Papillary Thyroid Cancer: Strategies for Optimal Individualized Surgical Management

Clive S. Grant, MD

Mayo Clinic, Rochester, Minnesota

ABSTRACT

Objective: The goal of this article was to describe the optimal individualized surgical management of patients with papillary thyroid cancer (PTC).

Methods: This summary reviews the relevant literature that takes into account description of the context of disease incidence, current practice guidelines, controversies in the management of thyroid resection and management of central neck lymph nodes, alternative methods of treatment, and evidence from the author's institution to support the final recommendations.

Results: Combining the rationale for treatment decisions from the Mayo Clinic's surgical management of PTC, plus recently published large institutional series and a meta-analysis of patient outcomes, the recommendations for PTC >1 cm include the following: (1) preoperative ultrasound to identify and map the location of lateral jugular lymph node metastasis; (2) bilateral total or near-total thyroidectomy; (3) routine central neck (compartment VI) lymph node dissection; and (4) inclusion of lateral neck lymph node dissection when indicated. Alterations are advised depending on either the level of expertise or anatomic findings at the time of performing the thyroidectomy and lymph node dissection.

Conclusions: Because all of the data presented from the Mayo Clinic and the literature fall short of Level 1 evidence, these recommendations should not be considered dogmatic nor should they exclude reasonable alternatives that are also presented. (*Clin Ther*. 2014;36:1117–1126)

Key words: central neck dissection, lymph node metastasis, papillary thyroid cancer, thyroidectomy.

INTRODUCTION

The goal of the present article was to describe the optimal individualized surgical management of patients with papillary thyroid cancer (PTC). To fully appreciate the context and impact on the surgical management of PTC, the almost explosive rise in this diagnosis must be recognized. PTC represents between 85% and 90% of thyroid cancers encountered in almost any thyroid surgery practice. From an analysis of information from the Surveillance, Epidemiology, and End Results (SEER) database, the incidence rates of thyroid cancer increased >2 times from 1973 to 2002, attributed to a nearly 3-fold increase in PTC.[1] Since 1988, nearly 50% of the increase consisted of cancers ≤1 cm, and 87% were ≤2 cm. However, thyroid cancer mortality rates have remained essentially flat. This increased detection of subclinical disease has been linked to more frequent and widespread use of imaging of the head and neck for unrelated causes, with the unanticipated discovery of PTCs, especially small ones. This dramatic rise in PTC has been corroborated by more recent data, again from the SEER database, with particular emphasis on the frequency in older patients. The largest increase in PTC has been seen in patients aged >45 years: in 2006, 61% of PTC cases were diagnosed in patients in this age group.[2] In fact, in the United States, the most frequent diagnosis of PTC is a PTC ≤1 cm in a patient aged ≥45 years. It was estimated that in 2013, >60,000 new cases of thyroid cancer would be diagnosed, an increase of 61% in just 5 years. Hughes et al[2] admonish that "the minimal clinical significance of microcarcinomas [defined as ≤1 cm in largest diameter] may mean that treatment of these tumors will provide minimal to no benefit in terms of survival, recurrence, or risk of progression to locally advanced disease in individual patients or the population as a whole."

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TUMOR BIOLOGY

Before narrowing the focus to PTC, it is wise to recall Blake Cady's keen insight in the assessment of tumor biology in general, relative to the influence of surgical intervention. He observed, "Biology is King; patient selection is Queen. Technical details of surgical procedures are the Princes and Princesses of the realm who frequently try to overthrow the powerful forces of the King and Queen, usually to no long-term avail…technical wizardry cannot overcome biological restraints."[3]

PRESENT SURGICAL PRACTICE: AMERICAN THYROID ASSOCIATION GUIDELINES

There are no randomized controlled studies to provide guidance in the surgical management of thyroid cancer; analysis of the preponderance of data from large, relevant retrospective studies must form the basis for present clinical practice. The American Thyroid Association (ATA)[4] has enumerated several reasonable overall goals for the management of thyroid cancer: (1) remove the tumor and metastatic nodes as well as locally involved structures; (2) minimize morbidity; (3) allow staging that facilitates further management and follow-up; and (4) minimize disease recurrence, both local and distant. Specific to surgery, excerpts from the ATA's goals of initial therapy state:

1. "To remove the primary tumor, disease that has extended beyond the thyroid capsule and involved cervical lymph nodes. Completeness of surgical resection is an important determinant of outcome, while residual metastatic lymph nodes represent the most common site of disease persistence/recurrence."

6. "To minimize the risk of disease recurrence and metastatic spread. Adequate surgery is the most important treatment variable influencing prognosis…"

The specific tactics to achieve these goals are also enumerated:

- For PTC >1 cm, total thyroidectomy (TTx) or near-total thyroidectomy (NTTx) is indicated. Lobectomy is sufficient for PTC <1 cm if the tumors are low risk, unifocal, and intrathyroid, with no metastatic lymph nodes or previous radiation.
- Therapeutic clearance of compartment VI (C-VI; central neck compartment) or lateral neck lymph node metastases are indicated (Figure 1).
- Prophylactic clearance of C-VI may be performed.
- No C-VI dissection may be appropriate for small, T1 to T2 PTC.

An important corollary to these surgical guidelines is that "these recommendations should be interpreted in light of available surgical expertise."

CONTROVERSY: EXTENT OF THYROIDECTOMY

With the ATA guidelines in place,[4] why are there controversies? Persisting for >3 decades is the debate over extent of thyroidectomy. In the Western world, NTTx and TTx are accepted as standard treatment for PTC >1 cm. These options are based, at least in part, on a study published in 2007 by Bilimoria et al[5] using the National Cancer Data Base, which showed recurrence was slightly but statistically higher (9.8% vs 7.7%) and survival slightly lower (97.1% vs 98.4%) in lobectomy patients compared with those undergoing bilateral resection. However, lobectomy has been shown to be equivalent to NTTx or TTx in survival in patients with T1 to T2/N0 tumors in publications from Memorial Sloan Kettering Cancer Center[6] and our institution.[7] In fact, this was a major point of surgical debate for nearly 3 decades, and I'm not sure we settled it—maybe we just wore out talking about it.

CONTROVERSY: CERVICAL LYMPH NODES

Without question the hottest topic in endocrine surgery today is the controversy over the appropriate

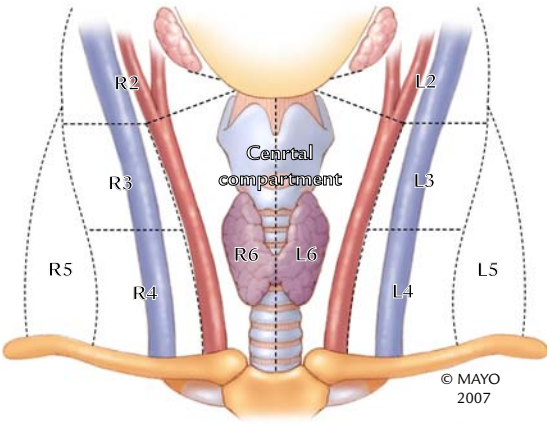

Figure 1. Compartments of the neck. © Mayo Clinic, 2007.