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Original Article

Clinical Practice Patterns in the Management of Thyroid Nodules: The First Survey from the Middle East and Africa

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Abstract

Objective: We sought to scope the practices in managing thyroid nodules in the Middle East and Africa (MEA). **Materials and Methods:** Survey of a convenience sample of physicians concerned with the management of thyroid disease. **Results:** Two hundred and twelve responses are included. Fine needle aspiration (FNA) is performed chiefly using ultrasound guidance (74.9%), generally by radiologists (47.1%). Respondents have a lower threshold for FNA than recommended. Management depends on the FNA cytology, with the follicular lesion of undetermined significance/atypia of undetermined significance resulting in repeat FNA for cytology (40.7%), immediate referral for thyroid surgery (32.9%), or molecular testing (13.2%). Follicular neoplasms are referred for lobectomy or total thyroidectomy by 81.6% of respondents. Nodules suspicious for malignancy are referred for thyroid surgery by 76.6% and for molecular testing by 20.1%. Respondents are less likely to perform FNA in an octogenarian than a younger patient with a comparable nodule. For a multinodular goiter, 29.9%, 25.9%, or 17.8% of respondents would, respectively, sample the largest 2–3 nodules, single largest nodule, or all nodules >1 cm in size. During pregnancy, respondents would perform FNA with nodular growth (27.1%) in the absence of nodular growth (25.6%), but more respondents (35.2%) would defer FNA until after pregnancy. **Conclusions:** The physicians' survey revealed a practice pattern in managing thyroid nodules in the MEA region, including both agreements and deviations from current guidelines. Focused quality assurance exercises, education, and research are needed.

Keywords: Fine needle aspiration, guidelines, management, therapy, thyroid cancer, thyroid nodule, thyroid surgery, ultrasound-guided biopsy

Introduction

Many thyroid nodules are found in autopsy and using thyroid ultrasound (US) in population studies.[1] The increased use of sensitive imaging techniques such as magnetic resonance imaging (MRI), computed tomography (CT), and the carotid US increased referrals for the evaluation of incidentally detected thyroid nodules.[2,3]

The majority of thyroid nodules are benign. However, an aggressive diagnostic approach to generally benign nodules or microcarcinomas resulted in overdiagnosis and unnecessary management of thyroid nodules.[4] Consequently, updated comprehensive clinical practice guidelines (CPGs) relating to the management of thyroid nodules and differentiated thyroid cancer have been published by endocrine societies.[5,6]

Several clinical practice patterns were observed with great interest in the international differences in thyroid nodule management among participants in routine laboratory testing, special measurements, and different management approaches.[7-9] However, these surveys acknowledged the inclusion of a small and perhaps under-representative group of participants from developing countries such as those from the Middle East and Africa (MEA).[9] We have previously documented practice patterns in managing common endocrine conditions by physicians from these regions using online surveys.[10-14] Thyroid nodules and thyroid cancer in the Middle East and Gulf seem to increase interest.[15-17] The current survey aimed to scope the clinical practice patterns in managing thyroid nodules by physicians in managing thyroid disease from MEA.

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Materials and Methods

Study design

The study is a cross-sectional electronic questionnaire-based study conducted between August 12, 2018, and March 31, 2019. The Survey Monkey® (SVMK Inc., San Mateo, California, USA) was used to create, disseminate, and analyze the questionnaire. The questionnaire was E-mailed to a convenience sample of physicians primarily practicing in the MEA and is likely to manage thyroid disease. They were identified from databases of health-related bodies, professional groups, and recent continuous professional development events as previously described.[10-14] The initial invitation E-mail explained the rationale of the study. Biweekly reminders were sent for nonresponders and partial responders. The survey service automatically blocked repeat submissions from the same internet protocol address, the Institutional Review Board of Sheikh Khalifa Medical City, Abu Dhabi, UAE. Respondents provided electronic consent before they can get access to the actual questionnaire.

Survey questionnaire

The questions were adapted from a previously published survey.[9] The questions covered diagnostic evaluation, choice of therapy, and follow-up of an index case of a solitary thyroid nodule [Table 1]. Most questions required a single best response to being selected from multiple choices. Some questions allowed additional free-text comments. The original questionnaire was constructed in such a manner to omit phrasing that could influence respondents' answers, and a broad range of choices was given, arranged alphabetically, numerically, or in random order.[9] Additional questions were included to define respondents' demographic and professional profiles and their regional and international affiliations similar to our previous studies.[10-14] A corrective single question was sent to all original respondents to follow the original methodology. A corrective single question was sent to all original respondents to follow the original methodology.

Data collection and statistical analysis

Survey responses were anonymously collected and stored electronically by the survey service, accessible in a password-protected manner. Only responses from those who met the inclusion criteria were analyzed (i.e., endocrinologists, internal medicine specialists with interest and practice in endocrinology, endocrine surgeons, oncologists, and nuclear medicine physicians) practicing in the MEA. No data were collected on nonresponders and no qualifying responders. The survey management service online tools were used for the examination of results and the descriptive analysis. We treated the whole group as one cohort, and we did not attempt to conduct any subgroup analysis. Summary statistics were prepared for responses to each question. Because not every participant answered all questions, the percentage of respondents providing a given answer was calculated individually for each question, using the number of respondents to that question as the denominator.

Table 1: Index thyroid nodule case*

A 52-year-old woman is found on cervical spine MRI to have an incidental 1.5 cm right thyroid nodule. The patient has no known history of thyroid disease and has otherwise been in good health. She takes no medications. She is a nonsmoker and has no history of radiation exposure. Family history is negative for thyroid disease. On examination, the nodule is not palpable, and there is no cervical lymphadenopathy

*Based on the case scenario used in reference.[6] MRI: Magnetic resonance imaging

Results

Respondents' demographic and professional profiles

A total of 3579 were invited, 2029 (56.7%) opened the E-mail invitation, 59 (1.6%) messages bounced, 104 (2.9%) opted out, 528 (14.8%) clicked through. Of those 438 respondents who attempted to participate, 364 provided complete answers, and 74 only provided partial responses. Eventually, 212 respondents (of whom 197 answered all the questions) were deemed valid and analyzed. The majority used the English version for their responses (92.0%). Respondents' demographic and professional profiles are summarized in Table 2. Adult endocrinologists and pediatric endocrinologists were the leading two groups representing 79.3% of the respondents. Three-quarters were career physicians (consultant/attending), and the remainder were middle-grade physicians such as specialists and fellows. In total, nearly half (45%) were in clinical practice for over 20 years. Over half of the respondents (50.3%) were members of the American Association of Clinical Endocrinologists, and 42.5% were members of regional societies of endocrinology and thyroid disease (excluding mainly diabetic groups), membership of other societies were also reported [Table 2]. Access to the resources such as thyroid hormones, drugs, and imaging measurements was almost universal. However, access to competent surgeons, nuclear medicine facilities, and molecular testing were less readily available [Table 2].

Diagnostic evaluation of the index case

Laboratory testing

The proportions of respondents ordering the listed laboratory testing for most of their patients, similar to the index case, are shown in Figure 1a. In addition to 97.2% of respondents requested thyroid-stimulating hormone (TSH) testing, 52.8% would obtain a free T4 level, and 23.6% would also order thyroid peroxidase antibodies. Factors prompting respondents to measure serum calcitonin included a family history of medullary thyroid cancer (87.2%), a patient history of phaeochromocytoma (62.6%) or hyperparathyroidism (49.3%), a family member with an unknown type of thyroid cancer (47.9%), and the presence of coarse calcifications on thyroid US (23.7%).

Imaging

Thyroid US would be obtained at baseline in the index case by 98.1% of respondents, with the study performed by radiology alone in 80.2%, in the respondent's clinic 25.9% [Figure 1b]. An assessment of cervical lymph nodes is reportedly performed routinely at the thyroid US by 89.6% of

Table 2: The demographic and professional characteristics of survey respondents, available resources for care of thyroid patients, and the respondents' professional affiliations

Question (respondents number)	Response options	Responses (%)
Specialty (212)	Adult endocrinologist	131 (61.8)
	Pediatric endocrinologist	37 (17.5)
	Internist with endocrine interest	29 (13.7)
	Surgeon	13 (6.1)
	Nuclear medicine physician	2 (0.9)
Career grade (212)	Senior (consultant/attending)	159 (75.0)
	Middle grade (specialist/fellow)	53 (25.0)
Time since graduation (years) (212)	>20	97 (45.7)
	10-20	73 (34.4)
	<10	42 (19.8)
Location of practice (212)	Middle east	164 (77.4)
	Africa	48 (22.6)
Resource availability (212)	Measurements of thyroid hormones	208 (98.1)
	Thyroid ultrasound imaging	205 (96.7)
	Antithyroid drug therapy	185 (87.3)
	Measurements of thyroid antibodies	181 (85.4)
	FNA and cytological examination	171 (80.2)
	Competent thyroid surgeon	150 (70.8)
	Nuclear medicine scanning facilities	117 (55.2)
	Access to molecular testing (even remotely)	42 (19.8)
Professional affiliations* (167)	AACE	84 (50.3)
	National/Regional Endocrine Societies**	71 (42.5)
	The Endocrine Society (USA)	53 (31.7)
	European Society of Endocrinology	36 (21.6)
	ATA	21 (12.6)
	Society for Endocrinology (UK)	14 (8.4)
	European Thyroid Association	5 (3.0)

*Not mutually exclusive, **Not primarily concerned with diabetes care. ATA: American Thyroid Association, AACE: American Association of Clinical Endocrinologists

respondents. A radionuclide thyroid scan would be obtained by 23.1% of respondents. Additional studies such as MRI, CT of the neck, or 2-fluoro-2-deoxy-D-glucose positron emission tomography (18FDG-PET) would be requested by a minority of respondents (3.8%, 3.3%, 1.9%, respectively).

Fine needle aspiration techniques

US guidance is routinely utilized for thyroid fine needle aspirations (FNAs) according to 74.9% of respondents and used selectively according to 15% of respondents. Respondents reported that US-guided FNAs are most commonly performed by a single person operating the US while sampling the nodule (30.9%) or with an assistant operating the US. In comparison, another performs the FNA

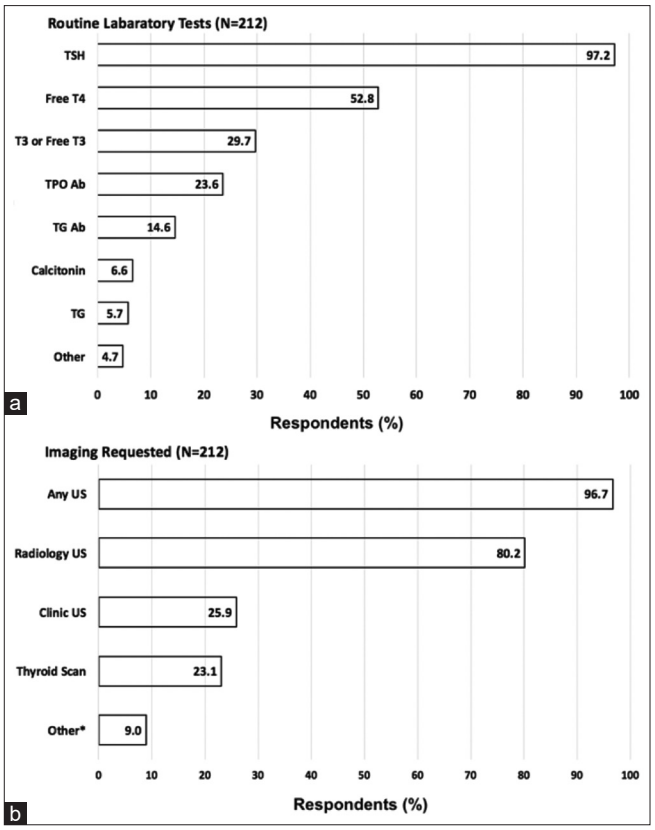

Figure 1: Diagnostic evaluation of the index case thyroid nodule. Number of respondents as a percentage who would request various testing modalities in the index case, including (a) routine laboratory tests and (b) imaging requested. Respondents were allowed to select multiple items concurrently. *Other denotes either neck computed tomography, neck magnetic resonance imaging, or 8 luoro-2-deoxy-D-glucose positron emission tomography-computed tomography

according to others (15.5%). US-guided FNA procedures are documented using digital or printed images taken during the procedure in 14.5%. Nearly half (47.1%) of respondents stated that thyroid FNAs are performed by radiologists. Only 23 respondents (11.1%) stated that FNA's were performed by the patient's endocrinologist, whereas 17.3% stated that one or more designated endocrinologists performed all FNAs for their practice. Pathologists and surgeons were reported to perform FNAs by 14.4%, 6.7% of respondents, respectively. However, since nonendocrinologists perform FNA, most are unaware of the needle size, the type of anesthesia used or the number of passes, and the method of slide preparation adopted. The reported methods of specimen processing varied between respondents. The details on the (a) various methods of specimen preparation, (b) who interprets the majority of thyroid FNAs performed in their practice, (c) the elements usually considered by the pathologist while interpreting thyroid, (d) the elements included in the majority of thyroid FNA result reports at the institution, and (e) how long it takes after the procedure to receive final results for thyroid FNAs performed [Supplementary Material; Appendix 1].

Selection of nodules for sampling by sonographic features, age, multiplicity, and pregnancy

Six nodules with various sonographic features were listed, and respondents were asked which nodules they would select for FNA. Responses and concordance with the American Thyroid Association (ATA) 2015 guidelines are shown in Table 3. 94.5% would appropriately select patients with intermediate-risk nodules; 60.9% will still do FNA for a <1 cm thyroid nodule. Furthermore, 42.1% and 31.3% of respondents may sample a complex cystic or spongiform nodule <2 cm in size. In contrast, the majority, i.e., 66.7% and 75.4%, will not sample an isoechoic nodule of 1.2 cm and a purely cystic 2.5 cm nodule, respectively. However, when respondents were asked to pick a single response to the above choices, responses split between sampling the 1.5 cm solid hypoechoic nodule (53.4%) and a 0.7 cm hypoechoic nodule with microcalcifications (24.3%) [Table 3].

Furthermore, compared to the index case of a younger patient with a 1.5-cm hypoechoic nodule, an 82-year-old woman with a similar nodule, having no suspicious clinical or sonographic features, and a normal TSH would less likely undergo FNA by 52.9% of respondents, equally likely by 29.4%. On the contrary, respondents are more likely to undergo FNA by 17.6% of respondents if the patient was a 52-year-old woman with a multinodular thyroid containing at least five solid hypoechoic nodules >1 cm in maximal diameter. The patient had no suspicious history, physical examination, sonographic features, and serum TSH level of 1.5 mU/L. Of 193 respondents, 29.9% would perform sampling of 2–3 of the largest nodules, 25.9% would sample the single largest nodule, 17.8% would sample all nodules >1 cm in maximal diameter, 12.2% would not perform FNA at all. Others (10.2%) would obtain a nuclear thyroid scan to identify "cold" nodules for sampling. When respondents were presented with a 22-year-old woman with a 1.5-cm thyroid nodule discovered during the 6th week of pregnancy, serum TSH was normal, and there were no suspicious clinical or sonographic features. Out of 199 respondents, 35.2% would postpone the FNA until after delivery, 27.1% would sample the nodule only if it grew during pregnancy, 25.6% would sample the nodule during the first trimester, 12.1% would perform FNA during the second trimester.

Management of thyroid nodules according to various thyroid FNA results

For the Bethesda class subcategories III-VI,[18,19] respondents were asked to select responses ranging from observation to additional diagnostics (molecular testing or thyroid radionuclide scanning) referral for thyroid surgery. Management of patients found to have an indeterminate or malignant result on initial FNA shown a progressive utilization of thyroid surgery in going from Bethesda classification system class III atypia of undetermined significance/follicular lesion of undetermined significance (AUS/FLUS) to class VI (malignant) and a low frequency of observation alone in this setting [Figure 2].

For nondiagnostic FNA (204), a repeat FNA for cytology is routinely performed by 82.4%. Furthermore, an FNA specimen would be sent for molecular analysis or immunohistochemical testing, or the patient is referred for thyroid lobectomy at this stage (by 4.9% of respondents each). Among 204 respondents obtaining an AUS/FLUS result at initial FNA, 40.7% would repeat the FNA for cytological examination, 23.9% would refer the patient for a diagnostic lobectomy, 13.2% would obtain molecular testing, 9.8% would recommend a

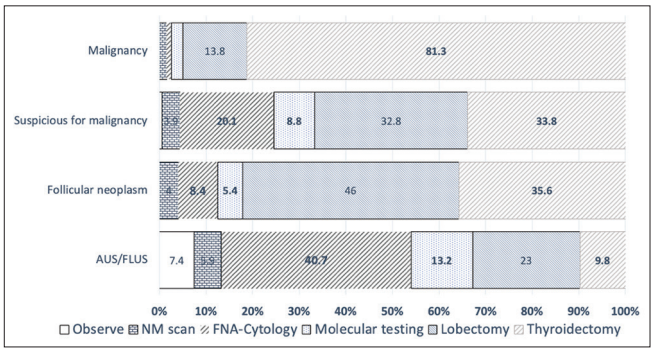

Figure 2: Management of thyroid nodules according to fine needle aspiration results. Management of patients with an indeterminate or malignant result on initial fine needle aspiration showed a progressive utilization of thyroid surgery in going from Bethesda classification system class III (atypia of undetermined significance/follicular lesion of undetermined significance) to class VI (malignant) and a low frequency of observation alone in this setting

Table 3: Respondents' selection of thyroid nodules for fine needle aspiration sampling based on the given ultrasound features alone* and the concordance with the American Thyroid Association criteria (2015)

Nodules anatomical features		ATA criteria (2015)	Percentage of respondents requesting FNA*	
Main US features	Max diameter (cm)		Multiple options allowed	Single option allowed
Solid, hypoechoic	1.5	Yes	94.5	53.4
Hypoechoic with microcalcifications	0.7	No	60.9	24.3
Complex cystic	1.4	No	52.1	10.7
Solid, isoechoic	1.2	No	33.3	4.9
Spongiform	1.8	No	31.3	4.4
Pure cyst	2.5	No	24.6	2.4

*Responses were asked the same question using two question types: Single option only possible (n=207) in the original survey and multiple options possible (n=75) in a supplementary single question survey to the original respondents. ATA: American Thyroid Association, FNA: Fine needle aspiration, US: Ultrasound

total thyroidectomy, 7.4% would observe the patient, and 5.9% would obtain a thyroid scan. Among 202 respondents with an initial FNA showing a follicular neoplasm, the most common response was a referral for diagnostic lobectomy (46.0%), followed by total thyroidectomy (35.6%), repeat FNA for cytology (8.4%), molecular testing (5.4%), thyroid scan (4.0%), and observation alone (0.5%). Among 204 respondents with an initial FNA result interpreted as suspicious but not diagnostic for malignancy, most would refer the patient for diagnostic surgery, including total thyroidectomy in 33.8% or lobectomy in 32.8%. Nearly a fifth of the respondents would repeat the FNA for cytology alone (20.1%), and only 8.8% would obtain molecular testing. A few respondents (3.9%) would request a thyroid scan. Among 203 respondents obtaining a malignant FNA result, 81.3% would refer for total thyroidectomy; 13.8% lobectomy; and a few would pursue the remaining options, including molecular testing, repeat FNA, or thyroid scan [Figure 2].

Follow-up of index case after a benign FNA

After obtaining a benign FNA result in patients such as the index case with a 1.5-cm solitary hypoechoic solid nodule, 58.0% of respondents would follow with serial thyroid US imaging at various intervals, whereas 18.0% would repeat the US on only one occasion, 12.0% repeat FNA to exclude false-negative results in 3–12 months, 7.5% refer back to primary care, 4.5% monitor by palpation only. A repeat US's reported interval varied among the 205 respondents, with 40.8% obtaining a repeat study by 6 months, 38.3% by 12 months, and 10.7% at 3 months. However, if the index case's thyroid nodule volume increased by more than 50%, 80.2% of the respondents would perform a repeat FNA, but 11.8% of them will send for a lobectomy (11.9%). The remaining minority would recommend total thyroidectomy, observe the patient with a repeat US in 6–12 months (2.0%), or give a trial of levothyroxine therapy. Follow-up for multinodular thyroid gland patients after a benign FNA would be with the serial US by 58.0% of 200 respondents, a single repeat the US by 18.0%, a single routine repeat FNA to exclude a false negative by 12.0%, return to primary care by 7.5%, or follow using palpation alone by 4.5% of respondents. The concordance of respondents' choices with the latest ATA 2015 guidelines is detailed in Table 4.

Use of molecular testing of thyroid nodules

When asked about the type of tests used, among 199 respondents, 49.7% did not use molecular testing in their practice, and 21.1% were not sure about the available types. 12.1% used a gene expression classifier, 4.5% used a specific mutation panel, 7.5% used both methods simultaneously, and 5.0% used either method. The percentage of respondents obtaining molecular testing in response to the different indeterminate or malignant FNA results was presented above in the section. It showed a response to various thyroid FNA results [Figure 2]. When respondents were directly asked which thyroid FNA interpretations currently result in a request for molecular analysis, 48.8% reiterated that molecular analysis is not used in their practice. The others would use it more often for AUS/FLUS (28.9%) and follicular neoplasm/suspicious for follicular neoplasm (23.9%), for FNA suspicious for thyroid cancer (22.4%), but less likely for FNA diagnostic of thyroid cancer (8.0%), insufficient FNA (7.5%), and benign FNA (3.5%).

Discussion

The use of imaging technology is expanding in day-to-day clinical practice.[20] This situation has generated increasing numbers of referrals of previously undetected thyroid nodules and diagnosis of thyroid cancer.[21] Several studies reported on changes in the management of these nodules over time in North America and Europe.[7-9] How well these nodules are managed according to good CPGs has not been ascertained in many parts of the world.[9] The current report provides a regional survey of the patterns of clinical practices in managing thyroid nodules. Respondents comprised a convenience sample of physicians practicing in the MEA and involved in managing thyroid disease. This particular region was not well represented in the recent international survey.[9] Thus, the study is needed to complete the global image of endocrine practice patterns concerning thyroid nodules. The online survey methodology is well established as it captures information in a time-and cost-effective manner. Although surveys have inherent limitations, we have generated several reports with meaningful information from the region covering diabetes and endocrine practice.[10-14] Ideally, a survey invites a predefined group of potential participants of homogeneous nature.[7-9] However, this is not readily available in our two regions. Nonetheless, in all our surveys, we have requested respondents to define their demographic, clinical, and professional profile to establish their relevance to the study with our convenience sampling.[10-14]

The key findings of the present study are (1) extensive assimilation of thyroid US into risk assessment and sampling of thyroid nodules; (2) lower size thresholds for FNA than those recommended in the current CPGs; (3) wide variation in technical aspects of FNA performance and interpretation; (4) low use of molecular profiling for cytologically-indeterminate nodules, primarily in North America; and (5) a low uptake of conservative strategy (i.e. observation alone) in patients with cytologically indeterminate thyroid nodules.

Although diagnostic US and FNA under US guidance would be obtained at baseline by most respondents, FNA would be performed in two-third of the cases by radiologists and the remaining by endocrinologists. Cytology would be reported by a general cytologist in most cases using Bethesda classification for reporting in <70% of the cases. In most cases, the assessment of cervical lymph nodes would be obtained in line with the latest ATA 2015 guidelines. However, surprisingly radionuclide thyroid scan would still be opted by 23.1% of our respondents as per the 2009 ATA survey results. This could be partly explained by a quarter of our respondents are European societies or trained in Europe.

Table 4: The concordance of the survey responses with the latest American Thyroid Association clinical practice recommendations

Rec. No	CPG recommendation (abbreviated)	Concordance with ATA (%)
R2	Measure TSH in all thyroid nodule patients	97.2%
R3	Do not measure thyroglobulin in the assessment of thyroid nodules	94.3%
R6	Include lymph node assessment in thyroid US	98.6%
R8a	Use a 1.0 cm FNA threshold for thyroid nodules with suspicious US features	36.7%
R8b	Use 1.0 cm FNA threshold for thyroid nodules with intermediate suspicion US features (hypoechoic, solid, regular margins)	93.7%
R8c	Use 1.5 cm FNA threshold for thyroid nodules with low suspicion US features (isoechoic or hyperechoic nodules, partially cystic with eccentric solid portion)	36.7%-
R8d	Use a 2.0 cm FNA threshold for thyroid nodules with very low suspicion US features (spongiform, complex cystic with no suspicious US features)	46.8-66.7%
R8e	Do not use diagnostic FNA for purely cystic thyroid nodules	74.5%
R9	Use the Bethesda system for reporting thyroid cytopathology	64.2%
R12	Refer patients to surgery after a malignant FNA result	951
R15	For thyroid nodules with AUS/FLUS cytology results, molecular testing may be performed	13.2%
R16	Use diagnostic surgery or molecular testing for thyroid nodules with follicular neoplasm cytology results	53.4%
R17	Use diagnostic surgery for most patients with suspicious for malignancy cytology results	32.8%
R18	Do not usually use 18FDG-PET to evaluate malignancy risk in thyroid nodules	89.1%
R19	Patients with FNA results of AUS/FLUS or follicular neoplasm who are selected for surgery should undergo a thyroid lobectomy	93/212
R20	Use total thyroidectomy for thyroid nodules with suspicious FNA results, or positive molecular testing, or clinical features that increase the suspicion of malignancy	33.8%
R21a	Evaluation of thyroid nodules in multinodular thyroid patients should generally be similar to patients with a solitary nodule (i.e., 2-3 largest or all nodules >1 cm in size)	47.7%
R23b	For patients with a prior benign FNA and low to intermediate suspicion features on the US, repeat the US and repeat FNA only for nodule growth or new suspicious US features	58.0%
R30a	Perform FNA on new thyroid nodules during pregnancy if the TSH is normal or elevated	37.7%

a: Represents the percentage of patients referred for thyroid surgery in whom total thyroidectomy would be requested, b: Represents the percentage of respondents who would sample all nodules >1 cm in a patient with a multinodular goiter. ATA: American Thyroid Association, FNA: Fine needle aspiration, TSH: Thyroid stimulating hormone, AUS/FLUS: Atypia of undetermined significance/follicular lesion of undetermined significance, 18FDG-PET: 2-fluoro-2-deoxy-D-glucose positron emission tomography, US: Ultrasound, CPG: Clinical practice guidelines

The recently updated ATA guidelines suggest a more restrained approach to thyroid nodule sampling[6] relative to the 2009 guidelines.[6] A less-selective approach is being used in the current clinical practice, with nearly two-thirds of respondents opting to sample a subcentimeter hypoechoic nodule with microcalcifications. Almost half chose to sample a complex-cystic nodule <2 cm, and more than a fifth selecting to sample a pure cyst for aspiration. This is peculiar as over 50% of the respondents are members of AACE and its previous chapters and are also actively involved in national and regional endocrine societies. The ATA 2015 guidelines recommend approaching one single or multiple thyroid nodules based on US risk stratification. In this regard, for a single hypoechoic nodule >1 cm, most of our respondents would appropriately select FNA. However, for multinodular goiters with similar sonographically hypoechoic nodules, less than a quarter would similarly address all nodules >1 cm.

As per ATA 2015, FNA must be performed on all new thyroid nodules in pregnancy if TSH is normal or elevated. In our survey, nearly two-thirds of respondents would not sample a new thyroid nodule during pregnancy and either postpone FNA until after pregnancy or only sample if the nodule grows under observation during pregnancy. This percentage is lower than the responses in the ATA 2015 survey (<50%).[9] Similarly, ATA 2015 suggests active surveillance of elderly with multiple comorbid conditions or limited life span; in this regard, our respondents, similar to those in ATA 2015 survey, are less likely to perform FNA.

Following most North American guidelines,[6,21] our respondents would select the measurement of serum calcitonin in over 50% of the cases only in the presence of thyroid nodules with suspicious US features, family history, or clinical suspicion of medullary thyroid cancer or in the setting of multiple endocrine neoplasias 2, the overall response not reaching 10%. The use of molecular testing is limited due to exuberant cost, unclear role due to specificity, and positive predictive value concerns. Close to 50% of respondents never used it, and the remaining used it occasionally in the setting of indeterminate thyroid nodules. The choice of further imaging by FDG PET scan, MRI, and CT scanning is also low in line with most guidelines.[6,21]

After obtaining a benign FNA in a thyroid nodule, the likelihood of later finding that nodule to be malignant is 1%–10% in various series,[23-25] particularly low false-negative rates in patients with benign features on thyroid US.[25-27] Hence, CPG would consider repeating neck US or FNA in the presence of nodular volume growth >50% or additional suspicious US features. When faced with a hypoechoic thyroid

nodule >1.5 cm and benign FNA, close to two-thirds of our respondents favor repeating neck the US in 6–12 months and repeat FNA if there is >50% thyroid nodule volume change or additional suspicious US features similar to the international survey (87.2%).[9] However, this growth is not specific for malignant thyroid nodules.[28]

The survey provided a baseline scoping of clinical practice status concerning the investigation and management of thyroid nodules in these two regions. Its findings should be considered when attempts are made to help clinicians implement essential updates of ATA across diverse settings. In this regard, more endocrinologists should acquire expertise in ultrasonography, and more cytologists should become experts in thyroid cytology. This setting may avoid unnecessary FNA of thyroid nodules or total thyroidectomy for DTC or undergo less intense postoperative surveillance.[29] Furthermore, a European perspective on the ATA 2015 guidelines highlighted that commercially available tests are developed based on the North American population. It is crucial to assess whether such tests can be used in other populations.[30]

Our study has both strengths and limitations. It is the first study of its nature from the region where increasing interest and controversies exist.[31,32] The number of respondents was reasonably large considering the number of physicians interested in thyroid disease. It represented a diverse group of clinicians from the two regions of interest, which were not adequately represented. A limitation of the current study is the low response rate and the respondents' inhomogeneous nature, though the latter was addressed by people defining their profile in detail. Another limitation is the unequal distribution of the representatives from various countries and the differences in resource availability between individual countries. Besides, it is possible that respondents to management surveys are more likely to be aware of CPGs and potentially adhere to their recommendations.

Conclusions

The present survey of physicians managing thyroid nodules in two developing regions documented the prevalent clinical practice patterns. It demonstrates both agreements and focal variations with recently updated CPGs. Interpretation of the findings should be cognizant of the limited access to specific resources, individual physicians' skills, and traditional care organizations. Reassessment of practice patterns after adequate time for adopting the most recent guidelines is recommended to reassess any gaps. Besides, results should inform plans for training and continuous professional development activities.

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Authors' contribution

Equal contribution to the conception, SAB adapted the survey questionnaire and manged it on line, analysand the data. Both authors contributed substantially to drafting and revision of the manuscript. They both approved its final version.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Compliance with ethical principles

The Institutional Review Board at Sheikh Khalifa Medical City, Abu Dhabi, UAE, approved the study. All participants provided informed electronic consent before they can proceed to the survey questions.

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Appendix 1: Technical details on preparation, interpretations, and reporting of thyroid fine needle aspiration

Specimen preparation:

48.0%: The specimen is smeared onto a microscope slide during the procedure

29.1%: The slides are examined for adequacy before the patient is released

26.0%: Specimens are stored in a preservative and sent to a reference laboratory

23.0%: The specimen is placed in solution, and a thin preparation is made

An extra specimen is routinely stored (in case it is needed later) for immunohistochemical testing (9.7%) or molecular testing (5.6%)

Interpretation

One hundred and ninety-seven respondents reported on who interprets the majority of thyroid FNAs performed in their practice. These included general pathologists on a rotating basis (42.6%), cytopathologists on a rotating basis (34.0%), a small number of designated thyroid cytopathologists (14.2%), the endocrinologists, or a commercial laboratory (3.6% each). The elements usually considered by the pathologist while interpreting thyroid FNA to include US findings (56.1%), high-risk history (radiation, family history of thyroid cancer) or underlying thyroid disorders (54.6%), previous FNA results for the same nodule (46.4%), and thyroid laboratory testing results (22.4%). Almost a quarter of the respondents (24%) were not sure

Reporting

A. 194 Respondents reported that the following elements are included in the majority of thyroid FNA result reports at their institutions:

A detailed description of the cytological findings (81.4%)

A statement regarding specimen adequacy (65.5%)

A Bethesda classification diagnostic category (64.9%)

For FLUS, an indication of inclusion (25.3%)

B. 197 respondents receive final results for thyroid FNAs performed at their institutions after the procedure:

5-7 days: 41.1%

8-14 days: 26.9%

1-3 days: 23.9%

15-30 days: 6.6%

US: Ultrasound, FNAs: Fine needle aspirations, FLUS: Follicular lesion of unknown significance