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CONSENSUS DOCUMENT

Cytological classification of thyroid nodules. Proposal of the SIAPEC-IAP Italian Consensus Working Group

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Foreword

In 2006-2007, a committee was established by the Italian Societies of Endocrinology (SIE and AME) and Pathology (SIAPEC-IAP), composed of invited endocrinologists with special interest in thyroid diseases, endocrine pathologists and cytopathologists. The main objectives of the committee were to analyse current diagnostic practice and reporting of fine needle aspiration biopsy cytology, and to define a consensus on the definition of each individual diagnostic category. Such a definition should include a shared, brief description of the main cytomorphological features followed by categorisation of the diagnosis in a five-tiered system (TIR 1 through 5). The definition should also provide a summary of clinical implications for each cytological diagnosis.
The committee met several times to analyse the currently proposed international classification schemes. Different diagnostic reporting approaches were discussed with clinical colleagues, and the suggested therapeutic attitudes were recorded. The following consensus document is the final proposal.

Introduction

The term FNC is an acronym for "fine needle cytology". This technique provides a cytological sample using 22G (or thinner) needles with or without aspiration. In the cytological report, the needle gauge used to collect the sample should be indicated. In case of solid and vascularized nodules, sampling without aspiration is recommended. Ultrasonography can be useful for multinodular glands and for cystic lesions with solid component filling their cavities. The presence of the cytopathologist on-site is recommended for evaluating sampling adequacy. Aspirated material should be smeared on a glass slide. Liquid-based cytology techniques (LBC) have not shown any substantial advantages compared with traditional methods; therefore, they should be performed only in reference centres by experienced cytopathologists. The use of a cell block is an additional technique, and can be helpful when further investigations are required.
The main goal of FNC is to identify patients who may benefit from medical treatment from those who should undergo surgery. In non-functioning thyroid nodules, the diagnostic accuracy of FNC is 95%. Ideal parameters of quality recommend less than 2% of false negative results and less than 3% of false positive results. The cytological report should be descriptive and, whenever possible, a definitive diagnosis should be made. A numerical code identifying a category of lesions homogeneous for malignancy risk and therapeutic options can be added to the cytological report. The clinical request form should contain essential clinical information, including the sampling site and the modality of the corresponding FNA.

The diagnostic categories are the following:

TIR 1. NON-DIAGNOSTIC

The "non-diagnostic" reports should not exceed 20% of the FNC (it is advisable they account for no more than 15%). They can be classified as inadequate and/or non-representative. The rate of non-diagnostic results varies depending on technical factors. By definition, a sample is inadequate when biased by smearing and/or fixing and/or staining errors, whereas a sample is defined "non-representative" when an insufficient number of cells for a definitive diagnosis is collected from the lesion.
The pathologist should specify the inadequacy or non-representativeness of the sample in the cytological report and, if possible, the causes should be detailed. A

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sample correctly smeared, fixed and stained is defined as adequate.
A sample with at least 6 groups of 10-20 well-preserved epithelial cells from the lesion can be considered representative. Cytological diagnosis should be made only on representative and adequate samples.
Action. Repetition of FNC at least one month after the previous, according to the clinician's judgement. Some cases that are morphologically defined as non-representative should be evaluated according to the clinical setting. These cases include the following:
a) abundant and homogeneous colloid with scattered follicular cells aspirated from colloid nodules or cysts;
b) only lymphocytes in clinically diagnosed Hashimoto thyroiditis;
c) erythrocytes, necrosis and macrophages from haemorrhagic pseudocysts.
If a solid portion remains after emptying a cystic lesion under ultrasonographic guidance, it should be immediately re-aspirated. Ultrasonography is fundamental in order to guide the needle to the solid component.

TIR 2. Negative for malignant cells

This category accounts for 60-75% of cytological reports. It includes colloid goiter, autoimmune thyroiditis (Hashimoto's) and granulomatous thyroiditis (de Quervain's).
Action. Follow-up or FNC repetition, according either to the clinician's or cytopathologist's judgement may reduce the number of false negative results.

TIR 3. Inconclusive/indeterminate (Follicular proliferation)

This category encompasses all follicular-patterned lesions: adenomatoid hyperplasia, adenoma, oxyphilic cells lesions, some cases of follicular variant of papillary carcinoma and microinvasive follicular carcinomas. In these cases only histology (and not cytology alone) can provide a definitive diagnosis. This category accounts approximately for 20% of cytological reports. About 80% of TIR 3 diagnoses are benign lesions, whereas only 20% of are malignant tumours after histological examination.
Immunohistochemical markers such as galectin-3, HBME-1, cytokeratin 19 may improve the accuracy of cytological diagnosis. Although they do not have a well established predictive value, they can be used following strict diagnostic protocols to discriminate positive cases (surgical option) from negative ones (follow-up).
Some cases characterized by too mild cytological alterations to be included in TIR 4 but which, on the other hand cannot be included in the benign category (TIR 2), can be classified as TIR 3. The choice of including these samples in the "low risk" category must be supported by an appropriate description in the medical report.
Action. Surgical excision of the lesion and histological examination. Intraoperative histological examination is not recommended. The surgical option should be evaluated in the clinical and imaging setting.

TIR 4. Suspicious for malignancy

This is a heterogeneous group of lesions. Samples with insufficient malignant neoplastic cells and samples without sufficient cytological atypia to make a diagnosis of cancer are included. This category almost always includes suspicious papillary carcinomas, and accounts for about 5% of cytological diagnoses.
Action. FNC repetition, according to the clinician's or cytopathologist's judgement. Surgery with intraoperative histological examination is recommended.

TIR 5. Diagnostic of malignancy

All cases with a definitive diagnosis of malignant neoplasm (papillary, medullary and anaplastic carcinomas, lymphomas and metastasis) are included in this category. It accounts for 5-15% of cytological diagnoses. The medical report should contain an adequate cytological description.
Action Surgery for differentiated carcinomas. The surgical option should be evaluated in the clinical setting and on the basis of the cytological report.
For anaplastic carcinomas, lymphomas and metastatic lesions, continuation of diagnostic/therapeutic procedures is recommended.

Conclusions

FNC is a screening test. A definitive diagnosis can be made only after histological examination of the nodule.

Selected references

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