8th WORLD CONGRESS of PEDIATRIC SURGERY
WOFAPS
12-15 November 2025
Titanic Mardan Palace Hotel
ANTALYA, TÜRKİYE

ASSESSMENT OF MALIGNANCY RISK OF THYROID NODULES IN CHILDREN

Sergey Minaev [1], Igor Gerasimenko [1], Oksana Iachnaia [1], Jennifer Martinez [2], Maria Bagdasaryan [1]

[1] Stavropol State Medical University

[2] University of Santo Domingo

The oncological risk of thyroid nodules (TN) is much less common in children and adolescents than adults. However, in children, they are more often found to be malignant. Nodular and multi-nodular thyroid diseases occur in 30% to 78% of all thyroid pathology cases.

Thyroid cancer (TC) accounts for 1.4% of all malignant neoplasms in the pediatric population. It is predominantly recorded in adolescents, who commonly exhibit papillary thyroid carcinoma (the most frequent variant), follicular carcinoma, or medullary carcinoma.

This study aimed to develop and assess the effectiveness of a risk assessment program for pediatric thyroid nodular formations, utilizing both clinical and instrumental diagnostic approaches.

Materials and Methods

This retrospective cohort study was of Stavropol from 2018 to 2024. The study included 174 children aged 8 to 18 years. Patients were classified based on the results of clinical and morphological examinations into those with benign TN (n=62; boys - 16 (25.8%), girls - 46 (74.2%)) and children with TC (n=12; boys - 3 (25.0%), girls - 9 (75.0%)). The control group consisted of clinically healthy children (n=100) (ratio of boys to girls - 1:1) without clinical, biochemical, or US signs of thyroid pathology.

A scale was developed that includes 14 parameters. Each parameter was assigned a score from 0 to 10 based on its predicted association with the risk of malignancy.

Results and Discussion

Based on the obtained data, an analysis of the total scores on the oncological risk scale for TN was conducted in the pediatric population, revealing statistically significant differences among the three patient groups (Table).

The oncological risk results for thyroid nodular formations in children and adolescents were presented as follows: from 0 to 10 points - low risk of TC, from 11 to 30 points - intermediate risk of TC, and more than 31 points - high risk of TC.

Group	Median	95% CI median	Skewness	Kurtosis
Healthy Children	6.0	[5.0, 7.0]	+1.00	+0.30
Benign TN	19.0	[18.0, 20.0]	+0.20	−0.50
Thyroid Cancer	42.0	[39.0, 44.0]	+0.15	−0.90

Table. Summary table of median stability and distribution characteristics among the groups of children.

The conducted ROC analysis confirmed the high diagnostic accuracy of the proposed scale. The AUC value was 1.00 (95% CI: 0.99–1.00), indicating a high diagnostic effectiveness of the proposed scale for assessing the oncological risk (malignant and benign) of thyroid nodular formations of children.

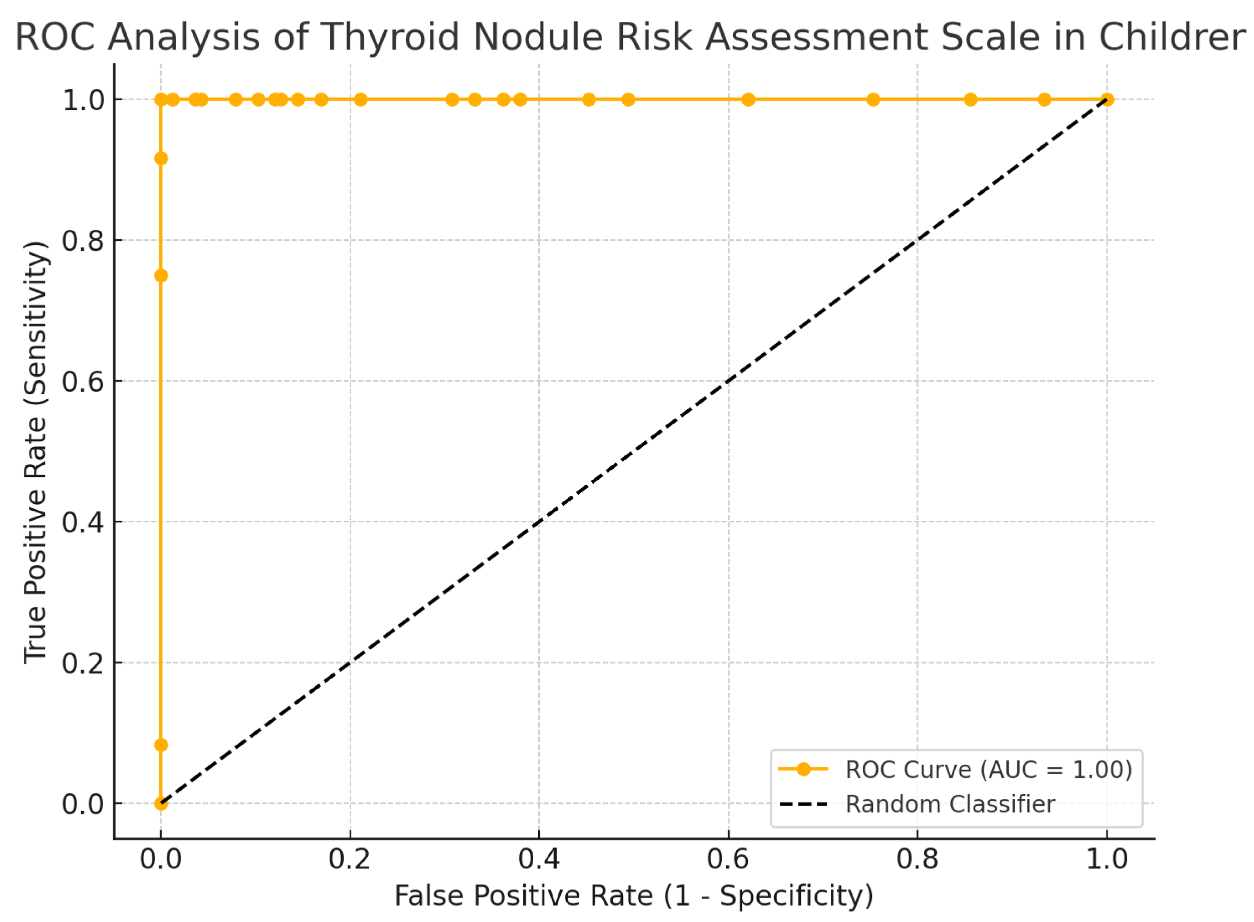

Figure. The ROC-analysis result demonstrated the proposed scale's high diagnostic effectiveness for assessing oncological risk in thyroid nodular formations in the pediatric population.

Conclusion

The developed scale for assessing the oncological risk of TN in children has shown high sensitivity, specificity, and reliability. It can be utilized for initial screening and risk stratification in pediatric endocrinology and oncology. Applying this scale enhances diagnostic accuracy, reduces the need for unnecessary invasive procedures, and improves the management of patients with TN.

References

1. Ceremsak JJ, Sharma RK, Weiss VL, Wang H, Topf MC [et al.] Trends and predictors of positive surgical margins in pediatric thyroid cancer. Int J Pediatr Otorhinolaryngol. 2025;192:112328.
2. Papini E, Monpeyssen H, Frasoldati A, Hegedüs L. 2020 European thyroid association clinical practice guideline for the use of image–guided ablation in benign thyroid nodules. Eur Thyroid J. 2020;9(4):172–185
3. Minaev S. V., Gerasimenko I. N., Iachnaia O. I. Surgical treatment for thyroid diseases in children. Medical News of North Caucasus. 2024;19(3):254-256.