also fewer cases of bilateral vocal cord injury in the CCC group (0.9%; 1 of 114) than in the TTE group (3.8%; 2 of 53) (Figure 1).

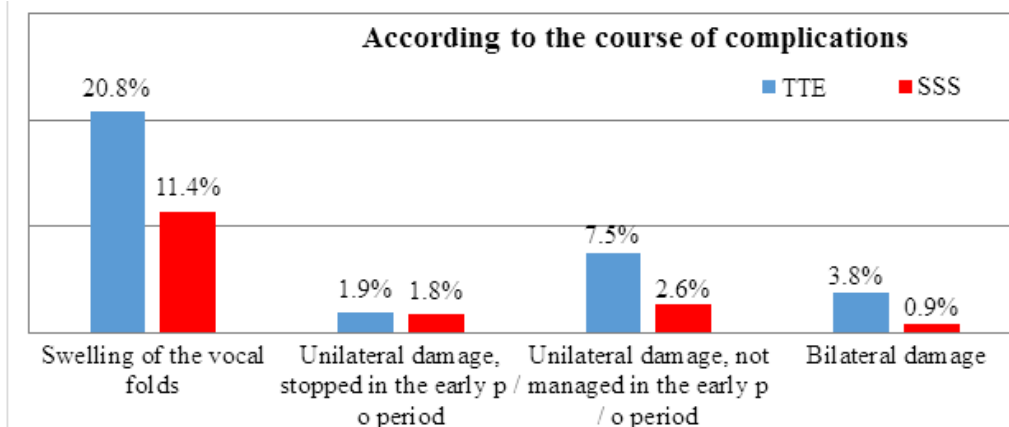


Figure. 1. Distribution of early postoperative complications from the vocal folds according to the severity of the course

At the time of discharge of patients from the hospital, the frequency of cases with persistent damage to the vocal folds was 11.3% (6 of 53) after TTE and 3.5% (4 of 114) after CCC ($\chi^2=7.090$; Df=2; $p=0.029$).

In the remaining 22.6% (12 of 53) cases after TTE, the complication was stopped in the early period. This indicator in the CCC group was 13.2% (15 out of 114).

After discharge, 150 of 167 patients were followed up, 48 after TTE and 102 after CCC.

In the period of 6-24 months after the operation, the recurrence of the disease was not observed in the TTE group, while after CCC, relapses were diagnosed in 13.7% (14 out of 102) of cases. At the same time, after TTE, half of the patients (52.1% 25 out of 48) had hypothyroidism, and after CCC - 26.5% (27 out of 102).

Persistent paresis of the larynx persisted with a higher frequency after TTE (12.5%; 8 of 48) than after CCC (2.9%; 3 of 102).

It was also possible to note such hormonal disorders as hypoparathyroidism, detected with a higher frequency after TTE - 16.7% (8 of 48) versus 2.9% (3 of 102) after CCC, and drug-induced thyrotoxicosis, noted in 18.8% (9 of 48) cases after TTE and not noted after CCC.

In total, 75.0% (36 out of 48) of patients with late postoperative complications were observed after TTE, and 40.2% (41 out of 114) after CCC ($\chi^2=15.826$; Df=1; $p<0.001$).

table 2 Comparative frequency of late postoperative complications (6-24 months after surgery)

Complications	TTE (n=48)		SSS (n=102)	
	quantity	%	quantity	%
Disease recurrence	0	0,0%	14	13,7%
Drug-induced thyrotoxicosis	9	18,8%	0	0,0%
Hypothyroidism	25	52,1%	27	26,5%
Hypoparathyroidism	8	16,7%	3	2,9%
Persistent paresis of the larynx	6	12,5%	3	2,9%
Patients with complications	36	75,0%	41	40,2%
Patients without complications	12	25,0%	61	59,8%
χ^2	15,826; Df=1; $p<0,001$			

According to the main causative factor, complications were distributed as follows, most of which were hormonal factors, amounting to 62.5% (30 of 48) in the TTE group and 23.5% (24 of 102) in the CCC group.

Next in frequency in the TTE group were the technical aspects of the operation, which occurred in 12.5% (6 of 48) of cases, and in the CCC group - relapses of the disease, amounting to 13.7% (14 of 102), which was not observed as a causal factor of complications after TTE ($\chi^2=33.453$; Df=3; $p<0.001$).

Thus, the factor analysis of the main causes of the complicated course of the early and late (up to 24 months of observation) period after surgical treatment of DTG showed that,

depending on the type of operation, a different structure of complications was noted ($\chi^2=33.453$; Df=3; $p<0.001$), in particular, if TTE is characterized by the predominance of hormonal changes - 62.5% (in 30 out of 48 patients) and complications due to the technical aspects of the operation (persistent paresis of the larynx - 12.5% - in 6 out of 48), and after subtotal resections these figures were 23.5% (24 of 102 patients had specific hormonal changes) and 2.9% (3 patients had postoperative paresis of the larynx), but there was a recurrence of the disease in 13.7% of patients (14 of 102 patients). In general, the proportion of uncomplicated course was 25% (12) after TTE and 59.8% (61) after CCC (Table 2).

When comparing the frequency of late postoperative complications in compliance with postoperative recommendations, it was possible to observe that the cases of drug-induced thyrotoxicosis decreased by half (8.3% after correction versus 18.8% before correction) after TTE (Table 3.4), also in the TTE group, the incidence of hypothyroidism was reduced from 52.1% to 16.7%, hypoparathyroidism - from 16.7% to 4.2%.

Table 3 Comparative frequency of late postoperative complications (6-24 months after surgery)

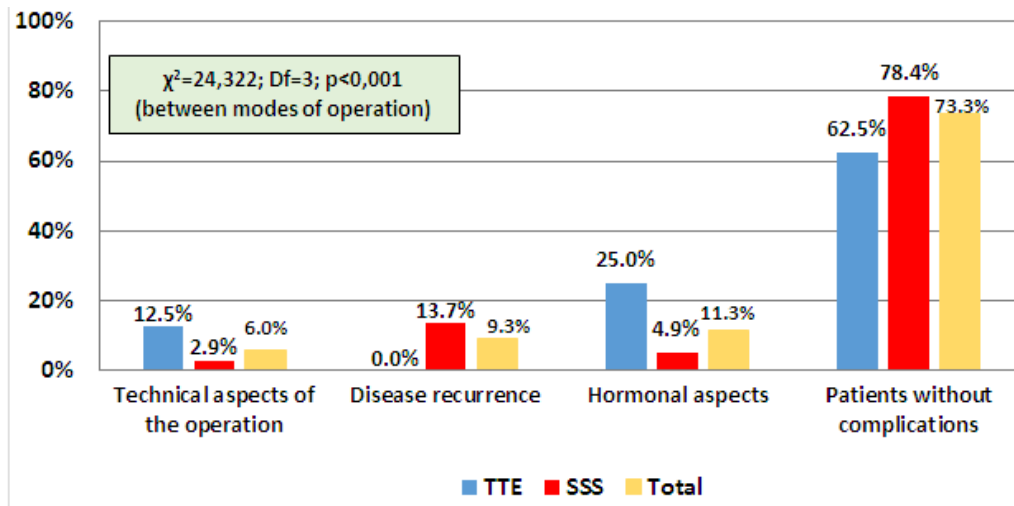
Complications	TTE (n=48)		TTE (n=48)	
	Before correction	%	After correction	%
Drug-induced thyrotoxicosis	9	18,8%	4	8,3%
Hypothyroidism	25	52,1%	8	16,7%
Hypoparathyroidism	8	16,7%	2	4,2%
Patients with hormonal complications	36	75,0%	12	25,0%
Patients without hormonal complications	12	25,0%	36	75,0%
χ^2	24,000; Df=1; $p<0,001$			
Complications	CCC (n=102)		CCC (n=102)	
	Before correction	%	After correction	%
Drug-induced thyrotoxicosis	0	0,0%	0	0,0%
Hypothyroidism	27	26,5%	6	5,9%
Hypoparathyroidism	3	2,9%	1	1,0%
Patients with hormonal complications	29	28,4%	7	6,9%
Patients without hormonal complications	73	71,6%	95	93,1%
χ^2	16,325; Df=1; $p<0,001$			

In the group of patients after CCC, there was also a tendency to reduce the frequency of hormonal disorders of DTG after surgical treatment. Thus, the frequency of hypothyroidism was reduced from 26.5% to 5.9%, and hypoparathyroidism - from 2.9% to 1.0% (Table 3).

The summary frequency of complications noted in the long-term period after surgical treatment of DTG is presented in Table 3.5. Thus, it can be seen that the overall frequency was 37.5% (18 out of 48) after TTE and 21.6% (22 out of 102) after CCC. At the same time, the incidence of hypothyroidism was significantly lower after CCC (5.9% vs. 16.7% in the TTE group), as was the incidence of hypoparathyroidism (1.0% vs. 4.2%) and persistent

laryngeal paresis (2.9% against 12.5%).

Factor analysis showed that in the structure of the main causes of the complicated course of the early and late period after surgical treatment of DTG, the technical aspects of the operation with the development of persistent paresis of the larynx account for 6.0% of cases (after TTE - 12.5%; CCC - 2.9%), specific hormonal changes after corrective therapy - 11.3% (TTE - 25.0%; CVR - 4.9%) and disease recurrence - 9.3% (TTE - 0; 13.7% after CCC), with In general, an uncomplicated course was noted in 73.3% of patients (TTE - 62.5% and CVS - 78.4%) (Fig. 2).



Rice. 2 Distribution of the frequency of complications after correction of therapy according to the main causative factor

Conclusion. Thus, the main factor in the development of hormonal abnormalities in the long-term period after surgical treatment of DTG was non-compliance by patients with recommendations for substitution therapy, which was noted in 47.9% of cases (23 out of 48) after TTE and in 16.7% of patients (17 out of 102) after CCC, in turn, in 27.1% (13) and 11.8% (12) of cases, such complications were detected with full adherence to the recommendations. Correction of hormone replacement therapy made it possible to reduce the frequency of this group of complications from 62.5% to 25.0% after TTE and from 23.5% to 4.9% after CCC, which, taking into account other complications (persistent laryngeal paresis - 12.5% and 2.9%, respectively, recurrence of the disease in 13.7% of patients after CCC) (in 14 of 102 patients) led to a decrease in the total proportion of postoperative complications from 75.0% to 37.5% after TTE and from 40.2% to 21.6% after CCC.

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