Factors Influencing Surgeons’ Treatment Recommendations for Low-Risk Papillary Thyroid Carcinoma

Alexandria D. McDow, MD, Juan P. Brito, MD, Jamia Linn Jennings, BA, Megan C. Saucke, MA, Corrine I. Voils, PhD, Benjamin R. Roman, MD, MSHP, Susan C. Pitt, MD, MPH

Introduction

- Previous studies suggest that many small <2 cm low-risk papillary thyroid cancers (LR-PTC) are indolent and may not lead to harm or decrease survival.
- The 2015 ATA guidelines now recommended less extensive surgical management of small LR-PTC.
- Studies have not examined the impact of these recent guideline changes on providers’ practice patterns.

OBJECTIVE: To identify factors associated with overtreatment of patients with small LR-PTC.

Methods

- Survey: A pilot-tested, Qualtrics© survey was distributed via email using the Dillman method. Questions were developed with stakeholder input and included case scenarios that varied PTC size, patient age and comorbidities, and treatment preferences.
- Study Population: Endocrine surgeons (ES) and otolaryngologists (ENT) who are members of 1 or more of the following national organizations:
  - American Thyroid Association
  - American Association of Endocrine Surgeons
  - American Head and Neck Society

Table 1: Demographics (n=246)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n (% )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years*</td>
<td>46 +/- 2</td>
</tr>
<tr>
<td>Female gender</td>
<td>71 (29.2)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>170 (70.5)</td>
</tr>
<tr>
<td>Years in Practice*</td>
<td>12.5 +/- 2.2</td>
</tr>
<tr>
<td>Academic Tertiary/Affiliated</td>
<td>201 (83.3)</td>
</tr>
</tbody>
</table>

Methods

*Data shown as mean +/- SD

Survey respondents were divided into three specialty groups: ES (n=145), ENT (n=101), and Academic Tertiary/Affiliated (n=201).

Table 2: Recommendation for Total Thyroidectomy by Specialty

<table>
<thead>
<tr>
<th>Tumor Size</th>
<th>ES n=145</th>
<th>ENT n=101</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 y, 0.8 cm PTC</td>
<td>8 (5.6%)</td>
<td>9 (8.9%)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Results

**Figure: Recommendation for TT for each Case Scenario (%)**

- **Likelihood of recommending TT for each Case Scenario (%)**
  - **Base Case**
  - **0.4 cm**
  - **1.1 cm**
  - **1.5 cm**
  - **20 y**
  - **75 y, >10 y LE**
  - **75 y, <10 y LE**
  - **45 y on LT4**
  - **Pt prefers NS**
  - **Pt prefers Lobe**
  - **Pt prefers TT**
  - **Surgeon prefers TT for self**

- **p-value compared to base case**
  - *** p<0.0001
  - ** p<0.001
  - * p<0.05

**Table 2: Recommendation for Total Thyroidectomy by Specialty**

*Patient age is 45y and PTC size 0.8 cm except where noted; data shown as n (%)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Base Case</th>
<th>Tumor Size</th>
<th>Age/ Comorbidities</th>
<th>Patient preference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Age &amp; Comorbidities</strong></td>
<td><strong>ES</strong> n=145</td>
<td><strong>ENT</strong> n=101</td>
<td><strong>p-value</strong></td>
<td></td>
</tr>
<tr>
<td>45y, 0.8 cm PTC</td>
<td>8 (5.6%)</td>
<td>9 (8.9%)</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td><strong>Tumor Size</strong></td>
<td><strong>ES</strong> n=145</td>
<td><strong>ENT</strong> n=101</td>
<td><strong>p-value</strong></td>
<td></td>
</tr>
<tr>
<td>0.4 cm</td>
<td>8 (5.6%)</td>
<td>9 (8.9%)</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>1.1 cm</td>
<td>49 (34.0%)</td>
<td>27 (26.7%)</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>1.5 cm</td>
<td>68 (47.2%)</td>
<td>37 (36.6%)</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td><strong>Patient Treatment Preference</strong></td>
<td><strong>ES</strong> n=145</td>
<td><strong>ENT</strong> n=101</td>
<td><strong>p-value</strong></td>
<td></td>
</tr>
<tr>
<td>Patient prefers AS</td>
<td>2 (1.4%)</td>
<td>4 (4.1%)</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Patient prefers Lobe</td>
<td>2 (1.4%)</td>
<td>7 (7.0%)</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Patient prefers TT</td>
<td>112 (77.8%)</td>
<td>67 (68.7%)</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Surgeon prefers TT for self</td>
<td>28 (19.3%)</td>
<td>13 (12.9%)</td>
<td>NS</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions

- Multiple factors influenced surgeons’ recommendations for management of small, LR-PTC including:
  - Tumor size
  - Patient age & comorbidities
  - Patient preference
  - Surgeon preference for self

- Patient preference had the greatest impact on the likelihood of recommending a TT for a 45-year-old female with a 0.8 cm PTC.

- Surgeon preference for his/her own treatment also impacted treatment recommendations for their patients and may decrease adoption of the 2015 ATA guidelines.

- Addressing patients’ and providers’ beliefs about thyroid cancer will be necessary to reduce overtreatment.

- Understanding what information patients need and what outcomes are most important will be critical to aligning their treatment decisions with their goals and values.

Acknowledgement: This study was supported by the AAES Paul LoGerfo Research Award and the UW Carbone Cancer Center award P30 CA014520 from the NIH/NCI.

Analysis: The primary outcome was the rate of recommending TT for each case scenario. Chi square analysis assessed differences by surgeon specialty (Table 2) and the impact of patient and provider characteristics (Figure) on the likelihood of recommending TT compared to the base case (above).
Factors Influencing Endocrinologists’ and Surgeons’ Recommendations for Active Surveillance

Alexandria D. McDow, MD, Juan P. Brito, MD, Megan C. Saucke, MA, Nick Zaborek, MA, Corrine I. Voils, PhD, Benjamin R. Roman, MD, MSHP, Susan C. Pitt, MD, MPH

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Department of Surgery, Division of Head and Neck Surgery • Memorial Sloan Kettering Cancer Center
Department of Medicine, Division of Endocrinology, Diabetes, Metabolism and Nutrition • Mayo Clinic

Introduction
- Prior studies suggest that many small <2 cm low-risk papillary thyroid cancers (PTC) are indolent and do not lead to harm or decrease survival.
- The 2015 ATA guidelines now recommend less extensive surgical management of small-risk PTC including active surveillance (AS) for nodules ≤ 1 cm.
- There is a lack of data examining the impact of recent guideline changes on providers’ practice patterns.
- OBJECTIVE: To identify factors that influence endocrinologists’ and surgeons’ recommendations for AS.

Methods
- Survey: A pilot-tested survey using Qualtrics® software was distributed via email. Questions were developed with stakeholder input and included 11 case scenarios that varied PTC size, patient age and comorbidities, and treatment preferences.
- Randomization: Respondents were randomized to receive or not receive evidence-based information about AS for PTC measuring ≤1 cm.
- Study Population: Endocrinologists and surgeons who are members of one or more of the following national organizations:
  - American Association of Endocrine Surgeons (AAES)
  - American Thyroid Association (ATA)
  - American Association of Medical Colleges (AAMC)
- Analysis: The primary outcome was the rate of recommending AS for each case scenario. X² analysis assessed differences by specialty (Table 2). Multivariable logistic regression identified factors associated with recommending AS for PTC ≤1 cm (Table 3).

Results

Table 1: Respondent Demographics (Total n=345)

<table>
<thead>
<tr>
<th>Endocrinologists</th>
<th>Surgeons</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>51 +/-15</td>
<td>46 +/-10</td>
</tr>
<tr>
<td>Female sex</td>
<td>36 (37.5)</td>
<td>71 (29.2)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>63 (65.6)</td>
<td>170 (70.5)</td>
</tr>
<tr>
<td>Years in practice</td>
<td>19.1 +/-14.6</td>
<td>12.5 +/-11.0</td>
</tr>
<tr>
<td>Academic tertiary</td>
<td>48 (49.5)</td>
<td>168 (69.4)</td>
</tr>
</tbody>
</table>

Data shown as mean +/-SD or n (%)

Figure 1: Recommendation for Active Surveillance by Specialty

- Endocrinologists were significantly more likely to recommend AS for all case scenarios except for a 45-year-old with a 15 mm PTC, a 75 yo with <10 year life expectancy, and when a patient preferred for a particular a particular treatment.

Table 2: Factors Associated with Endocrinologists’ and Surgeons’ Recommending Active Surveillance (AS)*

<table>
<thead>
<tr>
<th>Respondent Characteristics</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefers AS for their own treatment</td>
<td>7.53</td>
<td>3.13-18.16</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Recommends AS if the patient in the clinical scenario prefers AS</td>
<td>7.50</td>
<td>3.81-14.78</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Endocrinologist</td>
<td>2.91</td>
<td>1.47-5.75</td>
<td>0.002</td>
</tr>
<tr>
<td>Received information about AS prior to taking survey</td>
<td>2.11</td>
<td>1.22-3.64</td>
<td>0.008</td>
</tr>
<tr>
<td>Rarely takes risks in their own life</td>
<td>1.18</td>
<td>0.62-2.64</td>
<td>NS</td>
</tr>
<tr>
<td>Practices in an Academic tertiary setting</td>
<td>1.01</td>
<td>0.56-1.83</td>
<td>NS</td>
</tr>
<tr>
<td>Female</td>
<td>0.80</td>
<td>0.45-1.43</td>
<td>NS</td>
</tr>
<tr>
<td>Uncertainty in patient care makes respondent uneasy</td>
<td>0.60</td>
<td>0.31-1.16</td>
<td>NS</td>
</tr>
<tr>
<td>Believes patient preference is influenced by desire for peace of mind from surgery</td>
<td>0.49</td>
<td>0.24-0.97</td>
<td>0.04</td>
</tr>
</tbody>
</table>

* Odds Ratio >1.00 indicates increased odds that a providers recommend AS for a patient with a 0.8 cm PTC

Conclusions
- Provider preference for his/her own treatment and patient preference for AS had the greatest impact on whether or not a provider recommended AS.
- Endocrinologists recommended AS significantly more than surgeons.
- Receipt of information regarding AS prior to survey completion influenced provider responses, though the long-term effect providing information is unknown.
- Understanding patients’ goals and values is critical to reaching treatment decisions when using a shared decision-making model.
- Educating both providers and patients about AS has a significant potential to increase the utilization of AS.

Acknowledgement: This study was supported by the AAES Paul LoGerfo Research Award and the UW Carbone Cancer Center award P30 CA014520 from the NIH/NCI.
To evaluate endocrinologists’ and surgeons’ use of active surveillance and barriers to implementation

OBJECTIVE: To evaluate endocrinologists’ and surgeons’ use of active surveillance and barriers to implementation

Methods

Survey: A web-based, Qualtrics survey was distributed via email using the Dillman method. Questions were based on Cabana’s model of barriers to guideline adherence.

Study Population: Endocrinologists, general/endocrine surgeons, and otolaryngologists who are members of one or more of the following organizations:

Analysis: Statistical analysis was performed using chi-square and t-tests as appropriate

Participant Demographics

<table>
<thead>
<tr>
<th></th>
<th>Endocrinologists n (%)</th>
<th>Surgeons n (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondents</td>
<td>99</td>
<td>246</td>
<td></td>
</tr>
<tr>
<td>Age (mean, SD)</td>
<td>51.4 ± 14.9</td>
<td>46.0 ± 10.3</td>
<td>0.002</td>
</tr>
<tr>
<td>Female</td>
<td>36 (37.5)</td>
<td>71 (29.2)</td>
<td>0.14</td>
</tr>
<tr>
<td>Caucasian</td>
<td>170 (65.6)</td>
<td>63 (70.5)</td>
<td>0.62</td>
</tr>
<tr>
<td>Years in practice</td>
<td>19.1 ± 14.6</td>
<td>12.5 ± 11.0</td>
<td>0.0002</td>
</tr>
<tr>
<td>Practice Setting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic</td>
<td>48 (49.5)</td>
<td>168 (69.4)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Academic-affiliated</td>
<td>18 (18.6)</td>
<td>38 (15.7)</td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>3 (3.1)</td>
<td>15 (6.2)</td>
<td></td>
</tr>
<tr>
<td>Private Practice</td>
<td>25 (25.8)</td>
<td>18 (7.4)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3 (3.1)</td>
<td>3 (1.2)</td>
<td></td>
</tr>
</tbody>
</table>

Results

Figure 1: Self-reported Use of and Beliefs about Active Surveillance (AS) and the 2015 American Thyroid Association (ATA) Guidelines

Table 2: Barriers to Active Surveillance (AS)

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Agreed or Strongly Agreed n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beliefs about Patients</td>
<td></td>
</tr>
<tr>
<td>Patients are not aware of AS prior to seeing me</td>
<td>277 (81.2)</td>
</tr>
<tr>
<td>The psychological burden is too high for most patients</td>
<td>105 (30.7)</td>
</tr>
<tr>
<td>AS will not improve patients’ quality of life</td>
<td>81 (25.5)</td>
</tr>
<tr>
<td>Beliefs about AS</td>
<td></td>
</tr>
<tr>
<td>Guidelines for AS are too vague</td>
<td>96 (29.0)</td>
</tr>
<tr>
<td>Reservations about AS</td>
<td>65 (19.1)</td>
</tr>
<tr>
<td>Evidence is too weak</td>
<td>60 (18.1)</td>
</tr>
<tr>
<td>Anxious about AS because of clinical experience</td>
<td>59 (17.5)</td>
</tr>
<tr>
<td>AS is not appropriate for select patients</td>
<td>22 (6.4)</td>
</tr>
<tr>
<td>Patients may have a poor outcome</td>
<td>21 (6.4)</td>
</tr>
<tr>
<td>Clinical Practice</td>
<td></td>
</tr>
<tr>
<td>Colleagues do not offer AS</td>
<td>175 (51.3)</td>
</tr>
<tr>
<td>Concern about medical malpractice</td>
<td>63 (18.3)</td>
</tr>
<tr>
<td>Concern about the costs of AS</td>
<td>52 (15.4)</td>
</tr>
<tr>
<td>Knowledge / Utilization</td>
<td></td>
</tr>
<tr>
<td>Not comfortable offering AS</td>
<td>55 (16.0)</td>
</tr>
<tr>
<td>Does not know how to determine if a patient is appropriate for AS</td>
<td>29 (8.5)</td>
</tr>
<tr>
<td>Not comfortable discussing AS</td>
<td>25 (7.3)</td>
</tr>
</tbody>
</table>

Figure 2: Differences in Barriers to AS between Specialties (%)

Figure 3: Providers would be more likely to offer AS if they had...

More information for patients 27%
Standardized consent form 37%

Conclusions

• Most endocrinologists and surgeons believe that active surveillance (AS) is underused

• Significant barriers to AS implementation include:
  o Concerns about data supporting AS
  o Clarity of guidelines
  o Belief that patients are not aware or interested in AS

• Strategies for increasing use of AS include:
  o Improving patient and provider knowledge of AS
  o Developing a formal consent process

Acknowledgements: This study was funded by the University of Wisconsin Carbone Cancer Center’s Paul P. Carbone Young Investigator Award - NIH/NCI P30 CA014520 and AAES Paul LuGuerts Research Award
Use of Lobectomy for Low-Risk Papillary Thyroid Cancer by Low and High-Volume Surgeons: A National Survey

Alexandria D. McDow, MD, Megan C. Saucke, MA, Susan C. Pitt, MD, MPH

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Department of Surgery • University of Wisconsin School of Medicine and Public Health • Madison, WI

Introduction

- The 2015 American Thyroid Association (ATA) guidelines endorse lobectomy as an appropriate treatment for patients with clinically node-negative (cN0) low-risk papillary thyroid cancer measuring 1-4 cm without extrathyroidal extension (ETE).
- Data on the use of lobectomy for these patients are lacking, particularly by low-volume thyroid surgeons who perform the majority of thyroidectomies in the United States (U.S.).

OBJECTIVE: To evaluate the use of lobectomy for cN0, low-risk PTC (LR-PTC) without ETE by a large, nationally representative cohort of surgeons

Methods

Survey:
A piloted-survey was mailed using a modified Dillman method. Questions assessed how respondents would treat a 45-year-old female with cN0 LR-PTC measuring >1 cm.

Study Population:
Random sample of 500 general surgeons and 500 oto-laryngologists (ENT) registered with the American Medical Association who performed ≥1 thyroidectomy since 2015

Analysis:
Chi-square analysis examined differences by surgeon volume

Participant Demographics

<table>
<thead>
<tr>
<th></th>
<th>n = 320</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean, SD)</td>
<td>54.8 ± 8.4</td>
</tr>
<tr>
<td>Female</td>
<td>30 (9.5%)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>260 (80.2%)</td>
</tr>
<tr>
<td>Years in practice (mean, SD)</td>
<td>22.2 ± 8.5</td>
</tr>
<tr>
<td>General surgery trained (vs. ENT)</td>
<td>150 (46.9%)</td>
</tr>
<tr>
<td>Practice Setting</td>
<td></td>
</tr>
<tr>
<td>Academic</td>
<td>41 (13.6%)</td>
</tr>
<tr>
<td>Academic-affiliated</td>
<td>37 (12.2%)</td>
</tr>
<tr>
<td>Community</td>
<td>80 (26.3%)</td>
</tr>
<tr>
<td>Private Practice</td>
<td>158 (52.0%)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (1.6%)</td>
</tr>
</tbody>
</table>

Results

Figure 1: Surgeon Characteristics

- Low-Volume (n=184) (≤ 25 thyroidectomies/year)
  - Performs CND (n=225) (central neck dissection)
    - 63%
  - Aware lobectomy is appropriate for 1-4cm LR-PTC (n=235)
    - 78%
  - Uses ioNM (n=192) (intraoperative nerve monitor)
    - 74%
  - Personally performs US (n=84) (ultrasound)
    - 28%

- High-Volume (n=136) (≥ 25 thyroidectomies/year)
  - Performs CND (n=175)
    - 92%
  - Aware lobectomy is appropriate for 1-4cm LR-PTC (n=175)
    - 73%
  - Uses ioNM (n=136)
    - 92%
  - Personally performs US (n=59)
    - 73%

Figure 2: Percent of Surgeons Recommending Lobectomy for cN0 PTC

- 1.1 cm
  - 34% High-Volume
  - 19% Low-Volume
  - * p=0.05
- 1.5 cm
  - 21% High-Volume
  - 18% Low-Volume
  - ** p<0.001
- 2.0 cm
  - 21% High-Volume
  - 18% Low-Volume
  - *** p=0.001
- 3.0 cm
  - 11% High-Volume
  - 10% Low-Volume
  - ** p=0.002
- >4.0 cm
  - 7% High-Volume
  - 7% Low-Volume

Figure 3: Surgeon beliefs about the use of Lobectomy for LR-PTC in the United States

- Risk of recurrence is greater* after lobectomy: 52% High-Volume, 37% Low-Volume
- Mortality is greater* after lobectomy: 21% High-Volume, 13% Low-Volume
- Quality of life is better* after lobectomy: 24% High-Volume, 19% Low-Volume
- Lobectomy is underused: 42% High-Volume, 27% Low-Volume
- Lobectomy is overused: 3% High-Volume, 1% Low-Volume

Conclusions

- A minority of surgeons in the U.S. would recommend lobectomy for a patient with a cN0 PTC measuring 1-4 cm without any adverse features or history
  - 1 in 5 surgeons are not aware that lobectomy is supported by the ATA guidelines for 1-4 cm PTC
  - Low-volume surgeons are significantly less likely to be aware of this guideline for lobectomy
- Low-volume thyroid surgeons were less likely to recommend lobectomy for a 1.1 cm PTC
- As PTC size increased, significantly fewer surgeons would recommend lobectomy

Acknowledgements: This work was supported by the University of Wisconsin Carbone Cancer Center’s Paul P. Carbone Young Investigator Award - NIH/NCI P30 CA014520 and the AAES Paul LoGerfo Research Award.
Adoption of Active Surveillance: Analysis of a Large National Cohort of Physicians

Nan Yang, Megan C. Saucke, MA, Nick Marka, MS, Bret Hanlon, PhD, Alexandria D. McDow, MD, Kristin L. Long, MD, MPH, Susan C. Pitt, MD, MPH

Department of Surgery • University of Wisconsin School of Medicine and Public Health • Madison, WI

Introduction

• The 2015 American Thyroid Association (ATA) guidelines endorse active surveillance (AS) as an appropriate treatment for patients with small, low-risk papillary thyroid cancer (PTC) measuring ≤1 cm.

• Data on the adoption of AS in the U.S. for these patients are lacking.

OBJECTIVE: To evaluate adoption of AS for small, low-risk PTC by a large, nationally representative cohort of providers in the U.S.

Methods

Mailed Survey- Assessed adoption of AS using 2 cases:
(1) 45-year-old female with a solitary, clinically node-negative cN0 0.8 cm PTC with no adverse features or family/medical history
(2) The same case but the patient preferred AS

Eligible providers
Non-adopters
Partial adopters
Full adopters
Non-respondents
Refusal (n=15)
No response (n=959)
Undeliverable (n=38)
Deceased (n=1)
Duplicate (n=1)
Not treated thyroid cancer (n=23)

Methods

Population: Random sample of 1,500 endocrinologists & surgeons registered with the American Medical Association

Analysis: Respondents were categorized based on their responses to the 2 cases above as:
- Full adopters – recommended AS for both Case 1 and 2
- Partial adopters – recommended AS for Case 2 only
- Non-adopters – did not recommend AS for either case

Comparisons were made using Chi-square and t-tests.

Participant Response

Table 1: Respondent Demographics (n=464)

<table>
<thead>
<tr>
<th></th>
<th>Adopters n (%)</th>
<th>Non-adopters n (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>252 (54.3)</td>
<td>212 (45.7)</td>
<td>--</td>
</tr>
<tr>
<td>Age (mean ± SD)</td>
<td>53.4 ± 9.1</td>
<td>53.9 ± 8.9</td>
<td>0.55</td>
</tr>
<tr>
<td>Male</td>
<td>187 (75.4)</td>
<td>160 (81.6)</td>
<td>0.21</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td>0.91</td>
</tr>
<tr>
<td>Caucasian</td>
<td>182 (75.2)</td>
<td>152 (77.2)</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>4 (1.7)</td>
<td>3 (1.5)</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>38 (15.7)</td>
<td>26 (13.2)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>16 (7.4)</td>
<td>16 (8.2)</td>
<td></td>
</tr>
<tr>
<td>Years in practice (mean ± SD)</td>
<td>20.8 ± 9.3</td>
<td>20.7 ± 8.7</td>
<td>0.88</td>
</tr>
<tr>
<td>Academic practice setting</td>
<td>74 (29.5)</td>
<td>34 (17.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Treats &gt;25 thyroid cancer pts/yr</td>
<td>106 (42.2)</td>
<td>49 (24.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Aware AS is management option</td>
<td>238 (94.8)</td>
<td>158 (79.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Colleagues routinely offer AS</td>
<td>12 (5.1)</td>
<td>2 (1.1)</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Results

Figure 1: Adoption of AS

Figure 2: Awareness, Knowledge, and Use of AS

Figure 3: Beliefs about utilization of AS in the U.S.

Figure 4A: Adopters vs. Non-adopters

4A: Adopters

Adopters vs. Non-adopters

Adopters
Non-adopters

Underused
 Appropriately Used
 Overused

Adopters

Non-adopters

85%
14%
1%

67%
24%
9%

p<0.001

4B: Adopters Only

Adopters

Non-adopters

Adopters

Non-adopters

48%
12%

96%
3%

**p=0.001

p<0.05

Conclusions

• Only 1 out of 2 physicians recommended AS for a patient with a cN0, ≤1 cm low-risk papillary thyroid cancer

• Non-adopters of AS were less likely to:
  - Be a high volume provider
  - Practice in an academic setting
  - Be aware that AS is a management option
  - Discuss AS with patients
  - Discuss AS with patients
  - Use the ATA guidelines
  - Have resources to perform AS
  - Be motivated to increase use of AS
  - Have concerns about AS outcomes
  - Be concerned about AS outcomes
  - Believe AS makes a psychological burden on patients

• Efforts to increase adoption of AS in the U.S. should focus on awareness, interest and evaluation of outcomes

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Table 2: Analysis of a Large National Cohort of Physicians

Adopters
Non-adopters

Uses ATA guidelines in their practice

50%
29%

46%
20%

Believes patients are aware of AS

88%
70%

20%
3%

Uses ATA guidelines in their practice

100%
80%

20%
80%

Believes patients are aware of AS

**p<0.001

**p<0.05

Note: Responses to these questions were similar between “Full adopters” and “Partial adopters”