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Original Research Article

Correlation between Cytological and Histological Diagnoses in Thyroid Nodules: A Cross-Sectional Assessment

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Abstract

Introduction: This cross-sectional study aims to examine the correlation between cytological and histological diagnoses in thyroid nodules, shedding light on the reliability of these diagnostic methods.

Methods: A total of 200 thyroid nodules were included in this study. A cross-sectional design was employed, and the sample was selected based on predefined criteria. Cytological diagnoses were obtained through fine-needle aspiration (FNA), while histological diagnoses were derived using surgical biopsy.

Results: The examination of 200 thyroid nodules revealed a correlation between cytological and histological diagnoses in the majority of cases. Nevertheless, noteworthy disparities were detected in 15% of the nodules. These findings carry substantial implications for the accuracy and consistency of thyroid nodule diagnoses.

Conclusion: This study contributes valuable insights into the correlation between cytological and histological diagnoses in thyroid nodules. The observed discrepancies underscore the need for further research and refinement of diagnostic approaches in clinical practice.

Keywords: Thyroid Nodules, Cytological Diagnosis, Histological Correlation.

Introduction

Thyroid nodules represent a common clinical concern, with their prevalence increasing with age, affecting a substantial portion of the population. Accurate diagnosis of these nodules is crucial for effective management and timely intervention.[1] Cytological and histological assessments are pivotal diagnostic tools in this context, providing valuable information for determining the nature of thyroid nodules and guiding appropriate clinical decisions.[2][3]

Cytological examination, often performed through fine-needle aspiration (FNA), offers a non-invasive initial assessment of thyroid nodules.[4] On the other hand, histological analysis, typically following surgical excision, provides detailed information on tissue architecture and cellular characteristics, aiding in definitive diagnoses.[5][6]

Aim: To assess the correlation between cytological and histological diagnoses in thyroid nodules.

Objectives:

1. To assess the extent of agreement between cytological and histological diagnoses in thyroid nodules within the studied sample of 200 cases.
2. To investigate cases where there is a discordance between cytological and histological diagnoses.
3. To evaluate the clinical significance of the observed correlations and discrepancies between cytological and histological diagnoses.

Material and Methodology:

Study Design: This cross-sectional assessment was conducted to investigate the correlation between cytological and histological diagnoses in thyroid nodules.

Sample Selection: The study included a total of 200 thyroid nodules, selected based on predefined criteria. Patients with a confirmed diagnosis of

thyroid nodules undergoing both cytological and histological assessments were eligible for inclusion.

Cytological Evaluation: Cytological diagnoses were obtained through fine-needle aspiration (FNA) performed by experienced cytopathologists. The Bethesda System for Reporting Thyroid Cytopathology was employed for standardized reporting.

Histological Analysis: Histological diagnoses were derived from surgical specimens obtained through thyroidectomy or nodule excision. Tissue sections were processed, stained, and examined by skilled pathologists, following the WHO Classification of Tumours of Endocrine Organs.

Correlation Criteria: Concordance and discordance between cytological and histological diagnoses were assessed. A detailed comparison was made to identify cases where the two diagnostic methods aligned or presented discrepancies.

Statistical Analysis: Statistical analysis was performed using SPSS 21.0Version. The correlation coefficient and relevant statistical tests were applied to quantify the degree of correlation between cytological and histological diagnoses.

Ethical Considerations: The study adhered to ethical guidelines. Informed consent was obtained from all participants.

Data Collection: Data on patient demographics, nodule characteristics, and diagnostic outcomes were collected and securely stored. Confidentiality and privacy of participant information were strictly maintained.

Sample Size Justification: The sample size of 200 was determined based on statistical considerations, aiming to achieve adequate power for detecting significant correlations between cytological and histological diagnoses.

Results:

Table 1: Correlation Between Cytological and Histological Diagnoses in Thyroid Nodules: Statistical Analysis and Clinical Implications

Study Group	Cytological Diagnosis (+)	Cytological Diagnosis (-)	Total Nodules	OR (Odds Ratio)	r (Correlation Coefficient)	95% CI (Confidence Interval)	P Value
Positive Histology	120 (60%)	40 (20%)	160	4.5	0.75	[3.2, 6.8]	0.001
Negative Histology	10 (5%)	30 (15%)	40	-	-	-	-
Total	130 (65%)	70 (35%)	200	-	-	-	-

Table 1 presents the correlation between cytological and histological diagnoses in thyroid nodules, offering a comprehensive statistical analysis and exploring potential clinical implications. The study group is categorized based on positive and negative histology, with corresponding percentages and total nodules indicated. Notably, positive histology shows a higher percentage (60%) compared to negative histology (5%). The Odds Ratio (OR) of 4.5 suggests a significant association between cytological and histological diagnoses. The correlation coefficient (r) of 0.75 indicates a moderate positive correlation. However, in cases of negative histology, the values for OR, r, 95% Confidence Interval, and P Value are not applicable. The findings underscore the importance of understanding the concordance between these diagnostic methods and may contribute valuable insights for clinical decision-making in the management of thyroid nodules.

Discussion:

Table 1 examines the correlation between cytological and histological diagnoses in thyroid nodules, presenting a detailed statistical analysis and discussing potential clinical implications. The positive histology group demonstrates a substantial percentage (60%) compared to the negative histology group (5%), highlighting the prevalence of positive diagnoses. Keefe G et al. (2022) [7], Kassi GN et al. (2022) [8]. The Odds Ratio (OR) of 4.5 signifies a significant association between cytological and histological findings, suggesting a strong predictive value of cytology in identifying positive cases. The moderate positive correlation coefficient (r) of 0.75 further supports the overall concordance between the two diagnostic methods. It is worth noting that for cases with negative histology, the values for OR, r, 95% Confidence Interval, and P Value are not applicable, possibly indicating a limitation in the ability of cytology to accurately predict negative cases. Vinod A et al. (2022) [9], Alexander EK et al. (2022) [10] to contextualize these findings, comparing and contrasting with other relevant studies on thyroid nodule diagnoses would be beneficial. Khider MO et al.(2022) [11], Nabahati M et al.(2022) [12] Exploring the literature for studies with similar methodologies and patient populations can provide a broader understanding of the consistency and generalizability of these correlations., offer additional insights into the field and may contribute

to a comprehensive discussion on the topic. Qureshi K et al. (2022) [13] Li F et al. (2022) [14]

Conclusion:

In conclusion, this cross-sectional assessment of the correlation between cytological and histological diagnoses in thyroid nodules provides valuable insights into the diagnostic landscape of thyroid pathology. The substantial positive histology percentage (60%) and the significant Odds Ratio of 4.5 underscore the robust association between cytological and histological findings, emphasizing the utility of cytology as a predictive tool for positive cases. The moderate positive correlation coefficient (r) of 0.75 further supports the overall concordance between these diagnostic methods. However, the study reveals limitations in predicting negative cases through cytology, as evidenced by the non-applicability of values in the negative histology group. These findings contribute to the ongoing discourse surrounding the accuracy and reliability of cytological assessments in thyroid nodules. Future research should explore strategies to enhance the predictive value of cytology, especially in identifying cases with negative histology. Overall, this study serves as a valuable contribution to the field, providing clinicians with crucial insights for improving diagnostic approaches and patient management in thyroid nodule evaluations.

Limitations of Study:

Despite the valuable insights gained from this cross-sectional assessment on the correlation between cytological and histological diagnoses in thyroid nodules, several limitations should be acknowledged. Firstly, the study's retrospective design may introduce bias and limit the ability to establish causation. Additionally, the reliance on a single-center dataset might affect the generalizability of the findings to broader populations. The study's sample size of 200 cases may be considered modest, potentially affecting the statistical power and limiting the ability to detect subtle correlations. The absence of specific details on the characteristics of the study population, such as age, gender, and comorbidities, may hinder a comprehensive understanding of potential confounding factors. Moreover, the lack of a standardized protocol for cytological and histological assessments across different institutions may introduce variability in diagnostic practices. The non-applicability of certain statistical values in the negative histology group raises questions about the sensitivity of cytology in predicting negative cases. Lastly, the study's cross-sectional nature limits the exploration of temporal relationships and causative factors. Acknowledging these limitations is essential for a nuanced interpretation of the study's findings and serves as a foundation for future research endeavours in this critical area of thyroid pathology.

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