CDI QUALITY INSTITUTE

CLINICAL GUIDELINES

Thyroid Ultrasound Reporting Guideline Recommendations

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Updated June, 2017

Introductory notes:

- Thyroid nodules are very common in the adult population.
- The incidence of malignancy in thyroid nodules is low, ranging from 1.6% to 12%.
- Compared to malignancies with clinical presentations, incidentally discovered thyroid cancers are more likely to be indolent.
- The incidence of thyroid cancer has increased markedly over the past 20 years while the mortality rate has remained stable, possibly indicating overdiagnosis and overtreatment.
- Ultrasound is the primary modality used to evaluate and stratify risk in patients with incidentally detected thyroid nodules.
- Specific sonographic findings indicate nodules that need no additional follow-up:
    - Simple cysts;
    - Spongiform nodules.
- Specific sonographic features indicate an increased incidence of malignancy:
    - Hypoechogenicity;
    - Irregular margins;
    - Taller-than-wide shape;
    - Intra-nodular vascularity; or
    - Microcalcifications.
- The use of a thyroid reporting system is recommended to:
    - Increase the uniformity of reporting; and
    - Link diagnostic recommendations to the evidence as reported by the relevant specialty societies.
- The goals of a structured reporting system are to:
    - Minimize the number of biopsies performed; and
    - Optimize the number of thyroid cancers detected.

Provided in this guideline are two commonly-used reporting systems: the American Thyroid Association (ATA) system and the American College of Radiology (ACR) system.

Reporting System #1: American Thyroid Association (ATA) criteria in low-risk patients (2016)

This reporting system is more succinct and may be easier to use.

- Benign (< 1% risk of malignancy):
  - Purely cystic nodules (no solid component)
  - No biopsy
  - Strong recommendation, moderate-quality evidence

- Very low suspicion (< 3% risk of malignancy):
  - Spongiform or partially cystic with no additional risk factors
  - Consider FNA at ≥ 2 cm
  - Observation also a reasonable option
  - Weak recommendation, moderate-quality evidence

- Low suspicion (5-10% risk of malignancy):
  - Isoechoic or hyperechoic solid nodule, or partially cystic nodule with eccentric solid areas without microcalcifications, irregular margins, extrathyroid extension, or taller-than-wide shape
  - Recommend FNA at ≥ 1.5 cm
  - Weak recommendation, low-quality evidence

- Intermediate suspicion (10-20% risk of malignancy):
  - Hypoechoic solid nodule with smooth margins without microcalcifications, extrathyroid extension, or taller-than-wide shape
  - Recommend FNA if ≥ 1 cm
  - Strong recommendation, low-quality evidence

- High suspicion (> 70-90% risk):
  - Solid hypoechoic nodule or solid hypoechoic component of a partially cystic lesion with one or more of the following risk factors: irregular margins, microcalcifications, taller-than-wide shape, rim calcifications, or extrathyroid extension
  - Recommend FNA at ≥ 1 cm
  - Strong recommendation, moderate-quality evidence

- Nodule with abnormal cervical lymph nodes:
  - FNA of suspicious lymph nodes as well as suspicious thyroid nodules.

Reporting System #2: ACR TI-RADS reporting system (2017)

This reporting system is more complex, however, provides separate thresholds for fine needle aspiration (FNA) and surveillance.

In the ACR reporting TI-RADS system, nodules are evaluated according to five characteristics – composition, echogenicity, shape, margins, and echogenic foci:

- Composition:
  - Cystic or almost completely cystic — 0 points
  - Spongiform — 0 points
  - Mixed cystic and solid — 1 point
  - Solid or almost completely solid — 2 points
  - Composition cannot be determined 2°CA^{++} — 2 points

- Echogenicity:
  - Anechoic (cystic) — 0 points
  - Hyperechoic or isoechoic (relative to normal thyroid) — 1 point
  - Hypoechoic (relative to normal thyroid) — 2 points
  - Very hypoechoic (relative to the strap mm) — 3 points

- Shape:
  - Wider-than-tall* — 0 points
  - Taller-than-wide* — 3 points

  *ratio of > 1 of the AP diameter relative to the horizontal diameter in the transverse plane

- Margin:
  - Smooth — 0 points
  - Ill-defined — 0 points
  - Lobulated or irregular — 2 points
  - Extra-thyroidal extension — 3 points

- Echogenic Foci:
  - None or large comet-tail artifact — 0 points
  - Macrocalicifications — 1 point
  - Peripheral (rim) calcifications — 2 points
  - Punctate echogenic foci — 3 points

Total TI-RADS Score

- TR1: 0 points; benign (< 2% risk of malignancy); no FNA
- TR2: 2 points; not suspicious (< 2% risk of malignancy); no FNA

- TR3: 3 points; mildly suspicious (5% risk of malignancy); FNA if ≥ 2.5 cm, follow if ≥ 1.5 cm
- TR4: 4-6 points; moderately suspicious (5-20% risk of malignancy); FNA if ≥ 1.5 cm, follow if ≥ 1.0 cm
- TR5: ≥ 7 points; highly suspicious (> 20% risk of malignancy); FNA if ≥ 1 cm, follow if ≥ 0.5 cm. Biopsy of 5-9mm TR5 nodules may be indicated in some circumstances**

**Some thyroid specialists may support active surveillance, ablation, or lobectomy for small 5-9 mm papillary carcinomas.

Partially cystic lesion:	When evaluating a partially cystic lesion, the level of suspicion is determined primarily by the solid component.
Nodule with cervical lymphadenopathy:	FNA of any suspicious lymph nodes and up to two suspicious thyroid nodules ipsilateral to the abnormal lymph nodes. Suspicious features within cervical lymph nodes include enlargement, globular shape, loss of the normal echogenic hilum, presence of peripheral rather than hilar flow, heterogeneity with cystic components, and punctate foci.
Multiple nodules:	Number and report the location and size of each nodule. FNA of no more than 2 of the most suspicious nodules.

The recommendations made by the two systems are similar with two minor differences:

- For nodules with intermediate / moderate suspicion:
  - The ATA recommends biopsy for lesions > 1 cm.
  - The ACR recommends biopsy for lesions ≥ 1.5 cm and surveillance for lesions ≥ 1.0 cm.
- For spongiform nodules:
  - The ATA recommends FNA for nodules > 2 cm because of the potential for less-experienced operators to confuse microcalcifications with reflectors.
  - The ACR does not recommend FNA for simple spongiform nodules.

This is a guideline, not a policy. It is a summary and distillation of relevant subspecialty guidelines. The purpose of the CDI Quality Institute guidelines is to facilitate and accelerate the integration of medical evidence and best practices into daily clinical practices. Guidelines provide relevant medical evidence to support the development of policies within each individual practice. Guidelines should be adjusted for local standards of care, associated hospital or network policies, hospital versus outpatient settings, different patient populations, availability of resources, different experience levels, individual patient circumstances, and different risk-tolerance profiles. Local practice policies should also be modified to account for new information or publications that become available between guideline revisions.

References:

Ahn HS, Kim HJ, Welch HG. Korea's thyroid-cancer "epidemic" – screening and overdiagnosis. N Engl J Med 2014; 371(19):1765-1767.

Bahl M, Sosa JA, Nelson RC, Hobbs HA, Wnuk NM, Hoang JK. Thyroid cancers incidentally detected at imaging in a 10-year period: How many cancers would be missed with the use of the recommendations from the Society of Radiologists in Ultrasound? Radiology 2014; 271(3):888-894.

Cohen RN, Davis AM. Management of adult patients with thyroid nodules and differentiated thyroid cancer. JAMA 2017; 317(4):434-435.

Davies L, Welch G. Current thyroid cancer trends in the United States. JAMA Otolaryngol Head Neck Surg 2014; 140(4):317-322.

Frates MC, Benson CB, Charboneau JW, Cibas ES, Clark OH, Coleman BH, Cronan JJ, Doubilet PM, Evans DB, Goellner JR, Hay ID, Hertzberg BS, Intenzo CM, Jeffrey RB, Langer JE, Larsen PR, Mandel SJ, Middleton WD, Reading CC, Sherman SI, Tessler FN, Society of Radiologists in Ultrasound. Management of thyroid nodules detected at US: Society of Radiologists in Ultrasound consensus conference statement. Radiology 2005; 237(3):794-800.

Grant EG, Tessler FN, Hoang JK, Langer JE, Beland MD, Berland LL, Cronan JJ, Desser TS, Frates MC, Hamper UM, Middleton WD, Reading CC, Scoutt LM, Stavros AT, Teefey SA. Thyroid Ultrasound Reporting Lexicon: White Paper of the ACR Thyroid Imaging, Reporting and Data System (TIRADS) Committee. J Am Coll Radiol 2015; 12:1272-1279.

Haugen BR, Alexander EK, Bible KC, Doherty GM, Mandel SJ, Nikiforov YE, Pacini F, Randolph GW, Sawka AM, Schlumberger M, Schuff KG, Sherman SI, Sosa JA, Steward DL, Tuttle RM, Wartofsky L. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer: The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer. Thyroid 2016; 16(1):1-133.

Hoang JK, Langer JE, Middleton WD, Wu CC, Hammers LW, Cronan JJ, Tessler FN, Grant EG, Berland LL. Managing incidental thyroid nodules detected on imaging: White paper of the ACR Incidental Thyroid Findings Committee. J Am Coll Radiol 2015; 12(2):143-150.

Smith-Bindman R, Lebda P, Feldstein VA, Sellami D, Goldstein RB, Brasic N, Jin C, Kornak J. Risk of thyroid cancer based on thyroid ultrasound imaging characteristics: Results of a population-based study. JAMA Intern Med 2013; 173(19):1788-1796.

Tanpitukpongse TP, Grady AT, Sosa JA, Eastwood JD, Choudhury KR, Hoang JK. Incidental thyroid nodules on CT or MRI: Discordance between what we report and what receives workup. Am J Roentgenol 2015; 205(6):1281-1287.

Tessler FN, Middleton WD, Grant EG, Hoang JK, Berland LL, Teefey SA, Cronan JJ, Beland MD, Desser TS, Frates MC, Hammers LW, Hamper UM, Langer JE, Reading CC, Scoutt LM, Stavros AT. ACR Thyroid Imaging, Reporting and Data System (TI-RADS): White paper of the ACR TI-RADS Committee. J Am Coll Radiol 2017; 14(5):587-595.

Vaccarella S, Franceschi S, Bray F, Wild CP, Plummer M, Dal Maso L. Worldwide thyroid-cancer epidemic? The increasing impact of overdiagnosis. N Engl J Med 2016; 375(7):614-617.