Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.JournalofSurgicalResearch.com

Association for Academic Surgery

# Papillary thyroid microcarcinoma: decision-making, extent of surgery, and outcomes

*Amanda K. Price, BS, Reese W. Randle, MD, David F. Schneider, MD, MS, Rebecca S. Sippel, MD, and Susan C. Pitt, MD, MPHS**

*Division of Endocrine Surgery, Department of Surgery, University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin*

ARTICLE INFO

*Article history:*
Received 6 February 2017
Received in revised form
25 April 2017
Accepted 17 May 2017
Available online xxx

*Keywords:*
Papillary thyroid microcarcinoma
Decision-making

ABSTRACT

*Background:* The optimal extent of surgery for patients with papillary thyroid microcarcinoma (PTMC), tumors ≤1 cm, is controversial because survival is excellent regardless of approach. The objective of this study was to investigate patient and surgeon decision-making about the extent of surgery for PTMC.

*Materials and methods:* We conducted a retrospective review of thyroid cancer patients operated on at a single institution from 2008-2016. To examine decision-making about the extent of surgery, we performed a discourse analysis on all available documentation looking for patient or surgeon reasons.

*Results:* Of the 853 thyroid cancer patients, 125 (14.7%) had a PTMC as their largest tumor. Overall, 27.2% of the PTMC patients underwent a thyroid lobectomy, whereas 72.8% had a total thyroidectomy (TT). Of those patients diagnosed with PTMC preoperatively (19/125), a significantly higher proportion underwent a TT (94.7% *versus* 68.9%, $P = 0.02$). In all cases, documentation indicated that these preoperatively diagnosed patients followed the surgeon's recommendation regarding the extent of surgery. Reasons surgeons cited for recommending a TT included patient and disease factors (34.6%), belief that TT was the standard treatment (21.7%), ease of follow-up (8.7%), and referring provider preference (4.3%). Of the 19 patients diagnosed preoperatively, four (21.1%) patients had a complication, one (5.3%) of which was permanent and potentially avoidable with less extensive surgery.

*Conclusions:* These data suggest that surgeons drive decision-making about the extent of thyroidectomy in patients with preoperatively diagnosed PTMC. With recent guidelines recommending thyroid lobectomy, closer examination of decision-making is needed to ensure that patients make well-informed, preference-based decisions.



* *Corresponding author*. Department of Surgery, University of Wisconsin School of Medicine and Public Health 600 Highland Ave, K4/738 Madison, WI 53792. Tel.: +1 608 263 1387; fax: +1 608 252 0944.
E-mail address: pitt@surgery.wisc.edu (S.C. Pitt).

0022-4804/$ – see front matter © 2017 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.jss.2017.05.054

## Introduction

Thyroid cancer is the fastest growing malignancy in the United States with approximately 65,000 new cases diagnosed each year.[1] Over the past 35 years, the incidence of papillary thyroid cancer (PTC) tripled, largely due to an increase in the incidence of papillary thyroid microcarcinoma (PTMC).[2] These small cancers that measure 1 cm or less, account for approximately 50% of the rise in PTC incidence.[3] Many cases of PTMC are incidental findings on postoperative pathology, and the proportion diagnosed preoperatively is unclear due to the lack of this variable in population-based data sets. Despite the dramatic rise in incidence, the mortality rate of patients with PTC remains stable at approximately 0.5 per 100,000 people.[2] In addition, autopsy studies demonstrate that PTMC is a common finding with a reported prevalence as high as 36%.[4] Furthermore, estimates show that approximately 17 million Americans unknowingly have PTMCs that are not clinically relevant.[5] Taken together, the stable mortality rate and high proportion of people discovered to have PTMC on autopsy suggest that many of the new cases of PTMC reflect subclinical disease.

The optimal treatment strategy for patients with PTMC has long been debated among endocrinologists and surgeons. An analysis of the Surveillance, Epidemiology, and End Results (SEER) database from 1998-2010 demonstrated that 98.6% of PTMC patients in the United States undergo surgery, and 73.4% have a total thyroidectomy (TT).[6] However, the proportion of these patients who had PTMC diagnosed prior to surgery is unknown. Although most patients in the past underwent surgical treatment and had the option between TT and thyroid lobectomy (TL), recent changes in the American Thyroid Association (ATA) guidelines now recommend TL as the optimal treatment for patients with PTMC that lack features that would indicate removal of the contralateral lobe, such as nodal metastasis or a family history of thyroid cancer. The ATA guidelines also added a less aggressive approach, active surveillance with serial ultrasounds, as an alternative management strategy akin to that used for low-risk prostate cancer patients.[7,8] Furthermore, the ATA guidelines acknowledge the importance of patient preference in the decision-making process and emphasize the need to "minimize treatment-related morbidity and unnecessary therapy".[8,9] Potential treatment-related morbidities in patients with PTMC who undergo TT include the requirement for lifelong thyroid hormone replacement and an increased risk for permanent complications, such a hypoparathyroidism and voice changes, that can impair quality of life.[6,10,11]

Currently, data are lacking on why patients and surgeons chose TT over TL prior to the recent ATA guideline changes. Because of concern that TT represents overtreatment of PTMC, it is necessary to understand why these decisions were made to facilitate a shift toward less aggressive treatment and implementation of the updated guidelines. Published studies examining decision-making for PTMC are limited to physician surveys that do not assess how decisions are made in actual clinical practice.[12,13] Because the rate of PTMC diagnosis continues to increase, we need to understand how treatment decisions are made so that we can develop strategies to ensure patients are informed of their treatment options and make decisions that are aligned with their preferences and values. Therefore, the goal of this study was to further investigate clinical decisions about the extent of surgery for PTMC and how these decisions affect long-term outcomes.

## Material and methods

We conducted a retrospective review of all thyroid cancer patients (age: 5-78 years) in a prospectively maintained database who were operated on at the University of Wisconsin (UW) by nine different surgeons between January 2008 to May 2016. Patients were included if their largest tumor was a PTMC, they had no other thyroid malignancy, and their surgery was performed at a UW Health hospital. We examined information on demographics, timing and method of diagnosis, cytology, type of procedure, final pathology, complications, recurrence, and survival. For those with a PTMC diagnosed prior to surgery, we used discourse analysis to examine decision-making about the extent of thyroidectomy in surgical consult, history and physical, operative and postoperative documentation, and categorized into patient and surgeon reasons. We chose 2008 as the start date for this study to ensure that data on decision-making were available from documentation in the electronic medical record (EMR), which was implemented throughout UW Health in that year. This study was approved by the UW Institutional Review Board at the University of Wisconsin. Because the investigation was exempt from human subject research requirements, informed consent was not obtained from patients or providers.

Patients were defined as having a preoperative diagnosis of PTMC if they had a fine needle aspiration (FNA) that was positive for PTC prior to surgery. These patients were compared to the rest of the patients in the cohort who had PTMC diagnosed incidentally on final pathology following thyroidectomy for benign disease, such as a symptomatic multinodular goiter or an indeterminate thyroid nodule (ITN), defined as meeting Bethesda criteria 3-5.[14] During all but the last 5 months of the study period, the 2009 ATA guidelines were available to guide decision-making about the extent of surgery. These guidelines indicated that TT and TL were both acceptable treatments and did not include active surveillance. In terms of biopsying thyroid nodules, these guidelines stated that FNA was appropriate for all nodules measuring 1 cm or greater and for nodules that measured 1 cm or less if the nodules had suspicious features on ultrasound.[7]

Decision-making about the extent of surgery was examined in adult patients, 18 years of age or older ($n = 19$), who were diagnosed preoperatively with PTMC. The reasons for the extent of surgery were also assessed for adult patients diagnosed with PTMC on final pathology after undergoing a TL ($n = 32$). The decision examined in the TL patients was about whether or not to undergo a completion thyroidectomy (TL + CT) or no further surgery (TL only). One pediatric patient was excluded from the analysis because their decision-making was done by a surrogate.

To assess decision-making, we identified and reviewed all documentation in the EMR that included any discussion about the extent of thyroidectomy or available surgical options. We