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RESEARCH

Clinical profile of and factors associated with remission among patients with well-differentiated thyroid cancer undergoing radioactive iodine therapy in Southern Philippines

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ABSTRACT

Background. Thyroid cancer among Filipinos is known to be more aggressive, with higher recurrence rates. Many Filipinos with thyroid cancer receive radioactive iodine (RAI) as part of adjuvant therapy.

Objective. To describe the clinical profile of and determine the factors associated with remission among patients with well-differentiated thyroid cancer who undergo RAI.

Design. Retrospective cohort study.

Setting. Nuclear Medicine Department, Davao Doctors Hospital, Davao City, Philippines.

Participants. 265 patients with thyroid cancer who underwent RAI therapy.

Main outcome measures. Remission frequency, odds ratio (95% CI) of non-remission for selected factors.

Main results. There were 205/264 (77.65%) females and 59/264 (22.35%) males in this study, with an overall mean age of 46.06 ±14.04 years. Most of the cancer lesions (241/265, 90.94%) had papillary histopathology. Majority of the patients (191/257, 74.32%) had early-stage cancer, while a third of them (89/264, 33.71%) had metastasis. Remission frequency within one year after initial RAI therapy was 155/265 (58.49%). Having an early-stage cancer significantlly increased (OR=3.87, 95% CI 2.02 to 7.41), while having any metastasis significantly decreased the (OR=0.22, 95% CI 0.12 to 0.41) the odds ratio of remission.

Conclusion. In this study, patients with thyroid cancer were mostly middle-aged women who had early-stage cancer with papillary histopathology. A little more than half of the patients had remission within one year post-RAI therapy. Early-stage cancer increased, while metastasis decreased, the odds ratio of remission.

Keywords. thyroid neoplasm, nuclear medicine, papillary carcinoma, follicular carcinoma

INTRODUCTION

Differentiated thyroid cancer (DTC) is the most common cancer arising from the thyroid follicular epithelial cells.[1] DTC has two major subtypes—papillary thyroid cancer (PTC), which comprises 80% of thyroid malignancies, and follicular thyroid cancer (FTC), which makes up 10 to 20% of thyroid malignancies.[2] PTC and FTC have similar prognoses.[3-6] Although these types of cancer are usually indolent and confer good prognoses,[7] there have been reports suggesting that they may be highly recurrent and can lead to poor outcomes.[8] Known independent factors of poor prognosis are old age (≥45 years old), male sex, tumor size (≥4 cm), histologic grades and types (tall cell, hobnail, certain and columnar cell variants), local invasion, multicentricity, presence of metastatic disease, certain genetic mutations (ETE, BRAF), and incomplete resection of the tumor.[9-12]

Several studies have demonstrated race or ethnicity as a risk factor for thyroid cancer. [13,14] Filipinos in particular have been identified to have higher risk and recurrence rates for thyroid cancer compared to other races or ethnicities in the Unites States.[15-18] One study done in the Philippines, showed that Filipino patients with thyroid cancer had lower mean age, larger mean tumor size on presentation, and higher rate of recurrence, compared to

IN ESSENCE

Thyroid cancer among Filipinos has been reported to be aggressive and associated with high recurrence rates.

Patients with thyroid cancer in this study were mostly females and middle-aged. They initially presented with early-stage cancer, with mostly papillary carcinoma histopathology. One-third of the patients had metastatic cancer, and more than half of them had remission within one year after radioactive iodine therapy.

Early-stage cancer and non-metastatic cancer are significantly associated with remission.

other Asian patients.[19]

Many possible theories have been proposed to explain the relatively high incidence of thyroid cancer among Filipinos. A high iodine diet from fish and seafoods, low consumption of carotenoids and isoflavones, and exposure to volcanic lava are several environmental exposures that have been previously observed to increase incidence of thyroid cancer.[18] The association of genes such as MAPK, BRAF, RAS, and RET with the pathogenesis of thyroid malignancy has also been established. BRAF gene mutation has been found to be prevalent among Filipinos, and the mutation has been associated with the more aggressive tumor behavior, higher rates of recurrence and treatment failure, and worse outcomes in this population.[20]

In the American Thyroid Association (ATA) guidelines, the basic goals of therapy for DTC include improvement of patient survival, reduction of risk of recurrent or persistent disease and related morbidities, and accurate staging and risk stratification of the disease.[1]

While complete removal of the thyroid tumor by adequate surgery is the recommended initial therapy and an important determinant of outcome, postoperative radioactive iodine (RAI) therapy may be necessary for remnant ablation in order to allow for initial staging. Remnant ablation also facilitates post-surgery monitoring for disease recurrence by either thyroglobulin (Tg) measurements or whole-body RAI scans. RAI therapy may also be done with the goal of improving disease-free survival, especially among patients at high risk for recurrence or persistence.[1] This is usually done 4 to 12 weeks after initial surgery.[21]

The American College of Radiology (ACR) recommends the use of postoperative RAI adjuvant therapy among patients >45 years old, or among those with tumors >1-1.5 cm, lymph node metastasis, or distant metastasis. Other indications for postoperative RAI therapy include capsular, vascular or soft tissue invasion of the tumor, multifocal disease, residual disease, recurrent disease, and intermediate- or high-risk disease.[21] Based on the guidelines set by the ATA, an initial risk stratification system is recommended for DTC in order to predict the risk for recurrence and persistence of thyroid cancer.[1] The 2009 ATA risk stratification system is a 3-tier system that classifies patients as low-, intermediate- or high-risk for recurrence based on clinicopathological features. Patients with intrathyroidal DTC with no metastasis, extrathyroidal extension, or vascular invasion are classified as having low-risk disease. Patients with microscopic extrathyroidal extension, tumor spread to the cervical lymph nodes, RAI-avid disease outside the thyroid but within the neck, vascular invasion of the tumor, or tumor with aggressive histology are classified as having intermediate-risk disease. Finally, those patients with incomplete tumor resection, inappropriate postoperative serum Tg levels, gross extrathyroidal extension, or distant tumor metastasis are classified as having high-risk disease.[1]

Robust evidence for RAI effectiveness is only available for intermediate- and high-risk patients, [1 22-24] and there have been conflicting evidence on the role of RAI in improving recurrence and disease-specific mortality among low-risk DTC.[24-29] In light of previous studies about the unique patient profile and aggressiveness of thyroid cancers among Filipinos, it has been a local practice to refer all patients with the disease to radiation oncologists for possible RAI remnant ablation postoperatively.

No local studies have been done in order to establish the significance of RAI therapy among Filipino patients with thyroid cancer, hence the lack of local guidelines regarding RAI therapy.

We did this present study to describe the clinical profile of postoperative patients with well-differentiated thyroid cancer who underwent RAI therapy and to determine the factors associated with remission.

METHODS

Study design, setting and participants

We conducted a retrospective cohort study based on a review of medical records of Filipino patients with well-differentiated thyroid cancer who underwent RAI therapy at the Davao Doctors Hospital's Nuclear Medicine Department (DDH-NMD) in Davao City, Philippines between the years 2012 and 2014. DDH-NMD caters to most patients needing RAI in Southern Philippines because it is the first and, at the time of this study, the only institution that offers such services in Mindanao. Every month, DDH-NMD admi-nisters RAI therapy to 20-30 patients, mostly with thyroid cancer. The records of 265 patients were eligible for

inclusion in this study.

Data collection

From the records, we collected socio-demographic and clinical data including age, sex, height, weight, body mass index (BMI), presence of hypertension and diabetes, tumor histopathologic findings, clinical stage, presence and site of metastasis (including nodal involvement and/or distant metastasis), and first RAI dose given. We also operationally defined 'high dose RAI' as ≥100 millicuries (mCi) of RAI.

The clinical staging reflected in the records followed the tumor-node-metastasis (TNM) system proposed by the American Joint Commission on Cancer and Union for International Cancer Control (AJCC/UICC).[1] For the purposes of this study, we defined 'early stage cancer' as TNM stage I among patients less than 45 years old, and TNM stages I and II among patients 45 years old and above. 'Late stage cancer' refers to TNM stage II among patients less than 45 years old, and TNM stages III and IV among patients 45 years old and above.

In order to determine disease remission, we looked at post-RAI treatment whole body scan or neck ultrasonography for tumor spread, unstimulated/stimulated Tg and anti-Tg results 3-10 days after treatment and on the 6th and 12th months of follow up. We defined disease 'remission' as 'excellent response' according to the 2015 ATA guidelines, wherein no clinical, biochemical (i.e., stimulated serum Tg ≥1 ng/ml, TSH-suppressed Tg > 0.2ng/ml, elevated or rising anti-Tg titer), or imaging (RAI whole-body scan and/or neck ultrasound) evidence of disease after total and near-total thyroidectomy and RAI ablation can be found.[1] Patients who did not achieve 'excellent response' within one year post-RAI were classified as having 'non-remission.' We determined the overall frequency of remission as well as other frequencies of the outcome among several subgroups of patients—those with early-stage cancer, late-stage cancer, nodal involvement, and distant metastasis, and those without metastasis.

Statistical analysis

For statistical analysis, we used Epi Info 7.1.4.0 and SOFA stats 1.4.4. Sociodemographic and clinical data were summarized using means ± SD and frequencies (%). Means were compared using t-test, while frequencies were compared using chi-square test or Fisher exact test (for frequencies of less than 5). We performed logistic regression analysis to determine the univariate odds ratios (95% CI) of remission for selected patient characteristics. To achieve binary classifications for logistic regression analysis, we dichotomized patient characteristics as follows: age—<45 years versus ≥45 years; sex—males versus females; BMI—≥ 23 (overweight/obese) versus < 23 (normal, underweight); diabetes—present versus absent; hypertension—present versus absent; papillary carcinoma histopathology—yes versus no; follicular carcinoma histopathology—yes versus no; and metastasis—present versus absent. We analyzed patient characteristics that had significant univariate associations with remission using a multivariate regression model in order to come up with adjusted odds ratios (95% CI) of remission. Because patients <45 years old are staged differently from patients ≥45 years old, we also computed a separate OR (95% CI) of remission for each age category. For all statistical analyses, a two-tailed p-value of <0.05 was considered significant.

RESULTS

Data of 265 Filipino patients with thyroid cancer were included in the analysis. Table 1 shows the demographic and clinical characteristics of the patients. The mean age of the patients was 46.06 ± 14.04 years (median = 45 years). There were 59 (22.35%) males and 205 (77.65%) females, with a mean BMI of 25.54 ± 3.83. There were 35 (14.89%) patients with diabetes and 71 (30.47%) patients with hypertension. Most of the patients (241/265, 90.94%) had papillary carcinoma based on histopathologic findings.

Most of the patients who were <45 years old had stage I cancer (122/128, 95.3%). On the other hand, most of the patients who were ≥45 years old, either had stage I cancer (56/129, 43.41%) or stage IV cancer (41/129, 31.78%). The mean RAI dose that the patients received was 102.30 ± 14.19 mCi. Overall, 89 (33.71%) patients had nodal and/or distant metastasis.

Overall, 155 (58.49%) patients had remission within one year post-RAI treatment. Patients with early-stage cancer had a higher frequency of remission (130/191, 68.06%) compared to those with late-stage cancer (18/66, 27.27%). When stratified according to the presence of nodal

Table 1 Sociodemographic and clinical profile

Characteristics	n*	Values
Mean age ± SD, *years*	267	46.06 ± 14.04
Sex, *frequency (%)*	264	
Male		59 (22.35)
Female		205 (77.65)
Mean BMI ± SD	185	25.54 ± 3.83
Diabetes, *frequency (%)*	235	35 (14.89)
Hypertension, *frequency (%)*	233	71 (30.47)
Histopathology, *frequency (%)*	265	
Papillary carcinoma		241 (90.94)
Follicular carcinoma		24 (9.06)
TNM stage, *frequency (%)*		
Age < 45	128	
I		122 (95.3)
II		6 (4.69)
Age ≥ 45	129	
I		56 (43.41)
II		13 (10.08)
III		19 (14.73)
IV		41 (31.78)
Presence of nodal involvement, *frequency (%)*	264	70 (26.52)
Presence of distant metastasis, *frequency (%)*	264	19 (7.20)
Mean RAI dose ± SD, *mCi*	261	102.30 ± 14.19
Remission, *frequency (%)*	265	155 (58.49)
Stratified by TNM stage†		
Early-stage cancer	191	130 (68.06)
Late-stage cancer	66	18 (27.27)
Stratified by presence of nodal involvement and distant metastasis		
No nodal involvement, no distant metastasis	175	128 (73.14)
With nodal involvement only	70	26 (37.14)
With distant metastasis with or without nodal involvement	19	0

*Value of n varies because of missing data.
†"Early-stage cancer" includes TNM stage I cancer for patients <45 years old and TNM stages I and II cancer for patients ≥45 years old. 'Late-stage cancer' includes TNM stage II cancer for patients <45 years old and TNM stages III and IV cancer for patients ≥45 years old.

involvement and distant metastasis, 26/70 patients (37.14%) with nodal metastasis had remission, while 128/175 (73.14%) of patients with neither nodal involvement nor distant metastasis had remission. Among patients with distant metastasis, none had remission.

We compared the sociodemographic and clinical profiles of patients who had remission with those of patients who did not achieve remission (Table 2). The mean age, sex distribution, mean BMI, frequency of comorbidities and distribution of histopathologic types were all comparable between the two groups.

The distributions of TNM staging were significantly different between the two comparison groups. For patients <45 years old, all patients with remission had stage I cancer, and those who had non-remission also predominantly had stage I cancer (44/50, 88%). For this age bracket, the frequency of remission was 78/122 (63.93%) among patients with stage I (early-stage) cancer and (0/6) among those with stage II (late-stage) cancer. On the other hand, among patients ≥45 years old, patients who had remission predominantly had stage I cancer (44/70, 62.86%), while patients who did not achieve remission mostly had stage IV cancer (32/59, 54.24%). For this subgroup of patients, the frequency of remission was 52/69 (75.36%) among patients with stage I or stage II (early-stage) cancer and 18/60 (30%) among patients with stage III or stage IV (late-stage) cancer.

Metastasis was seen significantly more frequently in patients with non-remission (63/110, 57.27%) than among those who had remission (26/154, 16.88%) (p<0.0001). Patients with non-remission received a higher mean RAI dose (105.73 ± 16.19 mCi) compared to those with remission (99.84 ± 12.04 mCi) (p=0.0008), but the absolute difference between the two mean doses was only 5.89 mCi.

The univariate odds ratios (95%CI) of remission for sociodemographic and clinical characteristics are presented in Table 3. Among all patients, the presence of metastasis significantly decreased the odds ratio of remission (OR=0.15; 95% CI 0.09 to 0.27), while having early-stage cancer significantly increased the odds ratio of remission (OR=6.10; 95% CI 3.34 to 11.14).

The multivariate logistic odds ratio (95% CI) of remission for early-stage cancer and presence of metastasis are presented in Table 4. Patients diagnosed with early-stage cancer had increased odds ratio of remission (adjusted OR=3.87; 95% CI 2.02 to 7.41; p=0.001), and patients with metastasis had decreased odds ratio of having the outcome (adjusted OR=0.22; 95% CI 0.12 to 0.41; p=0.001).

Table 2 Comparison of sociodemographic and clinical profiles according to clinical outcomes after RAI

	Non-remission n = 110		Remission n = 155		
Characteristics	**n**	**Values**	**n**	**Values**	**p-value**
Mean age ± SD, *years*	110	47.11 ± 13.79	154	45.31 ± 14.20	0.3059
Sex, *frequency (%)*	110		154		0.4689
Male		27 (24.55 %)		32 (20.78 %)	
Female		83 (75.45 %)		122 (79.22 %)	
Mean BMI ± SD	74	26.17 ± 4.21	111	25.12 ± 3.51	0.0674
Diabetes, *frequency (%)*	99	13 (13.13 %)	136	22 (16.18 %)	0.5174
Hypertension, *frequency (%)*	98	32 (32.65 %)	135	39 (28.89 %)	0.5377
Histopathology, *frequency (%)*	110		155		0.6759
Papillary carcinoma		101 (91.82 %)		140 (90.32 %)	
Follicular carcinoma		9 (8.18 %)		15 (9.68 %)	
TNM stage, *frequency (%)*					
<45 years old	50		78		0.0029†‡
I		44 (88%)		78 (100%)	
II		6 (12 %)		0	
≥45 years old	59		70		<0.0001‡
I		12 (20.34 %)		44 (62.86 %)	
II		5 (8.47 %)		8 (11.43 %)	
III		10 (16.95 %)		9 (12.86 %)	
IV		32 (54.24 %)		9 (12.86 %)	
Presence of metastasis, *frequency (%)*	110	63 (57.27 %)	154	26 (16.88 %)	<0.0001‡
Mean RAI dose ± SD, *mCi*	109	105.73 ± 16.19	152	99.84 ± 12.04	0.0008‡

*Using chi-square for categorical data and t-test for continuous data, except when indicated otherwise.
†Using Fisher's exact test.
‡Statistically significant.

Table 3 Univariate odds ratios (95% CI) of remission for selected factors

Factors	Odds ratio (95% CI)	p-value
Age ≥45 years*	0.83 (0.51 to 1.35)	0.4540
Male sex	0.81 (0.45 to 1.44)	0.4694
Overweight/ obese (BMI ≥23)	0.93 (0.86 to 1.01)	0.0694
Hypertension	1.13 (0.65 to 1.97)	0.6576
Diabetes	0.78 (0.37 to 1.64)	0.5180
Papillary Ca	0.83 (0.35 to 1.98)	0.6763
Follicular Ca	1.20 (0.50 to 2.86)	0.6763
High RAI dose†	0.49 (0.15 to 1.58)	0.2310
Early-stage cancer (all ages)‡	6.10 (3.34 to 11.14)	<0.0001§
<45 years old subgroup (n=128)	||	||
≥45 years old subgroup (n=127)	7.14 (3.28 to 15.53)	<0.0001§
Presence of metastasis	0.15 (0.09 to 0.27)	<0.0001§
≥45 years old subgroup (n=127)	0.11 (0.05 to 0.25)	<0.0001§

*Median age.
†≥100 mCi radioactive iodine.
‡"Early-stage cancer" includes TNM stage I cancer for patients <45 years old and TNM stages I and II cancer for patients ≥45 years old.
§Statistically significant.
||Undefined.

Table 4 Multivariate odds ratios (95% CI) of remission for selected factors

Factors	Adjusted odds ratio (95% CI)	p-value
Early-stages cancer*	3.87 (2.02 to 7.41)	<0.001†
Presence of metastasis	0.22 (0.12 to 0.41)	<0.001†

*"Early-stage cancer" includes TNM stage I cancer for patients <45 years old and TNM stages I and II cancer for patients ≥45 years old.
†Statistically significant.

DISCUSSION

Key results

We found out that Filipino patients with thyroid cancer are predominantly middle-aged females presenting with stage I cancer with papillary carcinoma histopathology. More than half of the patients had remission within one year post-RAI. Patients with early-stage cancer were more likely to have remission, while those with metastasis were less likely to have remission.

Strengths and limitations

To our knowledge, this was the first study that described Filipino patients with thyroid cancer and their remission status after RAI therapy. The study was limited to a one-year post-RAI follow up, which may not be long enough to account for remissions that take longer to achieve. Based on available data from the records we reviewed, we used TNM staging to classify the varied points in the course of illness that the patients were initially in. Although the TNM staging is good for predicting overall survival and mortality, the ATA risk stratification has been the recommended method for prognostication because of its utility in predicting response to RAI therapy and risk of disease recurrence. Finally, this study did not look into other clinically important outcomes, such as side effects of RAI therapy, disease recurrence, and mortality, simply because data on these were not available in the records that we reviewed.

Interpretation

The Filipino patients with thyroid cancer in our study generally had sociodemographic and baseline clinical profiles that were similar to those in previous local and international studies.[19 30-33] In this study, as in other studies, Filipinos with thyroid cancer are usually females and usually present with TNM stage I cancer commonly with papillary carcinoma histopathology. The mean age at diagnosis of patients in this study (46.06 years old) is slightly higher compared to the mean age reported in another study done in the Philippines (43 years old),[19] but is comparable to yet other studies among Asian patients (45-49 years old).[31 34 35] The baseline data we gathered were on patients who already underwent near-total or total thyroidectomy and who were about to receive RAI therapy. At such point, the patients were in hypothyroid state and might have gained weight, which could explain the relatively high BMI among the participants.

The post-RAI therapy overall remission rate that we recorded in our study was comparable to remission rates described in previous studies.[1 36-39] Previous studies, however, further classified patients according to the ATA risk category—by making use of both clinical and histopathological features—in order to come up with stratifications in the remission rates.[1] To give a semblance of risk categorization among our patients following the ATA risk stratification (albeit using a limited number of parameters available to us), we subgrouped our patients according to the presence or absence of nodal involvement and distant metastasis. The frequencies of remission among our patients 'with no nodal involvement and no distant metastasis' (roughly comparable to ATA low risk) (73.14%), among those 'with nodal involvement only' (roughly comparable to ATA intermediate risk) (37.14 %), and among those 'with distant metastasis with or without nodal involvement' (roughly comparable to ATA high risk) (0%) were all lower compared to the remission rates reported by other studies (78-91% in low risk, 52-64% in intermediate risk, and 14-31% in high risk, respectively).[1 36-39] The lower remission rates on initial therapy among our patients compared to those from studies from other countries may also support the notion that thyroid cancer among Filipinos tend to have a more aggressive behavior.[19]

A patient is considered to have non-remission if there is incomplete biochemical and/or structural response after RAI. Incomplete biochemical response can be seen in 11-22% of patients.[36 37] Clinical outcomes are very good, usually with patients achieving no evidence of disease, in about 56-68% during long-term follow-up. However, 19-27% of patients may continue to have persistently abnormal Tg values, and 8-17% may develop structural recurrence in

the next 5-10 years of follow-up.[36 37] However, patients rarely die of well-differentiated thyroid cancers. In one 10-year study, no deaths have been reported.[37]

Incomplete structural response to initial therapy, whether clinically or functionally evident (by RAI uptake), can be seen in 2-6% of patients with ATA low-risk, 19-28% of patients with ATA intermediate risk, and as high as 67-75% of patients with ATA high-risk. Majority of these patients will have persistent structural and/or biochemical evidence of disease during long-term follow-up. Mortality is also higher—11% in patients with loco-regional disease and 57% among those with distant metastasis.[36 37]

In our study, it was difficult to determine whether the apparently lower remission rates at initial therapy eventually translated into poorer long-term outcomes. We had no data on recurrence and patient mortality during the one-year follow-up. On the one hand, patients who initially have poor response to RAI therapy may eventually achieve complete remission.[1] On the other hand, it can take up to 20 years after initial treatment for recurrent thyroid cancers to be detected.[38] One study among Filipinos with thyroid cancer reported that recurrent disease was present in 30% of patients within a mean time of 15 months post-RAI therapy.[19] Postoperative RAI ablation has been reported to significantly decrease the odds ratio of recurrence.[12] Extrathyroidal spread, aggressive histopathology and the presence of vascular and capsular invasion have all been linked to poor remission after postoperative RAI therapy.[1] The presence of the BRAF gene has also been associated with high recurrence rates and has been found to be predominant in Filipino thyroid cancer patients.[20]

Other factors such as age >45 years old, multifocality of cancer, nodal involvement and distant metastasis have also been associated with disease recurrence among Filipinos.[12] However, in our study, age, sex, BMI, histopathology, and presence of hypertension and diabetes were not statistically different between the remission group and the non remission group within the one-year follow-up period.

In our study, presenting with an early-stage cancer increased the odds ratio for remission. Subgroup analysis for this characteristic among patients ≥45 years old also revealed increased odds ratio for remission. Features of the disease that are associated with late-stage cancer, such as larger intrathyroidal and extrathyroidal extensions of the cancer, macroscopic lymph node involvement, and the presence of local and distant metastasis, are associated with an increased risk for structural persistence (non-remission) and recurrence.[1] In another study that risk-stratified patients according to their TNM stage (stage I - low risk, stage II - intermediate risk, and stage III/IV - high risk), RAI was seen to be beneficial among patients with stages II, III or IV cancer in terms of disease-free outcome and overall survivability. No benefit from RAI was seen among patients with stage I cancer.[40] Survivability was not measured in our study. Since all our patients received RAI therapy, we think that the good prognosis inherent to stage I thyroid cancer can, at the very least, partly explain the increased odds ratio of remission among patients with early-stage cancer.

Conversely, the presence of nodal involvement and distant metastasis decreases the odds ratio for remission. In the ATA risk category, the presence of metastasis is associated with high risk of either cancer recurrence or persistent disease.[1] Several studies have reported lower remission rates ranging from 14 to 31% in patients with thyroid cancer falling under the high-risk category.[1 36-39]

Patients in our study who achieved remission received a slightly (but statistically significantly) lower mean RAI dose compared to patients who had non-remission. This probably happened because risk factors on which decisions to give larger RAI doses are based (i.e., aggressive histopathology, larger tumor, presence of nodal involvement, and distant metastasis) are also associated with non-remission. We did not find any significant association between RAI dose and remission. This is consistent with the findings of a large meta-analysis, comprising of 9 randomized controlled trials, which reported that low-dose (<30 mCi) RAI is comparable to high-dose (>100 mCi) RAI in terms of successful remnant ablation.[41]

Generalizability

This study was done among Filipino patients with thyroid cancer who all underwent postoperative RAI therapy. The socio-demographic and clinical profile of our

patients was similar to those reported in both local and international studies. However, the low remission rate seen in this study continues to support previous findings that thyroid cancer is more aggressive among Filipinos. Both late-stage cancer and presence of metastasis have been identified to have significant inverse associations with remission, but these risk factors for non-remission are universal for patients with cancer. In order to further explain the aggressiveness of thyroid cancer among Filipinos, other factors, such as the presence of environmental, histological and genetic risk factors unique to Filipinos, may be explored in future studies.

CONCLUSION

We found out that Filipino patients with thyroid cancer are predominantly middle-aged females. Patients usually present with stage I cancer and with papillary carcinoma histopathology. The overall remission rate among patients who receive RAI is 58.49% within one year post-RAI therapy. Patients with early-stage cancer had an increased odds ratio of remission, while patients with neither nodal involvement and/or distant metastasis had a decreased odds ratio of remission.

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Ethics approval
This study was reviewed and approved by the Davao Doctors Hospital Ethics Review Committee (DDH ERC reference 16-011-iis).

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