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Referral of older thyroid cancer patients to a high-volume surgeon: Results of a multidisciplinary physician survey

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Abstract

Objective—Surgical outcomes of thyroid cancer patients are improved with high-volume surgeons. However, age disparities in referral to specialist surgical centers still exist. The factors that influence decision-making regarding referral of older thyroid cancer patients to high-volume surgeons remain unknown.

Methods—We surveyed members of the Endocrine Society, American College of Physicians and American Academy of Family Practice.

Results—Overall, 269 physicians completed the survey. Patient preference (68%), transportation barriers (63%) and confidence in local surgeon (54%) were the most cited factors decreasing likelihood of referral to a high-volume surgeon. In clinical scenarios, referral rates to a high-volume surgeon were similar for patients aged 40 and 65 with a 1 cm thyroid nodule diagnostic of thyroid cancer (N=137, 54%; N=132, 52% respectively) as for an 85-year-old with a 4 cm nodule (N=148, 59%). When comorbidities were introduced, more physicians (N=186, 74%) would refer a 65-year-old with a 4 cm thyroid nodule and comorbidities, compared to an 85-year-old with the same nodule size without comorbidities. In multivariable analysis, treating >10 thyroid cancer patients/year ($p < 0.001$, $p = 0.005$) and endocrinology specialty ($p = 0.003$, $p = 0.003$) were associated with referral to a high-volume surgeon for a 65-year-old with comorbidities and an 85-year-old without comorbidities.

Conclusions—Understanding surgical referral patterns of older thyroid cancer patients is vital in identifying obstacles in the referral process. We found that patient factors including comorbidities, and physician factors including specialty and patient volume, influence these patterns. This is the first step towards developing targeted interventions for these patients.

Key words for indexing

thyroid cancer; surgery; referral

BACKGROUND

The incidence of thyroid cancer is rising, with thyroid cancer now the eighth most common cancer in the United States.(1–5) Although typically a cancer with a favorable prognosis, the aggressiveness of thyroid cancer increases with age.(6, 7) There is also a recognized association between older age and worse outcomes.(8) Studies have shown that surgical outcomes of thyroid cancer patients, and older patients specifically, are improved with a high-volume thyroid surgeon.(9–16) However, current data show that older patients with thyroid cancer are less likely to receive guideline concordant care.(17) Additionally, older age and Medicare insurance were found to be independently associated with less aggressive management of patients with high-risk thyroid cancer.(18)

Even though older patients with thyroid cancer would benefit from referral to high-volume thyroid surgeons, age disparities in referral to a specialist surgical center exist.(19) The factors that influence decision making regarding referral of older thyroid cancer patients to a high-volume thyroid surgeon remain unclear and previously unexplored. Whether these decisions vary by type of provider is also not known. Determination of these factors would facilitate improving quality of care and developing targeted interventions in this growing population of thyroid cancer patients.

The objective of our study was to delineate the factors that influence decision making regarding referral of older thyroid cancer patients (age ≥ 65 years) to high-volume thyroid surgeons. We conducted a nationwide physician survey targeting endocrinologists, internists and family practitioners.

METHODS**Study Population**

Members of the American College of Physicians, the American Academy of Family Practice and the Endocrine Society were randomly selected and surveyed. The modified Dillman survey method was used to enhance survey response rates.(20) This three-wave method of survey administration comprises of (i) an initial mailing of an introductory letter, the survey instrument, a postage-paid return envelope, and a small monetary gift; (ii) a postcard reminder 3 weeks later; and (iii) a second survey with a postage-paid return envelope to all non-respondents 3 weeks later. Follow-up telephone encounters were also conducted with non-respondents. Data from the returned surveys were de-identified, entered into a Research Electronic Data Capture (i.e., REDCap) database and verified by the double entry method to ensure <1% error (21). The University of Michigan Institutional Review Board approved this study.

Survey Design and Measures

The instrument was designed by a diverse group of physicians and survey methodologists. It was subsequently piloted in a multidisciplinary group of providers at the University of Michigan prior to survey administration. The survey instrument included both questions and clinical vignettes. Responses regarding physician specialty, practice setting, years in practice and thyroid cancer patient volume were obtained from the survey questions (independent variables). Information on factors influencing likelihood of referral of older thyroid cancer patients (age ≥ 65 years) to a high-volume surgeon (defined as performing >100 thyroid surgeries per year) was also obtained. Factors listed included insurance restrictions, high risk for complications, patient immobility, patient's inability to perform basic activities (e.g. eating, bathing), patient's inability to perform more complex activities (e.g. shopping, managing finances), lack of patient's social support system, transportation barriers, patient preference and confidence in local surgeon.

Four thyroid cancer vignettes were included in the survey instrument: a 40-year-old patient without comorbidities with a 1.0 cm thyroid nodule diagnostic of papillary thyroid cancer, a 65-year-old patient without comorbidities with a 1.0 cm thyroid nodule diagnostic of papillary thyroid cancer, a 65-year-old patient with comorbidities (atrial fibrillation, osteoporosis, severe chronic obstructive pulmonary disease and congestive heart failure) with a 4.0 cm thyroid nodule diagnostic of papillary thyroid cancer, and an 85-year-old patient without comorbidities with a 4.0 cm thyroid nodule diagnostic of papillary thyroid cancer. Surveyed physicians were asked to choose one of the following answers: observe the patient, refer to a local surgeon that may not be a high-volume surgeon, or refer to a high-volume specialized surgeon that may require the patient to travel some distance (Figure 1). The dependent variable was collapsed into a binary variable: refer to a high-volume surgeon versus not refer.

Statistical Analysis

Univariate analyses of physician characteristics associated with referral of older thyroid cancer patients to a high-volume surgeon were performed using chi-square tests for all the clinical vignettes. Multivariable analysis was performed using logistic regression to evaluate the independent effect of physician characteristics on referral.

All statistical tests were performed using IBM SPSS Statistics 22. A *P* value <0.05 was considered as statistically significant.

RESULTS

Out of the 762 response-eligible physicians surveyed who treated thyroid cancer patients, 269 completed the survey. Physician characteristics are shown in Table 1. When presented with clinical scenarios, referral rates to a high-volume surgeon were similar for patients aged 40 and 65 years old with a 1 cm thyroid nodule diagnostic of thyroid cancer (N=137, 54% and N=132, 52%, respectively) as for an 85-year-old with a 4 cm nodule (N=148, 59%). When comorbidities were introduced (atrial fibrillation, osteoporosis, congestive heart failure, chronic obstructive pulmonary disease), more physicians (N=186, 74%) would refer

a 65-year-old with a 4 cm thyroid nodule diagnostic of thyroid cancer and comorbidities to a high-volume surgeon, compared to an 85-year-old with the same nodule size without comorbidities.

The results of the univariate and multivariable analyses of physician characteristics associated with referral to a high-volume surgeon for the clinical vignettes describing a 65-year-old thyroid cancer patient with comorbidities and an 85-year-old thyroid cancer patient without comorbidities are shown in Tables 2 and 3 respectively. In univariate analyses, both for a 65-year-old patient with comorbidities and for an 85-year-old patient without comorbidities with the same nodule size, endocrinologists ($p < 0.001$; $p < 0.001$ respectively), physicians in academic settings ($p = 0.033$; $p = 0.028$) and physicians treating > 10 thyroid cancer patients per year ($p = 0.013$; $p = 0.001$) were more likely to refer to a high-volume surgeon. Physicians with fewer years in practice ($p = 0.031$) were also more likely to refer an 85-year-old patient with a larger thyroid nodule but without comorbidities to a high-volume surgeon. In multivariable logistic regression analysis, however, only endocrinology specialty ($p = 0.003$; $p = 0.003$) and thyroid cancer patient volume over 10 per year ($p < 0.001$, $p = 0.005$) were statistically associated with referral to a high-volume surgeon for both above analyzed clinical scenarios. Treating more than 10 thyroid cancer patients per year was also statistically associated with referral to a high-volume surgeon for a 40-year-old and a 65-year-old thyroid cancer patient with small thyroid nodules (1 cm) and without comorbidities ($p = 0.013$, $p = 0.015$).

Figure 2 demonstrates the factors associated with decreased likelihood of referral of older thyroid cancer patients (age ≥ 65 years) to a high-volume surgeon. Patient preference (68%), transportation barriers (63%) and confidence of the referring doctor in local surgeon (54%) were the factors cited as most important in decreasing likelihood of referral. Less frequently quoted factors were insurance restrictions (30%), patient inability to perform basic (28%) or instrumental (21%) activities of daily living, lack of social support (27%) and patient immobility (26%). Being at high risk for complications was infrequently quoted as a reason not to refer an older patient to a high-volume surgeon for thyroid cancer surgery (3%).

DISCUSSION

In this national survey of a diverse group of physicians who treat patients with thyroid cancer, we found that whereas close to three-fourths of physicians would refer an older patient with comorbidities and a large thyroid nodule diagnostic of thyroid cancer to a high-volume surgeon, just over half would refer an oldest old patient without comorbidities with the same nodule size. We also found that endocrinologists and physicians treating more than 10 thyroid cancer patients per year are more likely to refer older thyroid cancer patients with or without comorbidities to a high-volume thyroid surgeon. Patient preference, transportation barriers and confidence in local surgeon were the most commonly reported reasons to decrease likelihood of referral to a high-volume surgeon.

Total thyroidectomy with or without neck lymph node dissection, which may be followed by radioactive iodine ablation, is the standard of care for patients with differentiated thyroid cancer.(22) However, it was previously demonstrated that elderly patients with differentiated

thyroid cancers receive less aggressive surgical and radioactive iodine treatment than younger patients, despite having more advanced disease and improved survival associated with treatment.(17) Successful surgery for thyroid cancer has been shown to not only increase the survival rate but also improve the quality of life of older patients.(23) It is generally perceived that the elderly may have increased operative risks because of the presence of increasing number of comorbidities, thus leading to a more conservative or non-operative approach to be adopted in these patients with thyroid cancer.(24–26) Older individuals with comorbidities are also at risk for functional disabilities, which can further impact cancer treatment strategies.(27) Additionally, several prior studies have shown that high surgeon volume is a significant predictor of improved outcomes following thyroidectomy, and has been associated with more completeness of initial operation (14, 15), shorter length of hospital stay, lower postoperative complication rates and lower costs.(9–14, 16) The lowest postoperative complication rates have been shown to be achieved by surgeons performing 100 operations annually (9, 28), but the threshold number of thyroid procedures that differentiates high-volume from low-volume surgeons varied across studies. (9, 28–31) Recently, a study has suggested a minimum threshold of 25 thyroid operations annually before detectable differences in outcomes may occur.(16) Despite these data, the majority of endocrine surgeries, including thyroidectomies, are performed by low-volume surgeons.(32)

Recognizing the patterns of surgical referral for older thyroid cancer patients and the factors influencing these patterns is vital in identifying obstacles in the referral process. Our team previously found that 44% of endocrinologists would refer a high-risk thyroid cancer patient to another facility for care, with 24% of them citing need for lateral neck dissection as the reason for referral.(33) However, not all surgery referrals come from endocrinologists, and the role of the patient's age and presence of comorbidities in the decision-making process has not previously been elicited. In this current study, when focusing on older patients and surveying a multidisciplinary cohort of physicians, we found that the presence of comorbidities was appropriately associated with more referral to high-volume surgeons. It has been shown that comorbidity, regardless of age, may affect treatment choices, have prognostic significance and may increase complexity of care in cancer patients.(25, 34–36)

Our finding in multivariable analysis that primary care physicians are less likely to refer older thyroid cancer patients with or without comorbidities to a high-volume surgeon, as compared to endocrinologists, may suggest a gap in knowledge. In our experience, primary care physicians are typically the ones who initiate the first surgical referral in the majority of thyroid cancer patients following diagnosis. Improving their knowledge on the positive association between surgeon volume and better patient outcomes is key to ensuring that more vulnerable populations, such as older or comorbid adults with thyroid cancer, receive care from experienced providers. Similarly, physicians with very low thyroid cancer patient volume may be unfamiliar with the increasing literature on the volume-outcome relationship. It is also possible that local economic and insurance factors influence these decisions. Especially in community practice, collaborative referral relationships may be critical to consider. It is also conceivable that these physicians have not formed collaborative relationships with other specialist providers that care for their thyroid cancer patients. However, we recognize that selective referral of these patients to high-volume surgeons may

not always be feasible. Additionally, surgeon volume is not the only factor to consider, as surgical center volume (usually an indicator of increased expertise and resources) is also important. Prior studies have demonstrated that travel to high-volume centers may require some patients to travel long distances to receive care. (37) Typically, older patients and those with comorbidities are the ones that may be unable or hesitant to travel longer distances. Indeed, transportation barriers were the second most cited reason in our survey decreasing likelihood of referral to a high-volume surgeon. Targeted educational interventions will help close knowledge gaps and tackle the existing issue of age disparities in thyroid cancer care.

To our knowledge, no study prior to ours has explored the reasons for not referring older thyroid cancer patients to high-volume surgeons, despite clinical evidence that thyroid cancer patients have improved outcomes with referral to a high-volume surgeon.(9–14, 16) We found that patient preference was the most common reason physicians cited that would decrease likelihood of referral of older thyroid cancer patients to a high-volume surgeon. This highlights the vital role of the patient in the shared decision-making process and the influence of patient preference on physicians' treatment recommendations. Confidence in a local surgeon (who may or may not be a high-volume surgeon) was also identified as a barrier to referral to a high-volume surgeon in a potentially distant tertiary institution. This decision could be influenced by established provider relationships with and more availability of local surgeons, rather than their specific expertise in thyroid surgery. Alternatively, confidence in local surgeons may be justified, when considering their cumulative experience, track record and availability of ancillary services. It is also possible that community-based physicians are not confident that referral to high-volume surgeons would add clinically important benefit to their older thyroid cancer patients.

Strengths of this study include representation of both primary care physicians and specialists and the clinically relevant research questions. Limitations are similar to other survey studies and include risk for non-response bias, the possibility that physician report may differ from actual physician practice and the possibility that the clinical scenarios used in our survey may not be generalizable to all thyroid cancer patients.

In conclusion, our results have important implications for thyroid cancer patient care. Educational efforts should focus on improving access of vulnerable thyroid cancer patients, such as the elderly, to high-volume surgeons to optimize outcomes. Additionally, efforts should focus on primary care physicians and very low thyroid cancer patient volume physicians, in order to ultimately develop targeted interventions for older thyroid cancer patients and those with comorbidities, and eliminate age disparities and access gaps in health care delivery. These efforts may include improving organized identification of high-volume surgeons in the community and at a distance, as well as increasing social support resources for elderly thyroid cancer patients.

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- A 40-year-old woman with no significant comorbidities has a fine needle aspiration of a 1.0 cm thyroid nodule that is diagnostic of papillary thyroid cancer. How are you most likely to proceed?
 - ☐ I would observe this patient
 - ☐ I would refer to a local surgeon that may not be a high-volume surgeon
 - ☐ I would refer to a high-volume specialized surgeon that may require the patient to travel some distance
- A 65-year-old woman with no significant comorbidities has a fine needle aspiration of a 1.0 cm thyroid nodule that is diagnostic of papillary thyroid cancer. How are you most likely to proceed?
 - ☐ I would observe this patient
 - ☐ I would refer to a local surgeon that may not be a high-volume surgeon
 - ☐ I would refer to a high-volume specialized surgeon that may require the patient to travel some distance
- A 65-year-old woman with atrial fibrillation, congestive heart failure, severe chronic obstructive pulmonary disease and osteoporosis, has a fine needle aspiration of a 4.0 cm thyroid nodule that is diagnostic of papillary thyroid cancer. How are you most likely to proceed?
 - ☐ I would observe this patient
 - ☐ I would refer to a local surgeon that may not be a high-volume surgeon
 - ☐ I would refer to a high-volume specialized surgeon that may require the patient to travel some distance
- An 85-year-old woman with no significant comorbidities has a fine needle aspiration of a 4.0 cm thyroid nodule that is diagnostic of papillary thyroid cancer. How are you most likely to proceed?
 - ☐ I would observe this patient
 - ☐ I would refer to a local surgeon that may not be a high-volume surgeon
 - ☐ I would refer to a high-volume specialized surgeon that may require the patient to travel some distance

Figure 1.

Selected clinical vignettes from the physician survey are shown.

Figure 2. Factors cited by physicians as decreasing likelihood of referral of older adults (age ≥ 65 years) with thyroid cancer to a high-volume surgeon.

TABLE 1

PHYSICIAN CHARACTERISTICS^a

	N (%)
Gender	
Male	164 (62)
Female	101 (38)
Race	
White	197 (62)
Asian	50 (16)
Other	16 (5)
Years in practice	
0–5 years	36 (14)
6–10 years	37 (14)
11–20 years	69 (26)
>20 years	124 (47)
Specialty	
Endocrinology	113 (41)
Family Practice	73 (27)
Internal Medicine	70 (26)
Other	18 (7)
Primary practice setting	
Private practice	140 (52)
Academic tertiary care center	35 (13)
Community-based academic affiliate	57 (21)
Other	36 (13)
Number of thyroid cancer patients physician provided care to in the last year	
0–10	184 (69)
>10	82 (31)

^aMissing data not included

TABLE 2

UNIVARIATE AND MULTIVARIABLE ANALYSES OF PHYSICIAN CHARACTERISTICS ASSOCIATED WITH REFERRAL TO A HIGH-VOLUME SURGEON (65-year-old female **with** atrial fibrillation, congestive heart failure, severe COPD and osteoporosis, has a fine needle aspiration of a **4.0 cm** thyroid nodule that is diagnostic of papillary thyroid cancer)

	Physicians referring to a high-volume surgeon [(n (%))]	Univariate p value	Multivariable p value
Specialty		<0.001	
Endocrinology	88 (73)		0.003
Internal Medicine	45 (47)		0.109
Family Practice	42 (32)		Ref
Other	11 (29)		0.760
Practice setting		0.033	0.638
Private practice	98 (52)		
Community-based affiliate	24 (46)		
Academic tertiary care center	41 (53)		
Other	22 (32)		
Number of thyroid cancer patients seen in 1 year		0.013	0.005
0–10	118 (64)		
>10	67 (82)		
Years in practice		0.260	0.935
0–5	27 (59)		
6–10	26 (54)		
11–20	44 (43)		
>20	88 (47)		

TABLE 3

UNIVARIATE AND MULTIVARIABLE ANALYSES OF PHYSICIAN CHARACTERISTICS ASSOCIATED WITH REFERRAL TO A HIGH-VOLUME SURGEON (85-year-old female **without** significant comorbidities has a fine needle aspiration of a **4.0 cm** thyroid nodule that is diagnostic of papillary thyroid cancer)

	Physicians referring to a high-volume surgeon [(n (%))]	Univariate p value	Multivariable p value
Specialty		<0.001	
Endocrinology	76 (63)		0.003
Internal Medicine	31 (32)		0.127
Family Practice	31 (24)		Ref
Other	10 (26)		0.443
Practice setting		0.028	0.261
Private practice	71 (38)		
Community-based affiliate	19 (37)		
Academic tertiary care center	39 (51)		
Other	18 (27)		
Number of thyroid cancer patients seen in 1 year		0.001	<0.001
0–10	88 (48)		
>10	59 (72)		
Years in practice		0.031	0.266
0–5	26 (57)		
6–10	21 (44)		
11–20	34 (33)		
>20	66 (36)		