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# Rates of Malignancy by The Bethesda System for Reporting Thyroid Cytopathology Category 3 and Category 4 Thyroid Nodules

Tiroid Sitopatolojisini Raporlamak için Bethesda Sistemi'ne Göre Kategori 3 ve Kategori 4 Tiroid Nodüllerinin Malignite Oranları

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## ÖZ

**Amaç:**Tiroid nodüllerinin sitopatolojisini değerlendirmek için kullanılan The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC)'ne göre kategori 3 ve kategori 4 olarak raporlanan nodüller değişik oranlarda malignite riskleri taşır. Bu çalışmanın amacı TBSRTC kategori 3 ve 4 tiroid nodüllerinde malignite oranlarını saptayıp değerlendirmektir.

**GereçveYöntemler:** Ocak 2013- Aralık 2018 tarihleri arasında İİAB sonuçları Bethesda kategori 3 ve kategori 4 olan, sonrasında tiroidektomi uygulanan hastalar retrospektif olarak değerlendirildi.

**Bulgular:** Yetmiş iki hasta dahil edildi. Bethesda kategori 3 grubunda 40 hasta 40 nodül mevcuttu.Histopatoloji sonucu 23 (%57.5) hastada benign, 17 (%42.5) hastada malign olarak raporlandı. Bethesda kategori 4 grubunda 32 hasta 32 nodül mevcuttu. Histopatoloji sonucu 12 hastada (%37.5) 20 hastada (% 62.5) malign olarak raporlandı.

**Sonuç:** TBRSTC kategori 3 ve 4 nodülleri değişik oranlarda malignite riski taşımaktadır.

**AnahtarKelimeler:** Bethesda; tiroid nodülü; malignite; ince iğne aspirasyon biyopsisi

**Title:** Rates of Malignancy by The Bethesda System for Reporting Thyroid Cytopathology Category 3 and Category 4 Thyroid Nodules

## ABSTRACT

**Aim:** The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) is employed to evaluate the cytopathology of thyroid nodules. The nodules reported as categories 3 and 4 constitute risk of malignancy at varying rates. This study aims to document the amount of actual malignancy rates in TBSRTC category 3 and 4 thyroid nodules.

**Materials and Methods:** Patients having thyroid nodules with reported Bethesda category 3 and category 4 results on FNAB who subsequently underwent thyroidectomy between January 2013 and December 2018 were retrospectively analyzed.

**Results:** Seventy-two patients and 72 nodules were included in the study. The Bethesda category 3 group consisted of 40 patients and 40 nodules. The histopathologic results were reported as benign in 23 (57.5%) patients and malignant in 17 (42.5%) patients. The Bethesda category 4 group covered the remaining 32 patients and 32 nodules. Histopathologic results were reported as malignant in 12 patients (37.5%) and benign in 20 patients (62.5%).

**Conclusion:** TBRSTC category 3 and 4 nodules bear varying rates of malignancy risk.

**Keywords:** Bethesda; thyroid nodule; malignancy; fine needle aspiration biopsy

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## Introduction:

The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) is a histopathologic reporting system used to classify thyroid fine needle aspiration biopsy (FNAB) specimens in a standardized manner (1). According to the 2017 revision of TBSRTC; the categorization and their implications are classified as follows: category 1: Nondiagnostic or Unsatisfactory, category 2: Benign, category 3: Atypia of undetermined significance or follicular lesion of undetermined significance (AUS/FLUS), category 4: Follicular neoplasm or suspicious for a follicular neoplasm, category 5: Suspicious for malignancy, category 6: classified as malignancy.

Although the expected malignancy rates are different for each category, it is estimated to be between 10-30% for TBSRTC category 3 and 25-40% for category 4(1).

This study aims to evaluate and verify the actual malignancy rates in TBSRTC category 3 and 4 thyroid nodules.

## Material-Method:

Patients with FNAB results with TBSRTC category 3 and category 4 who were subsequently underwent thyroidectomy between January 2013 and December 2018, were enrolled in the study.

Demographics, the number of nodules evaluated with FNAB, nodule size (mm), FNAB repeats, histopathology results of repeats, postoperative histopathology results of nodules, and tumor types were analyzed retrospectively.

Non-invasive follicular thyroid neoplasm with papillary-like nuclear features; (NIFTP) nodules were not considered malignant.

Approval from the institutional research ethics board was obtained (decision number 2023/02-07)

## Statistical Analysis:

Descriptive statistics were given as means for the continuous variables and percentage for categorical variables.

## Results:

A total of 72 patients and 72 nodules were enrolled in the study. There were 40 patients and 40 nodules in the Bethesda category 3 group. The mean nodule size was 23.03 mm in the patients within the Bethesda category 3 group. FNAB was repeated in 14 patients. Repeat FNAB results; were reported as Bethesda category 3 in 4 patients, Bethesda category 5 in 4 patients, Bethesda category 1 in 3 patients, Bethesda category 2 in 2 patients, and Bethesda category 6 in 1 patient. Postoperative histopathology results for the patients within the Bethesda category 3 group were reported as benign in 23 patients (57.5%). Malignancy was detected in the remaining 17 (42.5%) patients. Of these patients, 10 had papillary carcinoma (Pc) classical variant, 4 had Pc follicular variant, 2 had papillary microcarcinoma and 1 had medullary carcinoma.

There were 32 patients and 32 nodules in the Bethesda category 4 group. The mean nodule size was 24.59 mm. Histopathology results were reported as benign in 12 patients (37.5%) and malignant in 20 patients (62.5%). Eight patients had Pc follicular variant, 5 had Pc classical variant in, 5 had Pc oncocytic variant, one patient had papillary microcarcinoma, and one had anaplastic.

FNAB and histopathology results are summarized in Table-1.

## Discussion:

The histopathologic evaluation of thyroid nodules is the key in determining whether the patient needs thyroid surgery. It is very valuable to be able to distinguish benign/malignant thyroid nodules in the preoperative period as much as possible, to protect the patients from unnecessary thyroid surgery and related morbidity. For this purpose, The Bethesda System for Reporting Thyroid Cytopathology system was developed to classify thyroid fine-needle aspiration biopsy samples in a standard way(1). Nodules in each category of this system have different rates of malignancy risks(1). According to the revision made in 2017,commonly reported malignancy rates are10-30% for category 3 nodules and 25-40% for category 4 nodules. However, various results have been reported in various studies.

In a series of 116 patients in which Ryu et al. evaluated category 3 nodules, the malignancy rate was reported as 35.3%(2). In another series with 47 patients published in our country, this rate was reported as 27.7%(3). In the current study, this rate was found to be 42.5%, which is relatively higher than the reported values.

When dealing with the TBSRTC category 3 nodules, after evaluating the clinical and sonographic features that raise concerns, repeating FNAB or molecular tests may be preferred instead of making a direct decision for surgery or follow-up(4). Repetition of FNAB is a more commonly utilized method as molecular tests are expensive and harder to access.

The repeat FNAB of category 3 nodules, returns same category results in 20% of the time (5). In this study, FNAB was repeated in 14 of 40 patients with category 3 nodules, and FNAB result was again reported as category 3 in four patients (28.5%).

The histopathology result of TBSRTC category 3 nodules was reported as benign in56.6% and as malignant 43.3% of the patients in a series of 90 patients published by Altın et al (3). The most common malignancy was papillary carcinoma (36.7%) and the follicular variant, which is the most common subgroup of papillary carcinoma, in this study. Similarly, in the current study, the histopathologic

results were found to be mostly benign. The most common malignancy was papillary carcinoma in consistence with the previous studies. In contrast, the most common subgroup in the current study was the classical variant was of the papillary carcinoma.

In a series published by Alshaikh et al. in 2018 it was reported that 2 (22.2%) of TBSRTC category 4 nodules were operated (6). Sarkis et al. In the large series of 2076 nodules, which was an Australian experience, it was reported that 15.3% of 98 TBRSTC category 4 nodules were malignant(5). In another large series, the malignancy rate was reported as 32.6% in 65 category 4 nodules(7). In our study, unlike these studies, a high rate of malignancy (62.5%) was found in TBSRTC category 4 nodules. The fact that the malignancy rates were higher than the studies in the literature was thought to be due to the small number of patients included in the study.

In conclusion, TBSRTC category 3 and 4 nodules carry varying rates of malignancy risk.

Retrospective design and absence of radiological datas are the limitations of this study.

**Table 1:** Fine needle aspiration biopsy results and histopathology results

| | Benign (n,%) | Malign (n,%) |
|---|---|---|
| Bethesda 3 | 23 (%57.5) | 17 (%42.5) |
| Bethesda 4 | 12 (%37.5) | 20 (%62.5) |

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## References:

1.Cibas ES, Ali SZ. The 2017 Bethesda System for Reporting Thyroid Cytopathology. Journal of the American Society of Cytopathology. 2017 Nov;6(6):217–22.

2.Ryu YJ, Jung YS, Yoon HC, Hwang MJ, Shin SH, Cho JS, et al. Atypia of undetermined significance on thyroid fine needle aspiration: surgical outcome and risk factors for malignancy. Ann Surg Treat Res. 2014;86(3):109-14.

3.Altın F, Paksoy M. What Should Be Considered in Bethesda III Thyroid Nodules When Prefering Hemitioidectomy or Total Thyroidectomy. Haseki. 2020 Jun 17;58(3):293–300.

4.Mosca L, Silva LFF da, Carneiro PC, Chacon DA, Araujo-Neto VJF de, Araujo-Filho VJF de, et al. Malignancy rates for Bethesda III subcategories in thyroid fine needle aspiration biopsy (FNAB). Clinics. 2018;73:e370.

5.Sarkis LM, Norlen O, Aniss A, Watson N, Delbridge LW, Sidhu SB, et al. The Australian experience with the Bethesda classification system for thyroid fine needle aspiration biopsies. Pathology. 2014 Dec;46(7):592–5.

6.Alshaikh S, Harb Z, Aljufairi E, Almahari SA. Classification of thyroid fine-needle aspiration cytology into Bethesda categories: An institutional experience and review of the literature. Cytojournal. Published online Feb 16 2018.doi: 10.4103/cytojournal.cytojournal_32_17.

7.Williams BA, Bullock MJ, Trites JR, Taylor SM, Hart RD. Rates of thyroid malignancy by FNA diagnostic category. J of Otolaryngol - Head & Neck Surg. 2013 Dec;42(1):61.