

# The risk of thyroid cancer in a thyroid nodule on the basis of a tertiary reference thyroid cancer center experience

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## Introduction

Thyroid nodules constitute a common and rising clinical problem in Polish population. It is estimated, that thyroid nodules are observed even in up to 1.000 000,0 of women, what is a consequence of iodine deficiency in Poland during the eighties of XX century. On the other hand, the incidence of thyroid cancer (TC), the most common endocrine malignancy, has rapidly increased during the last decades. According to the Polish National Cancer Registry 2192 new cases of TC were diagnosed in 2010, among them 384 in men and 1808 in women, comparing to 448 new cases in 1990 (333 women and 115 men). These numbers clearly demonstrate the increase in thyroid cancer incidence by almost 5-fold during the last 20 years. Neck ultrasound and fine needle aspiration biopsy (FNAB) with ultrasound guidance constitute the most common and widely available diagnostic tools.

There are no unequivocal sonographic features of malignancy, however some of them, such as: solidity, hypoechogenicity or marked hypoechogenicity, microlobulated or irregular margins, microcalcifications, and taller-than-wide shape may suggest malignant tumor (1,2,3).

A global risk of TC in a single thyroid nodule is rather small and ranges between 1-11%. Currently, cytopathological diagnostics is based on The Bethesda System for Reporting Thyroid Cytopathology, which classifies FNAB findings into 6 categories (4) (Table 1). The risk of TC varies between distinct categories and ranges from 0-3%, 5-15%, 15-30%, 60-75% to 97-99% for Bethesda class II-VI, respectively, whereas in case on FNAB nondiagnostic result 1-4% (Table 1). However, these values may differ in a center, specialized in TC.

Category I	Category II	Category III	Category IV	Category V	Category VI
Nondiagnostic	Benign	Atypia / follicular lesion of undetermined significance	Follicular neoplasm or suspicious for follicular neoplasm	Suspicious for malignancy	Malignant
Risk of malignancy					
1-4%	0-3%	5-15%	15-30%	60-75%	97-99%
Recommendations					
Repeat FNAB	Clinical follow-up	Repeat FNAB	Surgical lobectomy	Near-total thyroidectomy or lobectomy	Near-total / total thyroidectomy

Table 1. The Bethesda System for Reporting Thyroid Cytopathology

## Material and methods

Two hundred thirty one patients (181 women, 50 men at mean age 56 years, median 56 years) were diagnosed due to a thyroid tumor or multinodular goiter in M. Skłodowska-Curie Memorial Cancer Center and Institute of Oncology in Gliwice, a tertiary reference center for TC in Poland.

In total 282 thyroid nodules were subjected to ultrasound-guided FNAB and involved in a further retrospective analysis. In 187 patients FNAB was carried out on one nodule, in 37 on two nodules, whereas in the 7 remaining

subjects on 3 tumors. Cytopathological results were categorized according to the Bethesda System for Reporting Thyroid Cytopathology (Table 1). All patients were referred to surgery. The minimal extent of the operation varied with reference to an initial diagnosis or US findings from lobectomy for follicular neoplasm or suspicion of TC, via subtotal thyroidectomy for multinodular goiter and total thyroidectomy in case of TC. Histopathological findings were compared with FNAB results.

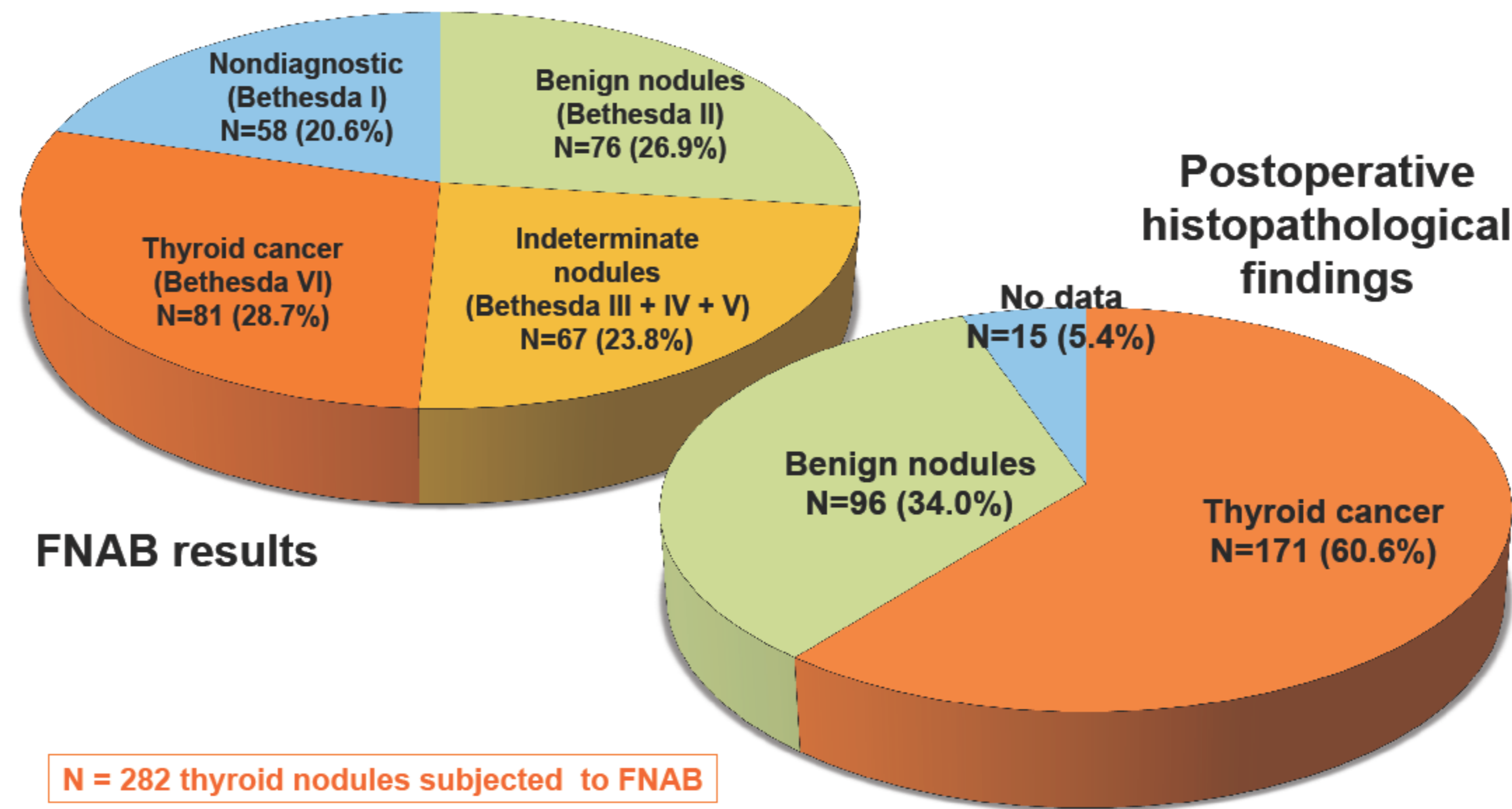
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## Aim of the study

The aim of the study was to evaluate the risk of thyroid cancer in patients admitted to a tertiary reference thyroid cancer center.

## Results



N = 282 thyroid nodules subjected to FNAB

Fig. 1. The comparison between of FNAB (left) and histopathological findings (right) on the basis of a retrospective analysis of 282 thyroid nodules diagnosed in a tertiary reference thyroid cancer center

Bethesda I	Bethesda II	Bethesda III	Bethesda IV	Bethesda V	Bethesda VI
51.7 %	27.6%	N/A	39.1%	70.7%	100%

Table 2. The risk of thyroid cancer with respect to a particular Bethesda category in thyroid nodules referred to a tertiary reference TC center

Initially, according to the results of US-guided FNAB of 282 thyroid tumors 76 (26.9%) of them were classified as benign (Bethesda II), 81 (28.7%) as malignant (Bethesda VI), while 67 (23.8%) as indeterminate nodules (Bethesda III+IV+V). For 58 (20.6%) remaining tumors the FNAB result was inconclusive (Bethesda I) (Fig. 1).

Finally, TC was confirmed by histopathological examination in 171 tumors (60.6%). Ninety six (34%) nodules were benign in histopathology, whereas for 15 (5.4%) remaining no data were available (Fig. 1).

Among 171 tumors postoperatively diagnosed as TC 21(76), 39(67) and 81(81) preoperatively classified as benign, indeterminate and malignant, respectively (the numbers given in brackets reflect a total number of benign, indeterminate and malignant nodules by FNAB, respectively). Surprisingly, TC was confirmed after surgery in 30 of 58 nondiagnostic FNAB (Fig.2).

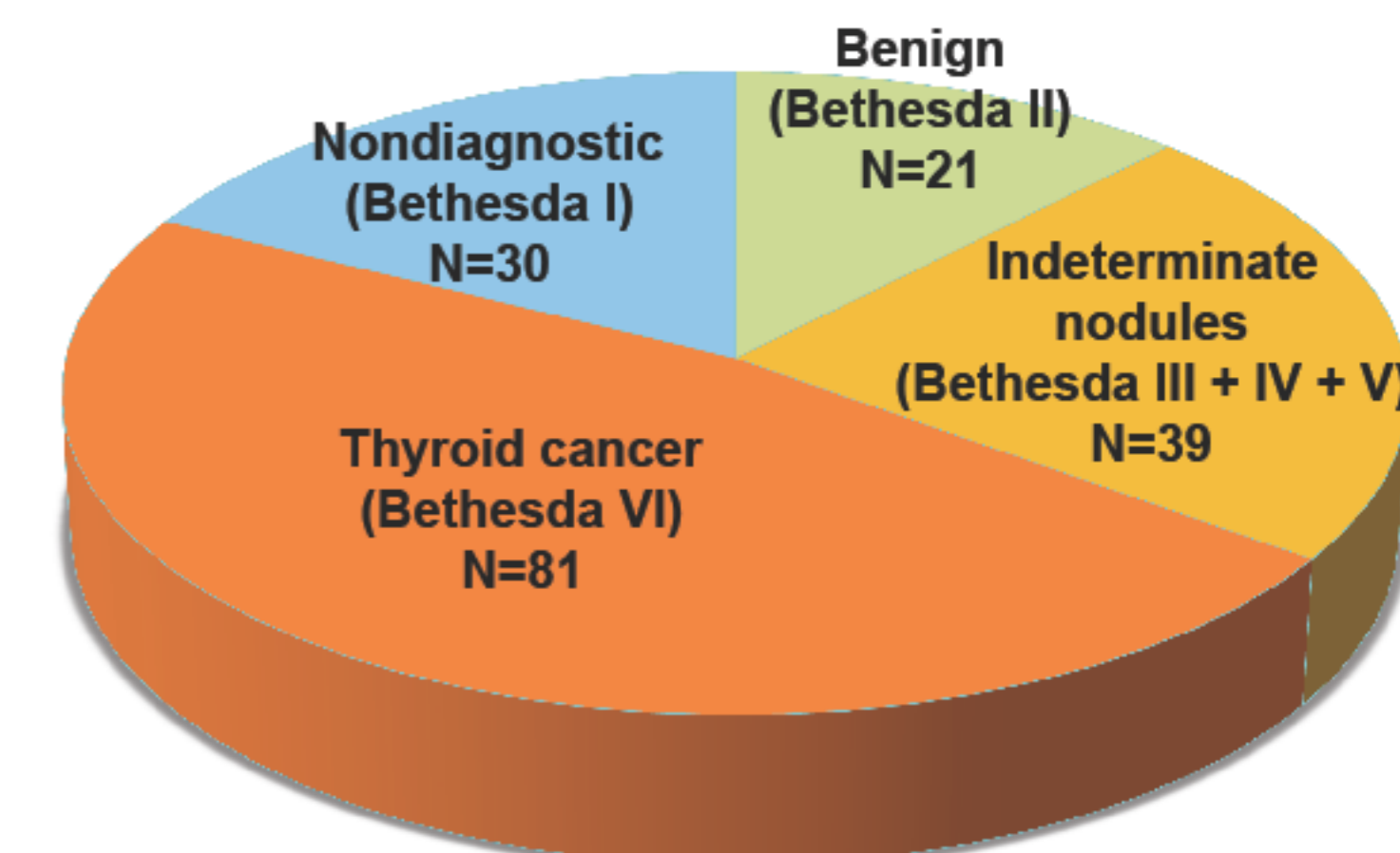
Considering 67 indeterminate nodules 3 were diagnosed as Bethesda III, 23 as follicular neoplasm (Bethesda IV), whereas 41 others were suspicious for malignancy (Bethesda V) (Fig 3). After the surgery, TC was diagnosed 39 tumors (58.2%), among them in 9 of 23 follicular neoplasms and 29 of 41 suspected for malignancy.

Relatively high risk of TC concerned initially benign thyroid nodules. TC was found in a postoperative histopathology as many as 21 of 76 them (27.6%).

## Conclusions

The risk of thyroid cancer in thyroid nodules referred to a specialized thyroid cancer center is substantially higher than in a routine practice. Thus, more careful procedures, including molecular markers are necessary to state a proper diagnosis and start the treatment on time.

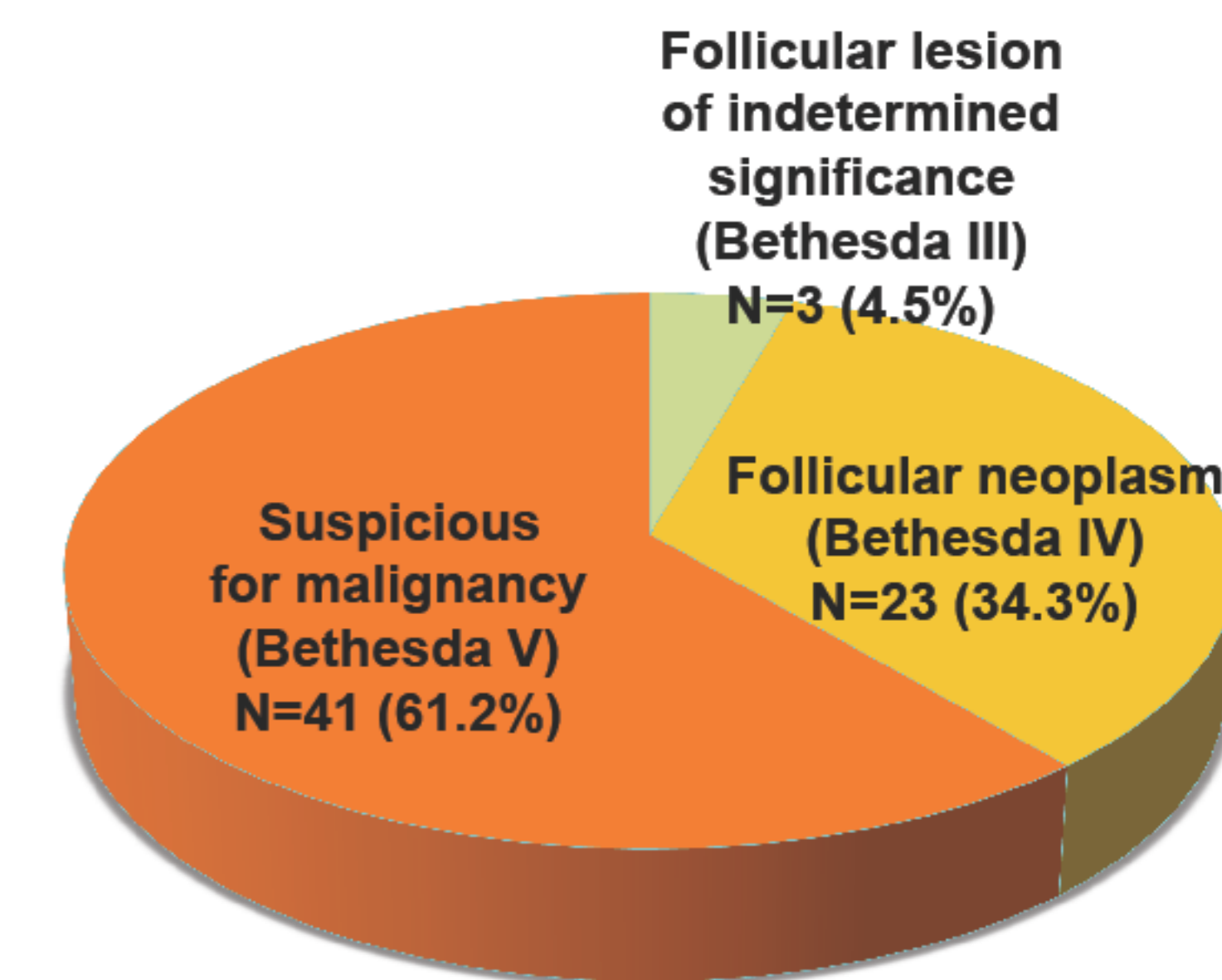
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N = 171 thyroid cancers confirmed in a histopathological examination

Fig. 2. The results of an initial FNAB in 171 thyroid nodules postoperatively diagnosed as thyroid carcinoma

The risk of TC evaluated on the basis of analyzed data was 27.6% for benign nodules, 39.1% for follicular neoplasm, 70.7% for nodules suspicious for malignancy and 100% when tumor were classified as malignant (Table 2).



N = 67 of indeterminate thyroid nodules by FNAB

Fig.3. FNAB results with reference to indeterminate thyroid nodules

