Surgery for Well-Differentiated Thyroid Carcinoma (WDTC): The Primary

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This Talk
What it isn’t
No Anatomy or Surgical Technique
No histology
- WDTC = Papillary (75%)
  + Follicular (15%)
No “on the one hand…on the other hand” recitation of the very extensive literature

This Talk
What it is
The most specific, focused talk ever on an extremely limited question- what to do with the well-differentiated primary…

….unfortunately this includes the most controversial area of all in thyroid treatment- what surgery to do for the well differentiated “low” risk tumor

Stage basis for Well Differentiated Thyroid Cancer

Papillary
Follicular

(AJCC Staging manual)
The Reaction to Cancer

The “Chapter 9” Equine Medicine Response

Broken leg….shoot the horse
Split fetlock….shoot the horse
Severe colic….shoot the horse

…..

Depending on the series 75-85% of WDTC falls into the low risk category with 99% 20 year survivals, no significant differences between hemi/total

…and yet there are continued recommendations for total/near-total (< 1 gm) thyroidectomies

This Talk

Why this controversy will never be resolved

What’s a prudent, defensible, sleep-at-night approach to surgical decision making:

-When to do a hemi vs. a total thyroidectomy
-When to do a frozen section
-When to take the recurrent nerve
-When and why to consider tracheal resection

A (Very) Few Facts

Autopsy series over the age of 50 years old

6% occult malignancy
- Majority between 4 mm and 10 mm microcarcinomas
- Small number (2% of 6%) include metastatic disease

A (Very) Few Facts

Papillary carcinoma is a multi-centric disease if you include the microcarcinomas

- 20% in routine path, 80% on fine-tooth path

- In the pre-modern era of common ultrasound/thryoglobulin/incidentaloma exams, hemithyroidectomy for “low risk” papillary was associated with < 4% recurrence rate
A (Very) Few Facts
The most common methods of follow-up surveillance require total thyroid ablation

- Thyroglobulin (unstimulated/stimulated)
- Radioactive iodine scans

Thyroid ablation is best achieved by total/near total thyroidectomy in combination with radioactive iodine

-in “low risk” WDTC who are we treating, patient or doctor?

Risk Assessment in WDTC
TNM (Age, Size, Metastases) ¹
EORTCC, NTCTCSR

AGES (Age, Grade, Extra-thyroidal, Size) ²
MACIS (Mets, Age, Completeness of resection, Invasion, Size)
AMES (Age, Mets, Extension, Size….gender) ¹
MSKCC system similar

1 - Papillary/Follicular   2- Papillary only

Age basis for Well Differentiated Thyroid Cancer
(Mazzaferri, Jhiang Am J Med 1994)

Risk Assessment in WDTC
In all systems, the defined “low risk” population has >= 99% 20 year survivals

Definition of “low risk” patients varies a bit between systems:
- Size 2 – 5 cm depending on histologic type
- Age >=18/20, <=40 – 45 (up to 50 w/ gender)

--This leads to the most conservative definition of the low risk patient: >=20, <= 45, up to 1.5 cm
Why this will never be settled

There has never been a prospective, randomized trial of anything you’ll hear about today

Power calculations have estimated that in order to answer the question of extent of surgical resection +/- radioactive iodine for “low risk” patients would require over 4000 patients in each arm. At the current rates in the United States it would require all qualifying patients to be entered for the next 10 years….and you won’t have the answers for another 20.

Why this may never need to be settled

Corollary- As of 2006 (last all-fields survey available), no prospective randomized cancer trial involving more vs. less resection of the primary organ has demonstrated increased cure rates

When to do a total thyroidectomy

Settled case law

When you plan on giving radioactive iodine
  -Extra-capsular spread (positive margin)
  -Increased risk of metastases (size, histology)
  -Patient-related meta-risks (e.g. young/old age)

Keep in mind that even radioactive iodine use is not of clear benefit in all cases. Best empiric evidence includes Mazzaferri and Jiang, AJM 97:420-28, 1994 (drew the line at 1.5 cm)

The truth about total thyroidectomy

Complication rates in general are significantly higher than the “1%” dogma

Rosato et al, World J Surg 2004, for example:
  14,934 patients over a 5 year period
  Multiple major thyroid centers in Italy
    Permanent complications overall 7.1%
    Permanent hypoparathyroidism 3.3%
    Permanent laryngeal nerve paralysis 1.3%
When to perform a Frozen section

Basic concepts – Why FNA works and Frozen won’t
- Papillary carcinoma is a diagnosis of cell (nuclear) morphology +/- structure
- Follicular carcinoma is a diagnosis of invasion

Aside from a Mayo Clinic series using an uncommon sampling technique, frozen section routinely confirms the final diagnosis of follicular carcinoma < 1% of the time

When to perform a Frozen section

Reviews of FNA cytologies diagnostic of papillary carcinoma are reported as 0% false positive (LiVolsi and Baloch, Endocrine Pathology 16:285-293, 2005)

FNAs suspicious for papillary carcinoma can be diagnosed up to 40% – 50% of the time on IOC (intraoperative cytology) with a 98% correlation with final pathology. Frozen section alone has a 71% correlation

When to take the recurrent laryngeal nerve

Basic surgical precept
Take a structure when it creates a margin or is non-functional

corollary 1: in general, debulking doesn’t work

corollary 2: log-kill biology (e.g. radiation) is effective for microscopic not gross margins

When and why to consider tracheal resection

Collective review of 17 studies, 1997 – 2004
- Tracheal invasion rates in WDTC 1% to 13%

Studies with survival data > 5 years
- 3 shave, 4 laryngeal/tracheal resections– n.a.

Studies with recurrence rates
- 5 shave 0% - 28% (100%)
- 12 laryngeal/tracheal 0% - 39%

When and why to consider tracheal resection

Pathology review of resection specimens show circumferential spread as opposed to longitudinal, mucosal side > adventitial side

Evidence of loss of differentiation at invasion site

General thought on considering sleeve resection
Evidence of gross invasion involving submucosal region (hemoptysis, CT, panendo, etc)

Summary
When weighing risk and benefit there is virtually no patient-centric case to be made for total thyroidectomy in “low risk” WDTC

Arguments always seem to come down to:
-Easier to follow (for the doctor)
-“My” complication rate is so low (all patients are hypothyroid and your rate is higher than you think)

Consider the improving follow-up/risk stratification options (e.g. ultrasound, gene expression)

Summary
Frozen section, or better yet IOC, has a place in lesions “suspicious for” papillary carcinoma

The recurrent nerve should be preserved if functional

Sleeve resection of the trachea should be considered for cases with gross submucosal invasion