Postoperative hypoparathyroidism is most commonly caused by the extirpation, injury or devascularisation of parathyroid glands. The aim of this study is to establish correlations between the advanced thyroid cancer staging, the appropriate individual treatment, the results obtained, the frequency and intensity of transient and/or permanent post-operative hypocalcemia. The present study can be continued with further researches in order to improve and develop surgical, oncological and endocrine management protocols for patients diagnosed with advanced thyroid cancer and also to avoid these relatively frequent and important complications.

**Keywords:** thyroidectomy, hypocalcemia, parathyroid glands, calcium therapy
The ENT clinical examination and thyroid ultrasonography were also performed.

Indirect laryngoscopy was performed in order to identify possible paralysis of vocal cords, eventual compression or invasion of thyroid nodules. In most cases, thin needle biopsy puncture and computer tomography were performed. This highlights the anatomical extension of the tumor and the possible invasion of adjacent structures, thus guiding the extent of surgery.

Percentage of female patients accounted for 74.74% of all cases, while male patients accounted for 25.25% (fig. 1).

Three other cases were non-thyroidal cancers: a case of neuroendocrine tumor, a thyroid locomotor plasmocytoma and a renal neoplasm metastasis case.

Analyzing the relationship between the histological subtype and the age for advanced cancers, it can be observed how the proportion of papillary thyroid cancer decreases from 88.46% for the age group of 45-50 years, to 84.61% for the age group 51-60 years at 54.05% for 61-70 years and only 66.66% for patients over 70 years of age.

Anaplastic thyroid cancer increases from 0 cases for the 45-50 age group, 2 cases (7.69%) for 51-60 years, 7 cases for 61-70 years (18.9%) and 7 cases (25.92%) for patients aged over 70 years. Follicular thyroid cancer occurs only in the age group of 61-70 years, in a number of 5 cases.

Medullar thyroid cancer is distributed relatively constant between the four age groups: 3 cases (11.5%) for the age group 45-50 years, 2 cases (7.69%) corresponding to the 5th decade of life, 5 cases (13.51%) for 61-70 years and 2 cases (7.4%) for patients over 70 years of age (fig. 4).

Thus, out of a total of 194 cases, patients aged 61-70 years are the highest-age group, with 49 cases and 25.52%, followed by the 51-60 age group, accounting for 22% of the total cases - 43 patients.

The fourth decade of life includes 33 patients, 31-40 year-old patients are 18 cases, while 19 to 30-year-old patients are 16 cases.

Patients over the age of 71 mark a decrease in incidence after the peak of 61-70 years, including 35 cases - 18.2% of the total. The minimum age in the study group is 19 years and the maximum of 84 and a mean age of 55.3 years (fig. 3).

To analyze the distribution of thyroid cancers subtypes among the investigated patients, we took the data from the histopathological bulletins attached to their admission sheets. Of the 194 cases considered, the highest histological weight is papillary thyroid cancer, with 79.89% of the total cases. This is followed by medullary thyroid cancer with 27 cases, anaplastic thyroid cancer - 17 cases and follicular thyroid cancer - 7 cases.

The rate of intraoperative complications related to recurrent laryngeal nerve injury, intraoperative haemorrhage requiring haemostasis and the necessity to achieve a definitive tracheostomy is 13%, 17% and 3.44%, respectively.

Regarding the rate of postoperative complications, these are present in 26.72% of patients, while the complications strictly related to the operative act are 17.24%. By excluding short-term complications (transient hypocalkaemia and postoperative haemorrhage), it appears that a number of 16 complications were the direct consequence of the operative act. A total of 12 patients (10.34%) experienced these complications.

Transient hypocalkaemia (16 cases, 29% of all complications), defined as 6-month remission hypocalcaemia, was associated with complications related to the operative act whereas permanent hypocalcaemia required supplemental calcium
Table 1
POSTOPERATIVE COMPLICATIONS DEPENDING ON TYPE OF THE INTERVENTION, IN THE CASE OF ADVANCED THYROID CANCERS;
TT=TOTAL THYROIDECTOMY, TL=TOTAL LOBECTOMY, RD= RADICAL DISSECTION OF THE NECK, SD=SELECTIVE CERVICAL DISSECTION, MRD=MODIFIED CERVICAL RADICAL DISSECTION, ETT=EXTENDED TOTAL THYROIDECTOMY, PTT=PERMANENT TRACHEOSTOMY, TE=TUMOR EXCISION, TOT=THYROIDECTOMY TOTALIZATION

| Complications by intervention | TOTAL | TT+ | TL+ | RD+ | RD S | PTT | TT | TT+ | ETT+ | TT+ | TE | TE | TE | WS | TT+ | TT+ | TT+ | TOT+ | TOT+ | TT+ | ETT |
|-------------------------------|-------|-----|-----|-----|------|-----|----|-----|------|-----|----|----|----|----|-----|-----|-----|------|------|-----|-----|
| Oropharyngeal fistula         | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Exits of the hypophysis       | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Tracheal fistula              | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| PERMANENT HYPOCALCEMIA        | 4     | 1   |     | 2   |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Unilateral vocal cord paresis | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Peri-articular emphysema      | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Phrenic nerve paralysis       | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Bilateral vocal cord paresis  | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Unilateral recurrent nerve paresis | 1 |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Pneumomediastinum             | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Subcutaneous emphysema        | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| TRANSIENT HYPOCALCEMIA        | 10    | 1   | 1   | 3   | 2    |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Wound dehiscence              | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Postoperative bleeding        | 2     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |
| Wound infection               | 1     |     |     |     |      |     |    |     |      |     |    |    |    |    |     |     |     |      |      |     |     |

There are important international studies that highlight the differences in the rate of complications between different centers and operating teams, underlyen the importance of evaluating post-operative complications in the same center over a period of time. This is explained by the direct correlation between the risk of complications and the expertise and experience of the operating team [8- 10].

Another study of our research center, between 2000-2002 revealed a complication rate of 6.87%. The studied group comprised all stages, including stages I and II, while the present study examines the complications of Stages III and IV. Also, the percentage of patients that required post-operative reintervention was reported to be 3.17%, while only 2 cases (1.72%) were documented in the present study. Permanent hypoparathyroidism was reported in 7.93% of patients, superior to the 3.44% found in this group. Considering these aspects, it appears that the experience of the operative team has contributed to the decrease of the rate of postoperative complications.

In a multicenter prospective study focused on the relationship between the rate of postoperative complications (recurrent lesion and hypoparathyroidism) and the experience of the operating team, an association has been found between the experience of the operating team and the surgical...
performance in thyroid cancer surgery, in the sense that the complications were the most common in the case of surgeons at the beginning or, on the contrary, at the end of their careers. Graves disease significantly increased the risk of transient lesion of the recurrent laryngeal nerve and transient hypoparathyroidism and could be a predictive factor for recurrent postoperative nerve damage and hypoparathyroidism after total thyroidectomy. From this point of view, better results were obtained because of the reducing of their complications rate [11-15].

Regarding the correlation between surgical intervention and the frequency of postoperative complications, it can be seen that total thyroidectomy with the radical neck dissection and tracheostomy has involved most complications strictly related to the operative act. The patient who underwent this treatment had postoperative hypopharyngeal fistula, transient hypocalcaemia and bleeding, all these requiring reintervention. These complications also correlate with the stage and type of cancer, the patient presenting an IV C grade, thyroid anaplastic carcinoma with a diameter of approximately 15 cm, with right internal jugular vein thrombosis and a right subclavian vein thrombosis and direct invasion of the subhyoid muscles, cervical vessels and recurrent bilateral laryngeal nerve [16-19].

Another type of intervention with multiple postoperative complications was extensive total thyroidectomy with radical neck dissection, in which the patient presented both complications directly related to the operative act and other complications: respiratory insufficiency and acute renal insufficiency. The patient had a fourth-degree papillary cancer with multiple comorbidities.

Routine administration of calcium vitamin D for two weeks was performed in all patients with total thyroidectomy, preventing symptomatic hypocalcaemia. The dose used was 3g per day 3 times a day in the first week and 1.5g three times a day in the second week. If symptoms of hypocalcaemia persist, it is recommended to supplement with intravenous calcium gluconate, one ampoule every 12 h, for 7-10 days under the control of serum calcium. Hypoparathyroidism is considered permanent if calcium supplementation is still needed, more than 6 months after surgery. For patients with hoarseness, an indirect laryngoscopy was programmed at 1, 3 and 6 months postoperatively, respectively, until the vocal cords function. After 6 months recurrent paralysis is considered permanent [20-24].

Depending on the postoperative progression, patients are usually discharged from the hospital in 2-3 days postoperatively after removing the drainage tube, this being done when the drained liquid does not exceed 25 mL for three consecutive days. Patients with various postoperative complications had a longer hospitalization period, depending on the patient's risk for recurrence. The ultrasound should include the thyroid lobe and the central and lateral lymph nodes. If a positive result (ultrasound ganglia larger than 5/8 - 8 cm diameter) is highlighted, it is done a biopsy with a fine needle for cytology with treglobulin dosing.

Conclusions
An important post-operative complication of total thyroidectomy is given by hypocalcaemia. This one can determine severe symptoms and also increases hospitalization time. The primary cause is secondary hypoparathyroidism following damage to, or devascularisation of, one or more parathyroid glands during surgery. The present study can be continued with further researches in order to improve and develop surgical, oncological and endocrine management protocols for patients diagnosed with advanced thyroid cancer to avoid these relatively frequent and important complications.

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