A Review of Differentiated Thyroid Cancer

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FPON Webcast

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Disclosure(s)

Genzyme/Sanofi – Advisory Board, Research Grant

2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer


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Objectives

By the end of this session, participants will be able to describe:

1. the excellent prognosis for most patients diagnosed with well differentiated thyroid carcinomas;
2. the general management of well differentiated thyroid carcinomas; and
3. management of thyroxine (Synthroid) for replacement and TSH suppressive purposes.
Outline

Introduction, Epidemiology
Diagnosis, Surgical Management
Staging and Risk Assessment
Radioiodine Remnant Ablation and Therapy
Thyrotropin Suppression Therapy
Surveillance
Future Directions, Clinical Trials
Outline

Introduction, Epidemiology
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Surveillance
Future Directions, Clinical Trials
Scope of the Problem

- Relatively uncommon (1%)
  - 50,000 cases in US
  - 230,000 breast
  - 230,000 lung
- 75% are Females
- Incidence tripled:
  - 1975: 4.9 / 100,000
  - 2009: 14.3 / 100,000
- Increasing 10% per year
- More “micro-carcinomas” (< 1.0 cm)
  - 1988: 25%
  - 2008: 39%
Scope of the Problem

- **Canada:**
  - Incidence: Approximately 6,300 in 2015
  - Deaths: 185 deaths in 2010

- **BC (2007):**
  - New cases: 68 men, 211 women
  - Deaths: 5 men and 9 women
  - Most deaths in patients over 60 yrs
Scope of the Problem
Scope of the Problem

[Graph showing the number of new cases and incidence rate by age at diagnosis (years).]

Carcinoma of the Thyroid

• 90% differentiated tumours
  • arising from follicular epithelial cells
  • 80% papillary +/- follicular elements
  • 10% pure follicular (incl Hurthle cell)

• 4% Medullary
• 5% Anaplastic
Carcinoma of the Thyroid

Papillary ca 98%
Follicular ca 94%
Medullary ca 80%
Anaplastic ca 10%

Relative rarity and high survival mean that there are very few prospective randomised trials so most management is based on retrospective data.

Risk Factors

- Majority are sporadic
- Iodine deficiency
- Radiation exposure
- Family history
- Rare familial disorders: Gardner’s syndrome, Cowden’s disease, familial polyposis, MEN2, Werner Syndrome
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Clinical Presentation

• Palpable thyroid mass
• Palpable cervical lymphadenopathy
• Incidental finding on cross sectional imaging or ultrasound
**Thyroid Nodule**

**Ultrasound + Fine Needle Aspiration (FNA)**

- Iodine Scan: only if thyrotoxic
- 15% inadequate – repeat
- Adequate specimen false +ve & -ve rates of 5%
- Ultrasound more sensitive than CT – but operator dependent
- Incidental nodules (<1cm) found > 50% of individuals
- These are rarely malignant
Surgical Management

Surgery – Primary Treatment

Adjuvant Radiation
- Radioiodine (131-Iodine)
- External Beam Radiation
Thyroxine

** No Prospective Randomized Trials **

Cooper et al, Thyroid. 2006 Feb;16(2):109-42.

(Strong recommendation, Moderate-quality evidence)
Primary therapy for thyroid cancer

1. (near) Total thyroidectomy, Central Neck Dissection
2. Lobectomy + isthmusectomy
3. And/Or Neck dissection

Cooper et al, Thyroid. 2006 Feb;16(2):109-42.
Near total thyroidectomy, because

- >60% have foci in contralateral lobe
- 5-10% of recurrences are in contralateral lobe
- $^{131}I$odine is more effective if less residual thyroid
- Serum thyroglobulin is a more specific marker
- Recurrence rate is lower than after lobectomy
Surgical Management

Near total thyroidectomy!
BUT:

• No substantial survival benefit
• Higher risk of hypoparathyroidism
• Higher risk to recurrent laryngeal nerves

• Lobectomy is reasonable in low risk patients
• Completion thyroidectomy if high risk features are found from pathological assessment
Neck Dissection – Lateral and Central

• Nodal recurrence lower if central neck dissection done at time of thyroidectomy
• 35% gross involvement, 80% microscopic
• +LN doesn’t reduce survival rates
• +LN increases risk of recurrence
Post-operative Thyroxine

- T4 (levothyroxine)
  - Begin with 50-75 mcg
  - Average therapeutic dose is 125-175 mcg
  - 4-6 weeks to clear
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Staging, Risk Assessment

- **Risk of Recurrence**
  - ATA Risk Stratification

- **Risk of Death**
  - TNM, AJCC
  - AMES, AGES
  - MACIS
# Staging, Risk Assessment

## Risk of Recurrence – ATA Risk Stratification

<table>
<thead>
<tr>
<th>ATA low risk</th>
<th>Papillary thyroid cancer (with all of the following):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- No local or distant metastases;</td>
</tr>
<tr>
<td></td>
<td>- All macroscopic tumor has been resected</td>
</tr>
<tr>
<td></td>
<td>- No tumor invasion of loco-regional tissues or structures</td>
</tr>
<tr>
<td></td>
<td>- The tumor does not have aggressive histology (e.g., tall cell, hobnail variant, columnar cell carcinoma)</td>
</tr>
<tr>
<td></td>
<td>- If $^{131}$I is given, there are no RAI-avid metastatic foci outside the thyroid bed on the first posttreatment whole-body RAI scan</td>
</tr>
<tr>
<td></td>
<td>- No vascular invasion</td>
</tr>
<tr>
<td></td>
<td><strong>Clinical N0 or ≤5 pathologic N1 micrometastases (&lt;0.2 cm in largest dimension)</strong></td>
</tr>
</tbody>
</table>

**Intrathyroidal**
- Encapsulated follicular variant of papillary thyroid cancer
- Intrathyroidal, well differentiated follicular thyroid cancer with capsular invasion and no or minimal (<4 foci) vascular invasion
- Intrathyroidal, papillary microcarcinoma, unifocal or multifocal, including $BRAF^{V600E}$ mutated (if known)

**ATA intermediate risk**
- Microscopic invasion of tumor into the perithyroidal soft tissues
- RAI-avid metastatic foci in the neck on the first posttreatment whole-body RAI scan
- Aggressive histology (e.g., tall cell, hobnail variant, columnar cell carcinoma)
- Papillary thyroid cancer with vascular invasion
- **Clinical N1 or ≥5 pathologic N1 with all involved lymph nodes <3 cm in largest dimension**
- Multifocal papillary microcarcinoma with ETE and $BRAF^{V600E}$ mutated (if known)

**ATA high risk**
- Macroscopic invasion of tumor into the perithyroidal soft tissues (gross ETE)
- Incomplete tumor resection
- Distant metastases
- Postoperative serum thyroglobulin suggestive of distant metastases
- Pathologic N1 with any metastatic lymph node ≥3 cm in largest dimension
- Follicular thyroid cancer with extensive vascular invasion (> 4 foci of vascular invasion)
### Risk of Recurrence – ATA Risk Stratification

**Table 12. American Thyroid Association Risk Stratification System: Clinical Outcomes Following Total Thyroidectomy and Radioiodine Remnant Ablation or Adjuvant Therapy**

<table>
<thead>
<tr>
<th>ATA risk</th>
<th>Study</th>
<th>N</th>
<th>ND</th>
<th>Biochemical incomplete, %b</th>
<th>Structural incomplete, %c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Tuttle et al. (538)</td>
<td>86</td>
<td>11</td>
<td>11a</td>
<td>3a</td>
</tr>
<tr>
<td></td>
<td>Castagna et al. (542)</td>
<td>91</td>
<td>ND</td>
<td>10a</td>
<td>NDa</td>
</tr>
<tr>
<td></td>
<td>Vaisman et al. (539)</td>
<td>88</td>
<td>15</td>
<td>2a</td>
<td>7a</td>
</tr>
<tr>
<td></td>
<td>Pitoia et al. (543)</td>
<td>78</td>
<td>10</td>
<td>7a</td>
<td>34a</td>
</tr>
<tr>
<td>Intermediate</td>
<td>Tuttle et al. (538)</td>
<td>57</td>
<td>22</td>
<td>21a</td>
<td>21a</td>
</tr>
<tr>
<td></td>
<td>Vaisman et al. (539)</td>
<td>63</td>
<td>16</td>
<td>21a</td>
<td>21a</td>
</tr>
<tr>
<td></td>
<td>Pitoia et al. (543)</td>
<td>52</td>
<td>14</td>
<td>34a</td>
<td>34a</td>
</tr>
<tr>
<td>High</td>
<td>Tuttle et al. (538)</td>
<td>14</td>
<td>14</td>
<td>72a</td>
<td>72a</td>
</tr>
<tr>
<td></td>
<td>Vaisman et al. (539)</td>
<td>16</td>
<td>12</td>
<td>72a</td>
<td>72a</td>
</tr>
<tr>
<td></td>
<td>Pitoia et al. (543)</td>
<td>31</td>
<td>13</td>
<td>56a</td>
<td>56a</td>
</tr>
</tbody>
</table>

**Table 11. ATA 2009 Risk Stratification System with Proposed Modifications**

- **ATA low risk:** Papillary thyroid cancer (with all of the following):
  - No local or distant metastases
  - All macroscopic tumor has been removed
  - No tumor invasion of bones, organs or structures
  - The tumor does not have aggressive histology (e.g., tall cell, hobnail variant, colloid cell carcinoma)
  - Histologic RAI avid metastatic foci outside the thyroid bed on the first postoperative whole-body RAI scan
  - No vascular invasion
  - Clinical N0 or <5 micrometers (0.2 cm) in largest dimension
  - Infilatory, encapsulated follicular variant of papillary thyroid cancer
  - Infiltrative, well-differentiated follicular thyroid cancer with capsular invasion and no or minimal (<1 mm) vascular invasion
  - Infiltrative, papillary microcarcinoma, unifocal or multifocal, including BRAF mutant or known

- **ATA intermediate risk:**
  - Micrometastatic invasion of tumor into the perilobar soft tissues
  - RAI-avid metastatic foci in the neck on the first postoperative whole-body RAI scan
  - Aggressive histology (e.g., tall cell, hobnail variant, columnar cell carcinoma)
  - Papillary thyroid cancer with vascular invasion
  - Clinical T1 or <5 micrometers (0.2 cm) in largest dimension
  - Multifocal papillary microcarcinoma with ITUB or BRAF/159 del (or known)

- **ATA high risk:**
  - Micrometastatic invasion of tumor into the perithyroidal soft tissues (gross ITUB)
  - Complete tumor resection
  - Postoperative serum thyroglobulin less than 5 IU/L
  - Pathologic N1 or any metastatic lymph node 0-9 mm in largest dimension
  - Follicular thyroid cancer with extensive vascular invasion (> 4 loci of vascular invasion)

### Recurrence Vs Survival?
# Staging, Risk Assessment

**AJCC/TNM Staging, Risk Assessment**

**Table 10. AJCC 7th Edition/TNM Classification System for Differentiated Thyroid Carcinoma**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0</td>
<td>No evidence of primary tumor</td>
</tr>
<tr>
<td>T1a</td>
<td>Tumor ≤1 cm without extrathyroidal extension</td>
</tr>
<tr>
<td>T1b</td>
<td>Tumor &gt;1 cm but ≤2 cm in greatest dimension, without extrathyroidal extension</td>
</tr>
<tr>
<td>T2</td>
<td>Tumor &gt;2 cm but ≤4 cm in greatest dimension, without extrathyroidal extension</td>
</tr>
<tr>
<td>T3</td>
<td>Tumor &gt;4 cm in greatest dimension limited to the thyroid or Any size tumor with minimal extrathyroidal extension (e.g., extension into sternothyroid muscle or parathyroid soft tissues)</td>
</tr>
<tr>
<td>T4a</td>
<td>Tumor of any size extending beyond the thyroid capsule to invade subcutaneous soft tissues, larynx, trachea, esophagus, or recurrent laryngeal nerve.</td>
</tr>
<tr>
<td>T4b</td>
<td>Tumor of any size invading prevertebral fascia or encasing carotid artery or mediastinal vessels</td>
</tr>
<tr>
<td>N0</td>
<td>No metastatic nodes</td>
</tr>
<tr>
<td>N1a</td>
<td>Metastasis to level VI (pretracheal, paratracheal, and parathyrinal lymph nodes)</td>
</tr>
<tr>
<td>N1b</td>
<td>Metastasis to unilateral, bilateral, or contralateral cervical (levels I, II, III, IV, or V) or retropharyngeal or superior mediastinal lymph nodes (level VII)</td>
</tr>
<tr>
<td>M0</td>
<td>No distant metastases</td>
</tr>
<tr>
<td>M1</td>
<td>Distant metastases</td>
</tr>
</tbody>
</table>

**Patient age <45 years old at diagnosis**

<table>
<thead>
<tr>
<th>Stage</th>
<th>T</th>
<th>N</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Any T</td>
<td>Any N</td>
<td>M0</td>
</tr>
<tr>
<td>II</td>
<td>Any T</td>
<td>Any N</td>
<td>M0</td>
</tr>
</tbody>
</table>

**Patient age ≥45 years old at diagnosis**

<table>
<thead>
<tr>
<th>Stage</th>
<th>T</th>
<th>N</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>T1a</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>II</td>
<td>T2</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>III</td>
<td>T1a</td>
<td>N1a</td>
<td>M0</td>
</tr>
<tr>
<td>IVa</td>
<td>T1a</td>
<td>N1b</td>
<td>M0</td>
</tr>
<tr>
<td>IVb</td>
<td>T4b</td>
<td>Any N</td>
<td>M0</td>
</tr>
<tr>
<td>IVc</td>
<td>Any T</td>
<td>Any N</td>
<td>M1</td>
</tr>
</tbody>
</table>

**Papillary carcinoma**

**Follicular carcinoma**

**SEER 1988-2001**
Staging, Risk Assessment

**AGES**
- Age: >45 years of age
- Grade: problematic
- Extrathyroidal (soft tissue) extension
- Size: 2cm (6%) vs 7cm (50%) mortality

**AMES**
- Age
- Metastasis
- Extrathyroidal extension
- Size


< 40 yrs
- Metastases <1cm
- Metastases >1cm

> 40 yrs
- Metastases <1cm
- Metastases >1cm

*Baudin and Schlumberger, Lancet Oncology, 2007*

*Fig. 2 Cumulative incidence of cause-specific survival and local–regional relapse-free rate by age.*

*Brierley et al Clin Endocrinology 2005*
Staging, Risk Assessment

• MACIS
  - 3.1 (<40yo) or 0.08 x age (if 40 or more years old)
  - 0.3 x tumor size (in cm)
  - +1 if incompletely resected
  - +1 if locally invasive
  - +3 if distant metastases

• MACIS – 20yr Disease Specific Mortality
  
  <6.0 = 1%
  6.0 – 6.99 = 11%
  7.0 – 7.99 = 44%
  >8 = 76%

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Adjuvant Therapy

- Radioiodine (131-I)
  - Ablation of remnant
  - Therapy of disease
- External beam radiotherapy
- Thyroxine
- Chemotherapy, targeted agents
Adjuvant Therapy

- Radioiodine (131-I) → microscopic disease
- Ablation of remnant
- Therapy of disease
- External beam RT → macroscopic disease
- Thyroxine
- Chemotherapy, targeted agents
Adjuvant Therapy

- Radioiodine (131-I) → microscopic disease
  - Ablation of remnant
  - Therapy of disease
- External beam RT → macroscopic disease
- Thyroxine
- Chemotherapy, targeted agents
Radioiodine (131-I) – what is it?

- Primarily short-range beta (1-2mm), some gamma
- Concentrated by thyroid follicular cells
- Cancer cells less “iodine-avid” than normal cells
  - Remove as much normal thyroid as possible (total thyroidectomy)
- Improve uptake – stimulate with TSH
Adjuvant Therapy

Radioiodine (131-I) – why ablation?

- Improve value of serum thyroglobulin measurements.
- Increase specificity of US and 131-I scanning.
- Treat microscopic disease.
  - Low dose: 30 mCi

Radioiodine (131-I) – why therapy?

- Destroy residual malignant cells
  - Adjuvant treatment of “high risk” patients
  - Treatment of established metastases
  - Higher dose: 150 to 200 mCi
Adjuvant Therapy

Radioiodine (131-I) – who should be treated?

- No randomized data
- 131-I reduces risk of recurrence
- Evidence of survival benefit

Adjuvant Therapy

Radioiodine (131-I) – who should be treated?

- No randomized data
- 131-I reduces risk of recurrence
- ?? Evidence of survival benefit ??

- Hay 2002 (Mayo Clinic) → no difference!

Adjuvant Therapy

Radioiodine (131-I) – who should be treated?

- No randomized data
- 131-I reduces risk of recurrence
- ?? Evidence of survival benefit ??
- **Two schools of thought**
  - Treat more! (Mazzaferri et al)
  - Treat less! (Hay et al)

**BCCA:**
- MACIS score > 6.0 = Treat
- MACIS score 5.0 to 6.0 = Review at Provincial Thyroid Conference
- Treating fewer patients
- Using lower doses for Ablation: 30 mCi vs 60 or 100 mCi
- More outpatient therapy

---


Adjuvant Therapy

Radioiodine (131-I) – how do we do it?

• TSH stimulation (> 30)
• Two methods:
  – Endogenous TSH ie. Thyroxine withdrawal
  – Exogenous TSH ie. Thyrotropin alpha (rhTSH)
• rhTSH (thyrotropin alpha)
  – Two retrospective studies: rhTSH = withdrawal
  – Improved quality of life
  – Expensive
  – Side effects
    • Common: Nausea 10%, Headache: 7%
    • Rare (<3%): fatigue, insomnia, vomiting, diarrhea, weakness

• Low Iodine Diet

Barbaro, J Clin Endocrinol Metab 2003 Sep;88(9):4110-5
Schroeder, J Clin Endocrinol Metab. 2006 Mar;91(3):878-84. Epub 2006 Jan 4
Adjuvant Therapy

Radioiodine (131-I) Protocol

- **Protocol**
  - **Monday:** 0.9mg IM (thyrotropin alpha)
  - **Tuesday:** 0.9mg IM (thyrotropin alpha)
  - **Wednesday:** 123-I scan + 131-I therapy
    - “radioactive” Wednesday, Thursday, Friday
    - Inpatient versus Outpatient
  - **Monday:**
    - Whole body scan
    - Blood tests: TSH, Tg

- **131-I → Rx + Dx**

RECOMMENDATION 58
A posttherapy WBS (with or without SPECT/CT) is recommended after RAI remnant ablation or treatment, to inform disease staging and document the RAI avidity of any structural disease.

(Strong recommendation, Low-quality evidence)
Adjuvant Therapy

Radioiodine (131-I) Side Effects

- Discomfort, Fatigue
- Xerostomia
- Dysgeusia
- Sialadenitis
- Transient hypogonadism (spermatopenia)
- Myelosuppression (transient versus permanent)
- Hypothetical risk of aplastic anaemia and leukaemia
  - Doses >1000mCi (usual dose 80-150mCi)
Adjuvant Therapy

- Radioiodine (131-I) → microscopic disease
  - Ablation of remnant
  - Therapy of disease
- External beam RT → macroscopic disease
  - Thyroxine
  - Chemotherapy, targeted agents
Adjuvant Therapy

External Beam Radiotherapy

- Gross (macroscopic) disease
- Unresectable gross disease
- Gross disease not responding to 131-I
- 5 to 7 weeks, daily treatment

**RECOMMENDATION 60**
There is no role for routine adjuvant EBRT to the neck in patients with DTC after initial complete surgical removal of the tumor.

(Strong recommendation, Low-quality evidence)
Adjuvant Therapy

Immobilization Shell

CT Planning
Adjuvant Therapy

External Beam Radiation

Sequelae:

- Xerostomia, altered taste, esophagitis, pharyngitis, laryngitis, fatigue, dry/moist desquamation
Adjuvant Therapy

- Radioiodine (131-I) $\rightarrow$ microscopic disease
  - Ablation of remnant
  - Therapy of disease
- External beam RT $\rightarrow$ macroscopic disease
  - Thyroxine
- Chemotherapy, targeted agents
Thyroxine - Rationale:
1. Replacement Therapy → FT4
2. Suppressive Therapy → TSH

Issues:
- 4 - 6 weeks to equilibrate
- Need both: FT4 and TSH
  - FT4: Upper limits of normal
  - TSH: <0.1 to 2.0 mU/L
- TSH Suppression: How low do you go?

Adjuvant Therapy
Adjuvant Therapy

TSH Suppression: How low do you go?

- Low Risk: 0.5 to 2.0 mU/L
- Intermediate Risk: 0.1 to 0.5 mU/L
- High Risk: < 0.1 mU/L

- BCCA: Generally < 1.0 mU/L, depending on risk category
  - Evidence strongest for High Risk

Why not < 0.1 mU/L for everyone?

- Low TSH = High FT4
- Prolonged hyperthyroidism
  - atrial fibrillation
  - cardiac hypertrophy and dysfunction
  - accelerated osteoporosis
- Balance risk of recurrence vs hyperthyroidism
(Adjuvant) **Palliative Therapy**

- Radiiodine (131-I) → microscopic disease
- Ablation of remnant
- Therapy of disease
- External beam RT → macroscopic disease
- Thyroxine
- Chemotherapy, targeted agents

**RECOMMENDATION 61**
There is no role for routine systemic adjuvant therapy in patients with DTC (beyond RAI and/or TSH suppressive therapy using LT₃).

(Strong recommendation, Low-quality evidence)
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- Frequency depends on response:

[C3] What are the criteria for absence of persistent tumor (excellent response)?

In patients who have undergone total or near-total thyroidectomy and RAI treatment (remnant ablation, adjuvant therapy or therapy), disease-free status comprises all of the following (summarized in Table 13):

1. No clinical evidence of tumor
2. No imaging evidence of tumor by RAI imaging (no uptake outside the thyroid bed on the initial posttreatment WBS if performed, or if uptake outside the thyroid bed had been present, no imaging evidence of tumor on a recent diagnostic or posttherapy WBS) and/or neck US
3. Low serum Tg levels during TSH suppression (Tg <0.2 ng/mL) or after stimulation (Tg <1 ng/mL) in the absence of interfering antibodies

BCCA:
- TSH-Stimulated Tg < 1 ng/mL
- Post-131-I scan: Clear
Blood tests – Serum Thyroglobulin (Tg)

• Excellent tumour marker
  – Produced by thyroid follicular cells (and well differentiated tumours)

• Most sensitive with TSH stimulation

• Anti thyroglobulin antibodies → Interferes with Tg

• Iodine avid tumours produce Tg
  – Not all tumours with elevated Tg take up iodine
Surveillance

- **Clinical exam:** q6-12 months

- **Blood tests:** q3-12 months - I do all FOUR:
  1. FT4
  2. TSH
  3. Tg (> 98% sensitivity)
  4. Anti-Tg-Ab

- **Imaging**
  - **US Neck:** Yes or No? How frequent?
  - **5 mCi 131-I Scan → NO!** (unless the scan is after treatment)
  - Others: CXR, CT Neck, TSH stimulated PET/CT
Recurrence

Gross disease:
- If resectable: Surgery
- Not resectable: 131-I +/- EBRT
- If non-iodine-avid: EBRT

Rising Tg – No gross disease?
- Empiric dose (100-200 mCi) 131-I ** NOT a 5 mCi SCAN **
- TSH-stimulated PET scan

Sx/RT-resistant disease:
- Chemotherapy: doxorubicin
- Tyrosine Kinase Inhibitors: vandetanib, sorafenib, lenvatinib
  - Sequelae: diarrhea, fatigue, HPT, hepatotoxicity, skin changes, nausea, dysgeusia, anorexia, thrombosis, heart failure,


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Future Directions

Clinical Trials
- Tyrosine Kinase Inhibitors: OS, QOL

Molecular Markers
- Diagnosis, prognosis, therapeutic targets

Improved Risk Stratification
- Who truly needs 131-I? US?
- Which LNs to biopsy?
- Minimally invasive follicular variant of papillary carcinoma in the absence of angio-invasion

Improve Surveillance Regimens
- Tg in the face of Anti-Tg-Antibodies
Summary

Well Differentiated Thyroid Cancer

- Relatively uncommon cancer
- Excellent prognosis
- Treatment: Surgery +/- Radioactive Iodine
- Life Long Thyroxine
- Blood Tests:
  1. FreeT4: upper limits of normal
  2. TSH: generally < 1.0
  3. Tg: excellent tumour marker
  4. Anti-Tg-antibodies: surrogate marker, interferes with Tg
Medullary Thyroid Cancer

• Para-follicular c-cells
  – Calcitonin
  – Does not produce Tg
  – Does not respond to TSH or 131-I
• Work-Up
  – Serum calcitonin, CEA
  – CT neck/chest
  – MEN Types 2A/2B
Medullary Thyroid Cancer

- Management
  - Surgery
    - Thyroidectomy + central neck dissection
  - Adjuvant External Beam RT
  - Serum calcitonin (?when)
  - Thyroxine (replacement)

- Metastatic disease
  - TKI: sunitinib, sorafenib (20-50%)
  - Chemo: doxorubicin, etc (10-20%)

- Survival:
  - < 40 yrs 75% ten year disease specific survival
  - > 40 yrs 50% ten year disease specific survival
Anaplastic Thyroid Carcinoma

- 2-5% of thyroid cancers
- Disease specific mortality = 100%
- Most = locally advanced
  - >50% distant mets @ diagnosis

Management
- Maximal surgery + external beam RT
- EBRT + chemotherapy