

Congress Abstract

The Role of Fine-Needle Aspiration Biopsy and Sonographic Stratification in Surgical Decision-Making for Pediatric Thyroid Nodules: Experience from an Ambulatory Surgery Center

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Introduction: Pediatric nodular thyroid disease is associated with an elevated probability of malignant transformation (20% to 26%), necessitating precise preoperative diagnostic triage (1). International consensus guidelines establish ultrasound-based risk stratification using the Thyroid Imaging Reporting and Data System (TI-RADS) alongside fine-needle aspiration biopsy (FNAB) with cytopathological evaluation under the Bethesda System as pivotal clinical instruments guiding the choice between observation and surgical intervention (1,2). This study aimed to evaluate the impact of TI-RADS and cytopathological classification on the selection of surgical versus observational management strategies in pediatric patients with thyroid nodules.

Materials and Methods: A consecutive retrospective analysis was conducted on 15 patients aged 10 to 17 years with thyroid nodules evaluated between October 2024 and July 2026 at an ambulatory surgical center. Inclusion criteria encompassed age under 18 years, ultrasonographic confirmation of a nodular lesion, and completion of fine-needle aspiration biopsy. No exclusion criteria were applied. The diagnostic workup incorporated sonography with TI-RADS categorization, ultrasound-guided biopsy with cytopathological reporting according to the Bethesda System (2,3), and serological assessment of thyroid-stimulating hormone (TSH), free thyroxine, antithyroid antibodies, and calcitonin. Data analysis relied on the calculation of relative frequencies and proportions. The study was conducted in accordance with the principles of the Helsinki Declaration; retrospective analysis of anonymized data did not require informed consent.

Results: Female adolescents constituted the majority of the cohort (86.7%; 13/15), with an overall mean age of 14.8 ± 2.3 years, consistent with the age distribution of thyroid pathology in adolescents (1). Ultrasound stratification revealed TI-RADS 2–3 in 73.3% (11/15) and TI-RADS 4 in 26.7% (4/15). Initial cytopathological classification yielded category I in 40.0% (6/15), category III in 26.7% (4/15), category IV in 26.7% (4/15), and category V in 6.7% (1/15). The proportion of non-diagnostic aspirates was related to the presence of cystic elements within this cohort (4). Hormonal profiling demonstrated euthyroidism in all evaluated cases with a median thyroid-stimulating hormone concentration of 2.1 mIU/L. Conservative dynamic surveillance at three- to six-month intervals was chosen for 93.3% of children (14/15). In one adolescent (6.7%; 1/15) presenting concordant TI-RADS 4 and category IV cytology, total thyroidectomy with regional lymph node clearance was performed; postoperative histopathology confirmed metastatic papillary thyroid carcinoma (1,5). The overall confirmed malignancy rate was 6.7%, which aligns with literature data for pediatric populations (5% to 26%) (1,5).

Conclusions: Combined application of TI-RADS sonographic stratification and Bethesda-based biopsy enables reliable triage of pediatric patients. The substantial proportion of category I aspirates (40.0%) mandates repeat aspiration for cystic lesions, whereas concordance between TI-RADS 4 sonographic criteria and neoplastic cytology constitutes a direct indication for surgical intervention.

Keywords: Thyroid Nodule; Biopsy, Fine-Needle; Thyroid Neoplasms; Child; Ultrasonography; Cytopathology