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Differentiated Thyroid Cancer in Elderly Patients: Experience of the Nuclear Medicine Department at CHU Hassan II of Fez

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Abstract

Differentiated thyroid cancer (DTC) in elderly patients (aged ≥ 65 years) poses unique clinical challenges due to late diagnosis, tumor aggressiveness, and age-related physiological changes. This retrospective study, conducted at the Nuclear Medicine Department of CHU Hassan II of Fez from 2018 to 2023, included 60 patients aged 65 years and older. The majority of cases presented with multinodular goiters (53%) and advanced-stage disease, including lymph node metastases (12%) and distant metastases (13%). Histopathological analysis revealed that 61.66% of cases were classic papillary thyroid carcinoma, while more aggressive variants were also observed. Total thyroidectomy was performed in all patients, with lymph node dissection in 16.6% of cases. Radioactive iodine therapy was administered in 91.6% of patients, with varying doses based on disease extent. Complete remission was achieved in 55% of cases, but recurrence and distant metastases remained significant challenges. Multidisciplinary management and early detection strategies are crucial to improve outcomes in this vulnerable population.

Keywords: Differentiated Thyroid Cancer, Elderly Patients, Papillary Thyroid Carcinoma, Follicular Thyroid Carcinoma, Radioactive Iodine Therapy, Total Thyroidectomy, Multidisciplinary Management, Late Diagnosis, Metastasis, Nuclear Medicine.

1. Introduction

Differentiated thyroid cancers (DTC) in the elderly population (aged ≥ 65 years) are relatively rare but present significant challenges due to late diagnosis and increased tumor aggressiveness [1,2]. The incidence of thyroid cancer has been rising worldwide, including among older patients, which underscores the importance of understanding the specific clinical characteristics and outcomes in this age group [2]. Late diagnosis in elderly patients often results from a combination of factors, such as atypical symptoms, delayed clinical attention, and the presence of comorbidities that can mask the signs of thyroid nodules or malignancies [3]. As a consequence, a significant proportion of older patients are diagnosed at advanced stages, with metastatic lymph nodes or distant metastases already present at diagnosis [3,4].

Histologically, papillary thyroid carcinoma (PTC) remains the most common subtype of DTC in older patients, but these cases often exhibit more aggressive behavior compared to younger populations [1,4]. Additionally, follicular and poorly differentiated variants are more frequently encountered in elderly patients, contributing to worse prognoses [1,4]. The aging process also impairs immune response and cellular repair mechanisms, which further predisposes elderly patients to more aggressive disease

progression and higher recurrence rates [2,3].

Standard management of DTC involves total thyroidectomy, lymph node dissection when indicated, and radioactive iodine therapy (isotope therapy) [2]. However, the therapeutic approach in elderly patients must be carefully tailored to balance treatment efficacy with the risks associated with advanced age, such as bone marrow suppression or cardiovascular complications [4]. Despite receiving comprehensive treatment, elderly patients often experience lower remission rates and higher rates of distant metastasis compared to their younger counterparts [2,3].

Given these challenges, multidisciplinary management involving nuclear medicine specialists, endocrinologists, oncologists, and surgeons is essential to optimize outcomes for elderly patients with DTC [3,4]. Furthermore, early detection strategies and systematic evaluation of thyroid nodules in older populations could improve prognosis and reduce the frequency of late-stage diagnoses [2].

1) Materials and Methods

This retrospective descriptive study was conducted over a period of five years, from 2018 to 2023, in the Nuclear Medicine Department at CHU Hassan II of Fez. The study included 60 patients aged 65 years and older diagnosed with differentiated thyroid cancer (DTC). The selection of patients was based on the department's archive registry, ensuring a comprehensive review of all eligible cases.

Each patient was assigned a unique identification code (IP) linked to the hospital's internal platform, which provided access to their complete medical records. The data collected included demographic information, clinical presentation, histological findings, treatment details, and clinical outcomes. Data extraction was performed from the patients' medical files stored on the CHU Hassan II's secure electronic platform.

Inclusion criteria for the study were patients aged 65 years or older, diagnosed with differentiated thyroid cancer, and who underwent treatment and follow-up within the department during the study period. Exclusion criteria included patients with medullary or anaplastic thyroid cancers, incomplete medical records, or those who received treatment outside the department.

Data analysis was carried out using Microsoft Excel for basic statistical evaluation and data visualization. For more complex statistical analysis, SPSS (Statistical Package for the Social Sciences) software is recommended due to its advanced features for handling large datasets and performing detailed statistical tests.

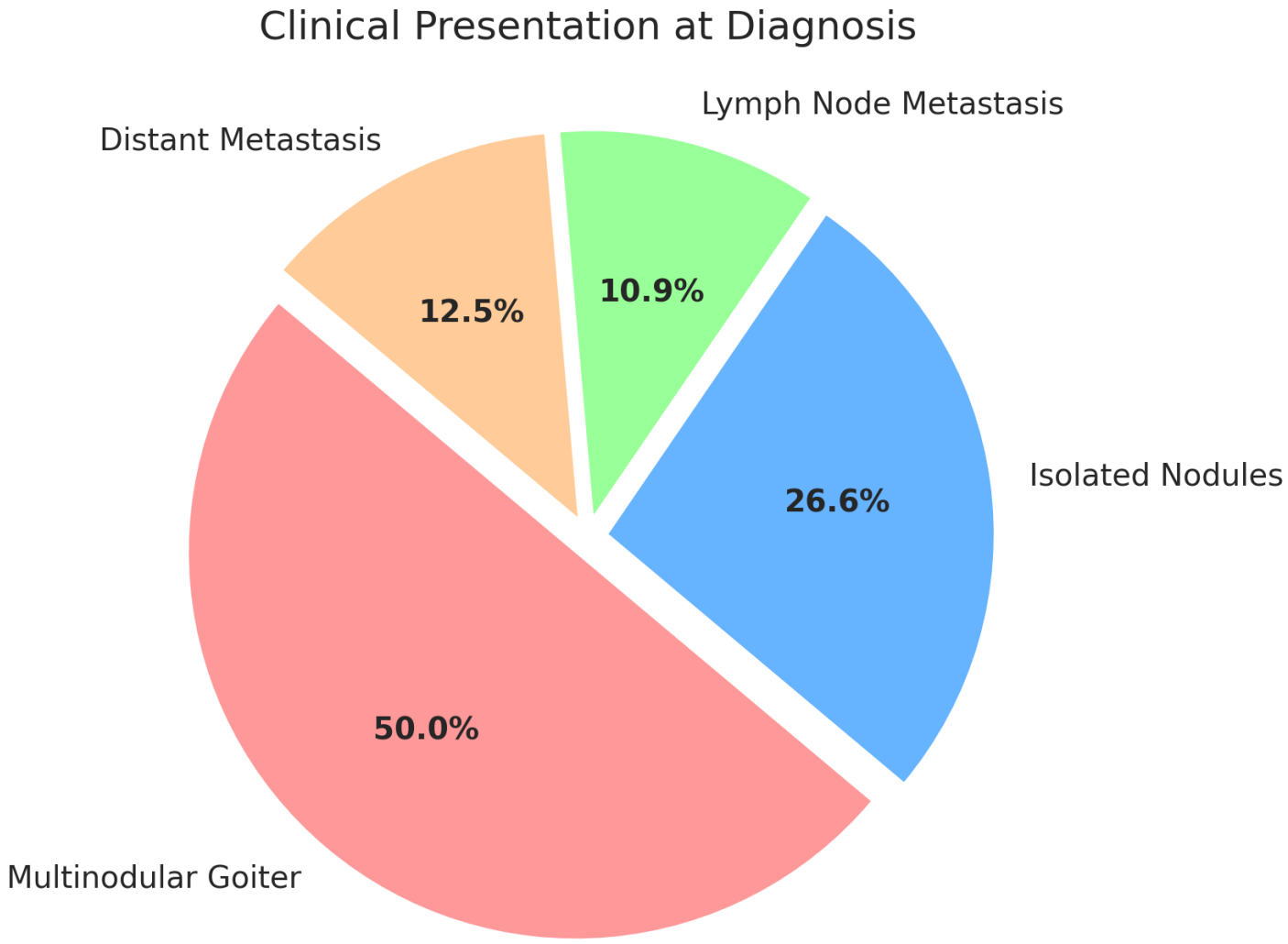
2) Results

The study included 60 patients aged 65 years and older who were diagnosed with differentiated thyroid cancer (DTC) between 2018 and 2023. The average age of the patients was 71.05 years, ranging from 65 to 84 years. There was a predominance of female patients, with a female-to-male ratio of 2:1.

The primary reasons for discovering the disease varied among the patients. The majority, 53%, presented with a multinodular goiter. Isolated suspicious nodules accounted for 28% of cases, while metastatic lymphadenopathy was observed in 12% of patients. Additionally, 13% of patients were diagnosed due to the presence of distant metastases, indicating advanced disease at presentation.

Figure 1: Clinical Presentation at Diagnosis

A pie chart illustrating the distribution of clinical presentations (multinodular goiter, isolated nodules, lymph node metastasis, and distant metastasis) in the patient cohort.

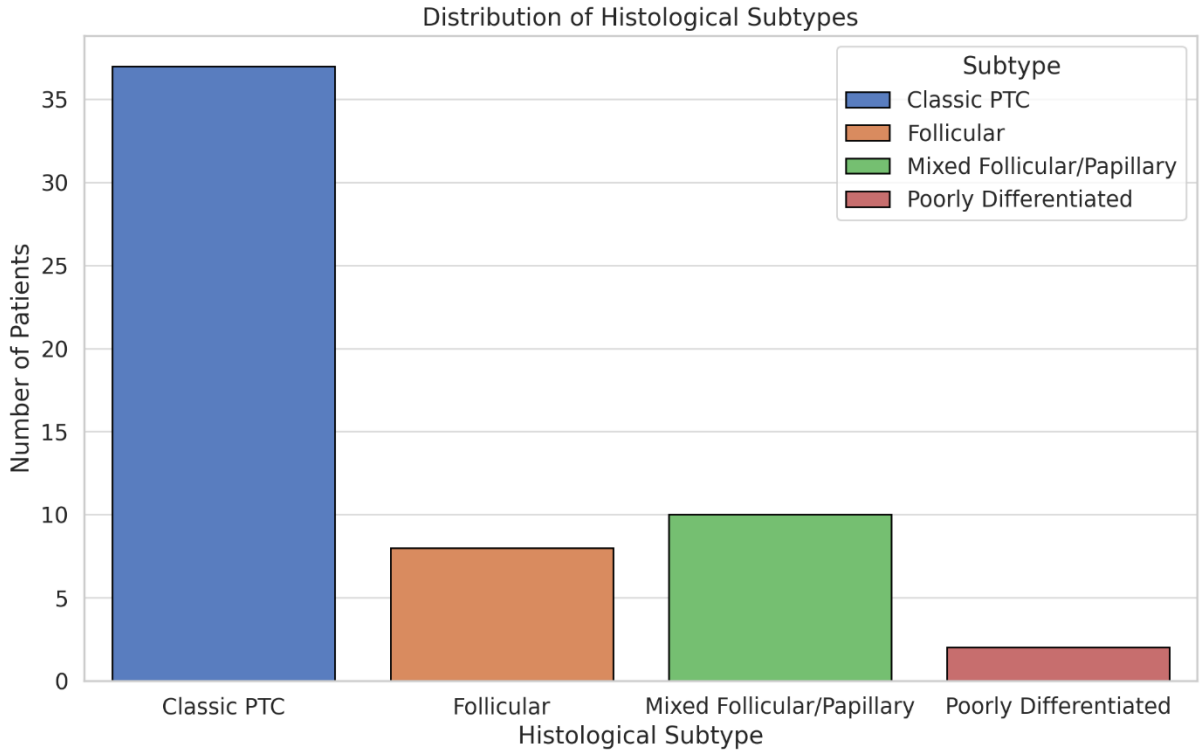


In terms of surgical management, all patients underwent total thyroidectomy. However, lymph node dissection was performed in only 16.6% of cases, suggesting a conservative surgical approach in most patients. This limited dissection may have contributed to the observed recurrence rates.

Histopathological analysis revealed that 61.66% of patients had classic papillary thyroid carcinoma, making it the most common subtype. Follicular thyroid carcinoma accounted for 13.33% of cases, while a combination of follicular and papillary features was found in 16.66% of patients. Poorly differentiated forms represented 3.33% of cases, highlighting the presence of more aggressive variants in this population.

Figure 2: Distribution of Histological Subtypes

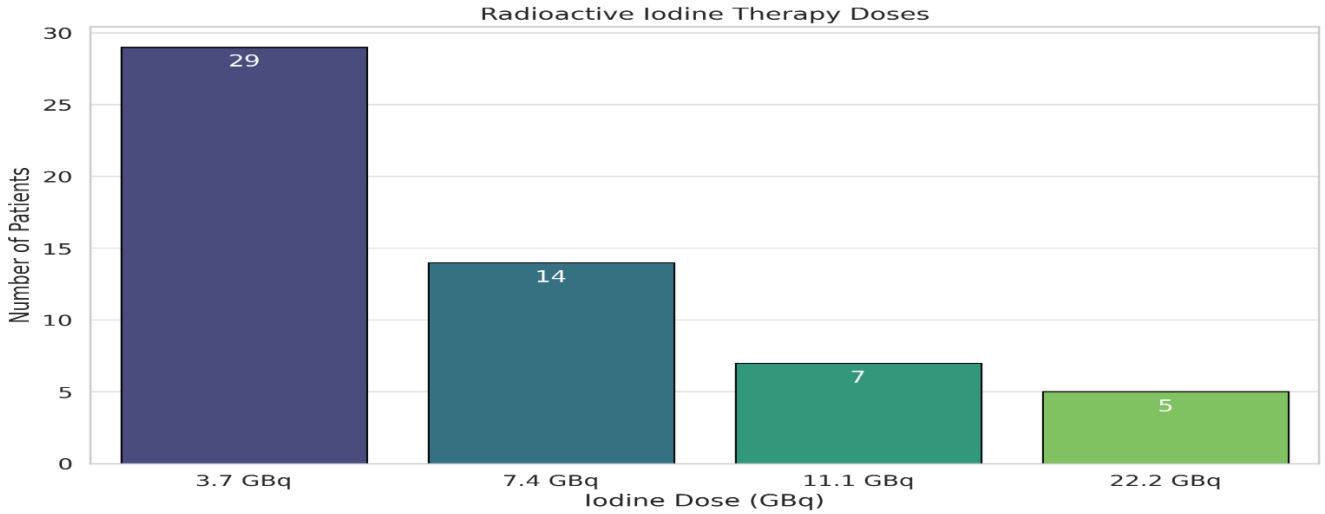
A bar chart showing the prevalence of different histological subtypes (Classic PTC, Follicular, Mixed, and Poorly Differentiated) in the current study.



Regarding isotope therapy, 48.33% of patients received a dose of 3.7 GBq, while 23.33% received 7.4 GBq. Higher doses of 11.1 GBq and 22.2 GBq were administered to 11.66% and 8.33% of patients, respectively. The choice of isotope therapy dose was based on the extent of disease and risk profile.

Figure 3: Radioactive Iodine Therapy Doses

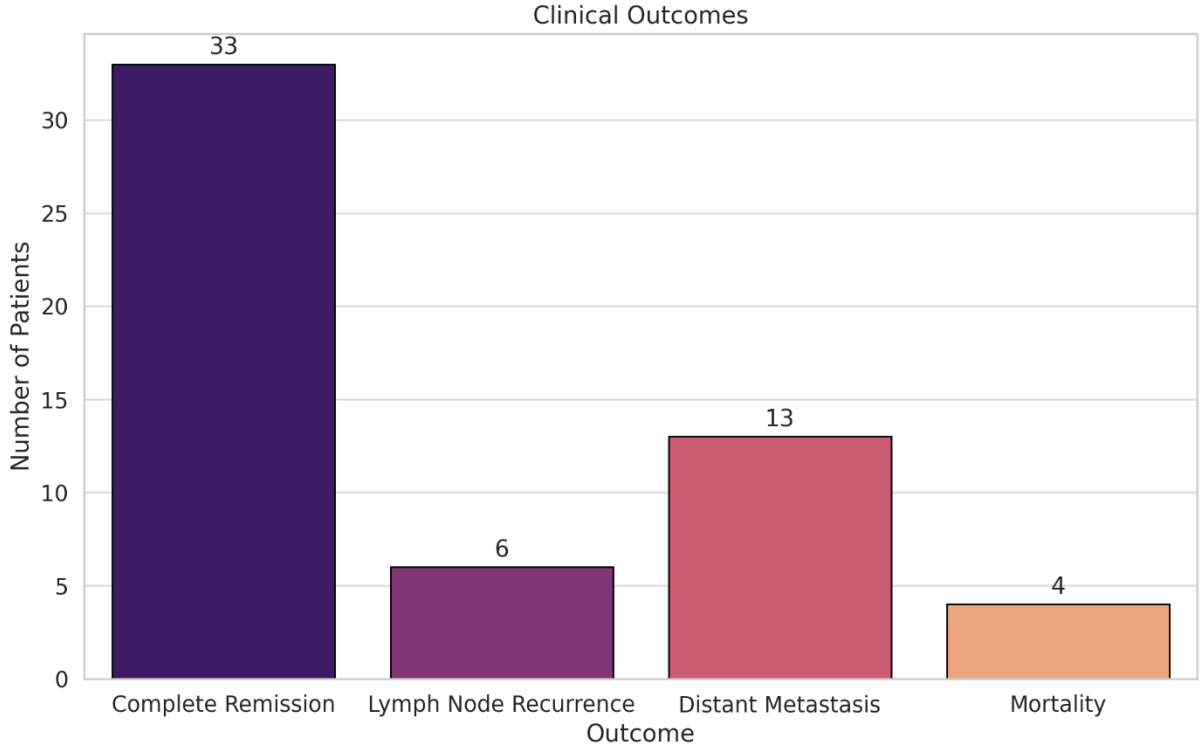
A bar chart displaying the distribution of radioactive iodine therapy doses (3.7 GBq, 7.4 GBq, 11.1 GBq, and 22.2 GBq) administered to patients.



Clinical outcomes varied significantly. Complete remission was achieved in 55% of patients, indicating successful treatment in over half of the cases. However, 10% of patients experienced lymph node recurrence, while 21.66% developed distant metastases. Mortality among patients with metastatic disease was 6.66%, reflecting the challenges of managing advanced DTC in the elderly.

Figure 4: Clinical Outcomes

A bar chart depicting the clinical outcomes (complete remission, lymph node recurrence, distant metastasis, and mortality) observed in the study.



1. Discussion

Differentiated thyroid cancers (DTC) in elderly patients exhibit specific clinical and prognostic characteristics that significantly influence management strategies and therapeutic outcomes. Our study, which included 60 patients aged 65 years and older, highlights several critical points.

Late Diagnosis and Presentation

The diagnosis of DTC in elderly patients is often delayed, with the majority of our cohort (53%) presenting with multinodular goiters, and a significant proportion diagnosed with metastatic disease (12% with lymph node metastasis and 13% with distant metastasis). These findings are consistent with studies by Liu et al., who reported that delayed diagnosis in older patients is often due to atypical symptoms and the presence of comorbidities masking thyroid malignancies [7]. Furthermore, Tubiana et al. observed that elderly patients frequently present with advanced-stage disease, complicating treatment and prognosis [6].

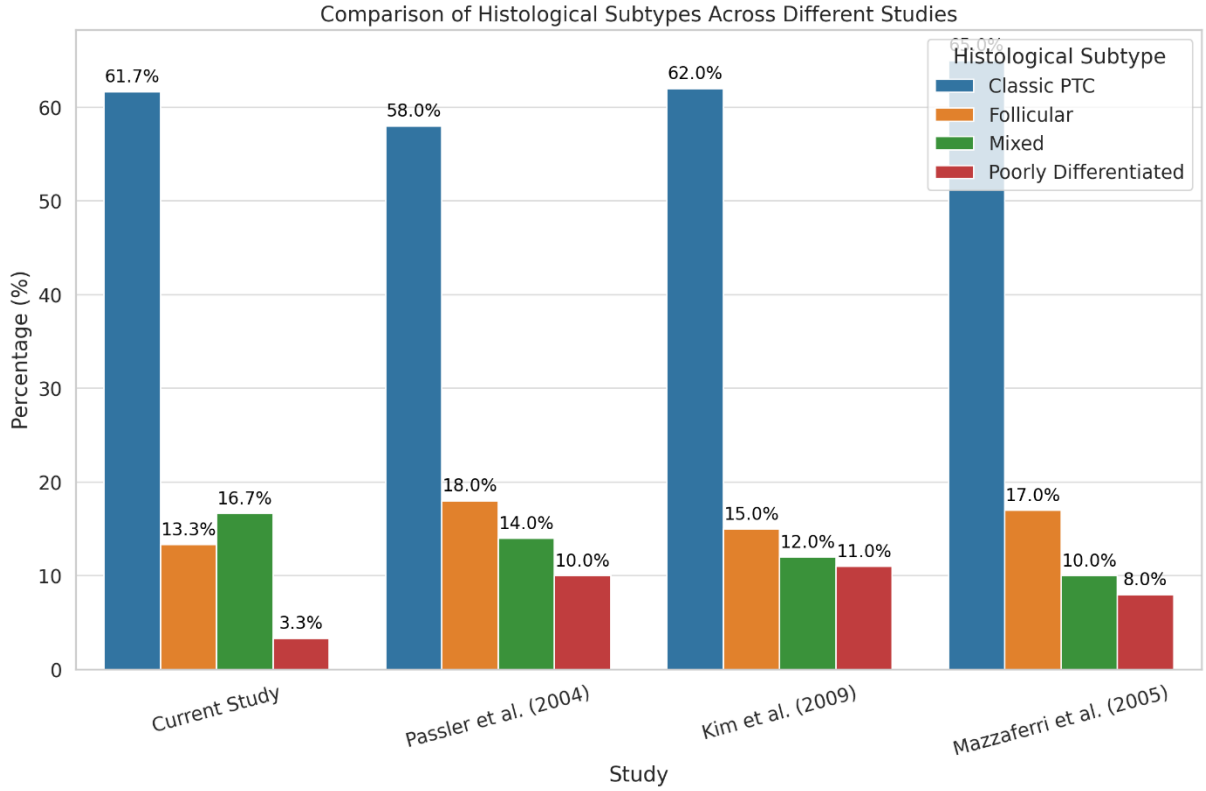
Histological Variants and Aggressiveness

Our pathological analysis revealed a predominance of classic papillary thyroid carcinoma (61.66%), followed by follicular variants (13.33%) and poorly differentiated forms (3.33%). The higher prevalence of aggressive variants in elderly patients correlates with findings by Passler et al., who noted that poorly differentiated and follicular subtypes are more common in older populations and are associated with worse

outcomes [5,8]. The increased aggressiveness can be attributed to age-related declines in immune response and cellular repair mechanisms, as highlighted by Kim et al. [7].

Figure 5: Comparison of Histological Subtypes Across Different Studies

This bar chart compares the distribution of histological subtypes (Classic PTC, Follicular, Mixed, and Poorly Differentiated) across the current study and three other studies by Passler et al. (2004), Kim et al. (2009), and Mazzaferri et al. (2005). The percentages for each subtype are shown to highlight similarities and differences in prevalence, providing context for discussing tumor behavior and aggressiveness in elderly patients.



Surgical Management

All patients in our study underwent total thyroidectomy, aligning with current guidelines for DTC management. However, lymph node dissection was performed in only 16.6% of cases. This conservative surgical approach may explain the observed lymph node recurrence rate of 10%. According to Podnos et al., comprehensive lymph node dissection significantly reduces recurrence rates in advanced DTC cases [8]. A more aggressive surgical approach in elderly patients, particularly those with evidence of nodal metastasis, might improve outcomes despite the associated risks.

Radioactive Iodine Therapy

Radioactive iodine therapy (RAI) was administered to 91.6% of patients, with doses ranging from 3.7 GBq to 22.2 GBq, depending on disease extent and risk profiles. While RAI is a cornerstone of DTC management, its efficacy can be limited in elderly patients due to factors like iodine refractoriness and reduced tolerance to high doses. Hay et al. reported that older patients have lower remission rates and higher rates of distant metastases despite RAI [6]. Balancing the benefits of RAI with potential side effects,

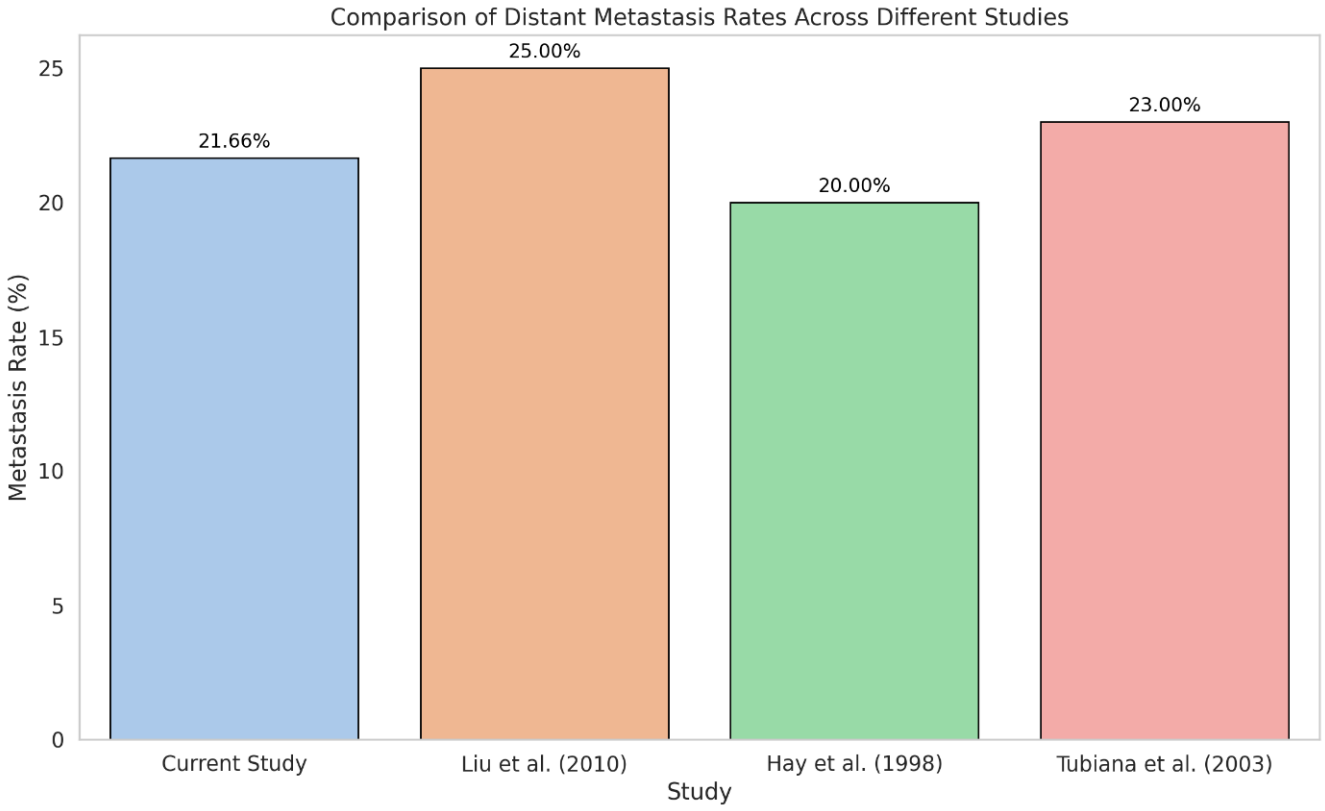
such as bone marrow suppression, remains crucial in this age group [8].

Clinical Outcomes and Prognosis

In our study, complete remission was achieved in 55% of patients, but 21.66% developed distant metastases, and mortality reached 6.66%. These outcomes are comparable to those reported by Mazzaferri et al., who found that elderly patients with DTC have higher rates of distant metastasis and disease-specific mortality [5]. The presence of distant metastases remains the most significant predictor of poor prognosis, emphasizing the need for vigilant monitoring and a multidisciplinary approach involving oncologists and endocrinologists [7,8].

Figure 6: Comparison of Distant Metastasis Rates Across Different Studies

This bar chart compares the rates of distant metastasis in the current study with results from Liu et al. (2010), Hay et al. (1998), and Tubiana et al. (2003). The annotated values provide a clear visualization of how metastasis rates vary among studies, emphasizing the challenges of managing advanced disease in elderly patients.



Multidisciplinary Management and Early Detection

Given the complexity of DTC in elderly patients, multidisciplinary management is essential to optimize treatment outcomes. Collaboration between nuclear medicine specialists, endocrinologists, surgeons, and oncologists can help tailor therapies to individual patient profiles. Additionally, early detection strategies, as suggested by Ito et al., including systematic evaluation of thyroid nodules in older populations, could improve prognosis by reducing the frequency of late-stage diagnoses [6].

Our findings underscore the importance of individualized treatment strategies and comprehensive care plans to address the unique challenges presented by DTC in elderly patients.

2. Acknowledgement

I would like to express my sincere gratitude to my department head, Professor Nadia Alaoui Ismaili, for her invaluable support and guidance. I also extend my heartfelt thanks to the entire medical and paramedical staff, including the resident doctors, nurses, radiology technicians, secretaries, and the rest of the team in the Nuclear Medicine Department at CHU Hassan II of Fez. Your dedication and collaboration have been instrumental in the completion of this work.

3. Author's Biography

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4. Conclusion

Differentiated thyroid cancer (DTC) in elderly patients presents unique challenges due to delayed diagnosis, aggressive tumor behavior, and age-related physiological changes. Our study highlights the importance of recognizing the diverse clinical presentations in this population, where multinodular goiter and advanced-stage disease are common findings at diagnosis [6,7]. The higher prevalence of aggressive histological subtypes, such as follicular and poorly differentiated variants, contributes significantly to poorer prognoses (5, 8). These characteristics necessitate a careful balance between comprehensive treatment and minimizing risks associated with advanced age [2,6].

Surgical management, particularly the extent of lymph node dissection, plays a critical role in reducing recurrence rates [8]. While total thyroidectomy remains standard, limited lymph node dissection in elderly patients may need to be reconsidered, especially when nodal metastasis is present [7,8]. Radioactive iodine therapy (RAI) remains a cornerstone of treatment; however, the variability in patient response and the potential for side effects underscore the need for personalized dosing strategies [6,9].

Multidisciplinary collaboration among nuclear medicine specialists, endocrinologists, oncologists, and surgeons is essential to optimize therapeutic outcomes [3,7]. Early detection strategies, including systematic evaluation of thyroid nodules in older populations, may help mitigate the impact of late-stage diagnoses and improve survival rates [3,10]. Future research should focus on refining treatment protocols tailored to elderly patients, ensuring both efficacy and safety in this vulnerable group [6,8].

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