Correlation Between the TIRADS Score and Cytology Findings in Rustaq Hospital, Oman (year 2020 to 2023)

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ABSTRACT

Objective: To investigate the correlation between the Thyroid Imaging Reporting and Data System (TIRADS) scores and cytology findings in patients with thyroid nodules at Rustaq Hospital, Oman.

Methods: This retrospective study analyzed data from 202 patients who underwent thyroid nodule evaluation at Rustaq Hospital. Variables included age, sex, region of residence, TIRADS scores, cytology findings, histology results, and type of malignancy. Statistical analyses included descriptive statistics, frequency distributions, correlation analysis, and data visualization.

Results: The study found a strong positive correlation (r = 0.737) between TIRADS scores and cytology findings. Higher TIRADS scores were associated with more severe cytology results. The most common malignancy identified was papillary thyroid cancer.

Conclusion: The findings support the use of TIRADS in conjunction with cytology to improve diagnostic accuracy and management of thyroid nodules. These results are consistent with existing literature, which also highlights a significant correlation between ultrasound risk stratification and cytological assessment.

Introduction

Thyroid nodules are prevalent, with a considerable number being detected incidentally during imaging studies. Accurate risk stratification and diagnosis are crucial to determine the appropriate management of these nodules. The Thyroid Imaging Reporting and Data System (TIRADS) is a standardized tool used to classify thyroid nodules based on ultrasound features, aiding in predicting malignancy risk.

Concurrently, the Bethesda System for Reporting Thyroid Cytopathology provides a framework for interpreting fine-needle aspiration cytology (FNAC) results. This study aims to examine the correlation between TIRADS scores and cytology findings in patients at Rustaq Hospital, Oman, and to compare these findings with existing literature.

Materials and Methods Study Design

This retrospective study was conducted at Rustaq Hospital, Oman.

Data from 202 patients who underwent thyroid nodule evaluation were included. Data Collection: Variables included patient ID, sex, age, region of residence, TIRADS scores, cytology results, histology results, and type of malignancy. Data were extracted from hospital records. Statistical Analysis: Descriptive statistics were computed for age, TIRADS scores, and cytology results. Frequency distributions for regions, TIRADS scores, cytology categories, and types of malignancies were analyzed. The correlation between TIRADS scores and cytology findings was assessed using Pearson's correlation coefficient. Data visualization included histograms, bar charts, and scatter plots.

Results

Total number of patients were 202, duplicated 8 patients, male 18, female 184

Descriptive Statistics

Age Distribution: The mean age was 42.82 years (SD = 15.60),

ranging from 14 to 88 years, (diagram 3).
Region Distribution: The majority of patients were from Rustaq (91), followed by Musanaa (49) and Barka (26). (diagram 2)
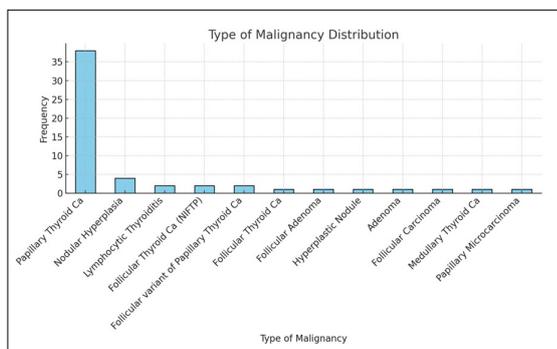
Frequency Distribution
TIRADS Scores: TIRADS 3 (86), TIRADS 4 (74), TIRADS 5 (42).
Cytology Findings: (diagram 5) Category 2: Benign (77)
Category 2c: Benign (36)
Category 5: Suspicious for Malignancy (29)
Category 3a: Atypia of Undetermined Significance (AUS) (28)
Category 3f: Follicular Lesion of Undetermined Significance (FLUS) (19) Category 4: Follicular Neoplasm or Suspicious for a Follicular Neoplasm (13)

Type of Malignancy: Papillary thyroid cancer was the most common malignancy (38 cases, diagram 1).
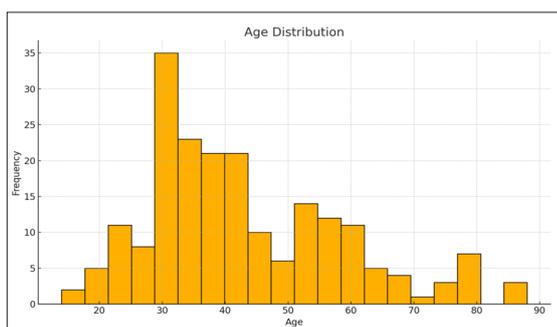
Correlation Analysis A strong positive correlation ($r = 0.737$) was found between TIRADS scores and cytology findings, indicating that higher TIRADS scores are associated with more severe cytology results.
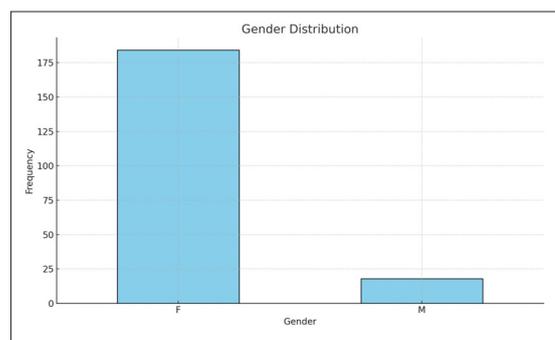

Figure 1: Type of Malignancy Distribution
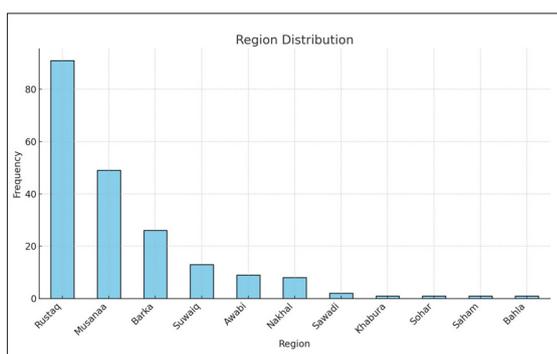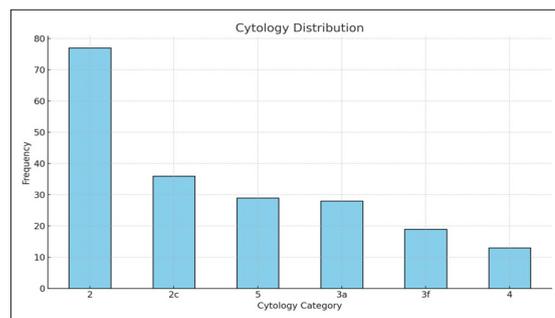

Figure 2: Region Distribution

Figure 3: Age Distribution

Figure 4: Gender Distribution

Figure 5: Cytology Findings

Literature Review
Several studies have demonstrated the reliability of TIRADS in predicting the malignancy risk of thyroid nodules, correlating strongly with cytology findings classified under the Bethesda System for Reporting Thyroid Cytopathology.

One meta-analysis investigated the relationship between TIRADS scores and Bethesda cytology categories across multiple studies. The findings confirmed a significant correlation, emphasizing that higher TIRADS scores are predictive of higher Bethesda categories, indicating a greater likelihood of malignancy. The study concluded that TIRADS is a reliable tool for risk stratification of thyroid nodules and can guide the decision-making process for fine-needle aspiration biopsy.

A comprehensive review discussed the various ultrasound risk stratification systems, including TIRADS, and their role in the evaluation of thyroid nodules. It highlighted the strengths and limitations of TIRADS, particularly its ability to reduce unnecessary biopsies while maintaining high sensitivity and specificity for detecting malignancy. The review also underscored the importance of combining ultrasound features with cytology results to enhance diagnostic accuracy.

Another study provided updates on the Bethesda System for Reporting Thyroid Cytopathology, focusing on its categories and their clinical implications. The study reviewed the predictive values of each category and discussed advancements in molecular testing that complement cytology. It emphasized that integrating TIRADS with the Bethesda system can improve the diagnostic workflow for thyroid nodules, allowing for better risk stratification and management.

An evaluation of the practical application of TIRADS in a clinical setting compared its performance with other risk stratification systems. The results demonstrated that TIRADS had a higher

predictive value for malignancy compared to other systems. The study recommended the adoption of TIRADS in routine clinical practice to standardize the assessment of thyroid nodules and improve patient outcomes [1-4].

Conclusion
The study demonstrates a strong correlation between TIRADS scores and cytology findings, reinforcing the utility of TIRADS in conjunction with cytology for evaluating thyroid nodules. These results are consistent with existing literature and underscore the importance of integrating both methods to improve diagnostic precision and patient outcomes.

References
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