**Surgery for Invasive and Poorly Differentiate Thyroid Malignancies**

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**Differentiated Thyroid Carcinomas**

- Soft tissue involvement outside the thyroid (extrathyroidal extension) at the time of initial surgery resulted in 36% local recurrence rate and 18% death from disease.  
  Samaan et al., Cancer 1992
- Likelihood of cancer death increased significantly for:
  - Age ≥ 40 yrs.
  - Tumor size ≥ 1.5cm.
  - Local tumor invasion.
  - Regional LN metastasis.
  - Delay in therapy > 12 months (1355 patients)  
  Mazzaferi, 1994 OSU

**How do we evaluate these patients?**

- Comprehensive history and physical examination including laryngeal function
- High resolution ultrasound for evaluation of the lateral neck and parathyroidal/area
- High resolution CT scan with contrast from skull base to carina
- CT scan of the chest (past)/ PET CT scan today
- MRI brain when indicated
Perspective:
- 2009-2010
- 987 new thyroid cancer patients
- 14 thyroid surgeons
- Personal experience
  - 541 new thyroid patients
  - 228 recurrent persistent disease
    - 18 tracheal/laryngeal or esophageal muscularis resections
  - 241 new thyroid malignancies

When is a “peel off” safe?
- Always reduced down to microscopic residual disease whenever feasible
- Exceptions, when both functioning recurrent laryngeal nerves are grossly involved
- Do not leave “gross disease”
- For tracheal margins, seek microscopic free margins if feasible (without laryngectomy)

Is “circumferential disease” = nerve sacrifice?

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Case Presentation (DJ)

- 68-yo minister with left thyroid mass noticed by primary care physician
- FNA poorly differentiated thyroid cancer (non-large cell).
- Thyroglobulin positive
- No changes in speech or swallowing
- Mass is immobile
- No history of radiation exposure or FMH of thyroid malignancy

How should we evaluate the patient?

- Ultrasound of thyroid and necks with FNA?
- Cross sectional imaging of neck?
- CT of chest?
- PET/CT scan?

Aggressive Thyroid Cancer

- Laryngotracheal invasion
- Esophageal invasion
- Upper mediastinum soft tissue invasion
- Skin invasion
- Less convincing
  - Lymphovascular invasion
  - Muscle invasion
Invasive Differentiated Thyroid Cancer

- Areas of controversy:
  - When is a peel-off safe (trachea, RLN)?
  - How much of a margin of normal tissue is necessary?
  - Is RA1-131 sufficient for microscopic disease?
  - Is post-op XRT beneficial?

Management of Trachea and RLN Inlet

- Do not leave gross disease or thyroid tissue
- Stepwise management of the trachea and thyroid cartilage (much less common)
  - Pathologic analysis of pretracheal fascia (thyroidectomy)
  - Remove perichondrium if cartilage appears grossly normal
  - Shave cartilage for pathologic analysis of invasion (Window for less than 2 cm greatest dimension)
  - Analyze submucosa for pathologic invasion (Sleeve)
Follow up (DJ)

- Pathology
  - Poorly differentiated thyroid carcinoma with strap muscle invasion and superficial tracheal invasion, margins free of malignancy
  - Esophageal muscularis invasion
  - No lymph node metastasis (0/27)

Now What?

- RAI? How much? Timing
- External beam radiation therapy?
- Role of concomittant chemo/radiation therapy?

Postoperative External Beam XRT For Differentiated Thyroid Cancer: Outcomes and Morbidity with Conformal Treatment

- Survival 79% at 4 years
- IMRT reduced morbidity from 12 to 2%
- 11/15 (73%) of those with Gross disease recur locally
- <3% recurrence with microscopic margins

**Patient Follow-up**

- Post operative radiotherapy for tracheal invasion
- RAI- no stimulated thyroglobulin or RAI uptake
- NED at 15 yrs (US, Thyroglobulin, CT chest and now CXR)

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**Complex tracheal reconstruction for invasive thyroid cancer**

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**Sleeve Tracheal Resection for Invasive Ca**

- 64 y.o. latin american male
- s/p left thyroid lobectomy 1997 for colloid nodule
- PE: normal TVC function without palpable masses
- US: right thyroid mass with indistinct margins and left thyroid bed multifocal disease
- No lateral neck lymphadenopathy
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Partial Resection of the Laryngotracheal Apparatus: The Anderson Experience

- Median age 65 (range 54-82)
- All patients reduced to microscopic residual disease
- All patients received post operative external beam radiotherapy
- Median follow-up of 7.8 years

Results

- One recurrence in the laryngotracheal or esophageal organs
- Tracheostomy dependence in 5% of patients; esophageal stenosis 18% (10% g-tube dependence or utilization)
- Pulmonary metastases present or develop in 21% of patients
- Disease specific survival 80% at ten years.

Conclusions- appropriate resection of all gross disease with XRT is effective at controlling the local/regional environment in a population with a predicted l/r recurrence rate of >36%
The Evolution of Head and Neck Surgery

- Thyroid and Parathyroid Surgery: smaller incisions and remote access approaches
- Major and minor salivary gland surgery
- Skull base surgery
- Melanoma of the head and neck and aggressive non-melanoma skin cancers
- Head and Neck Surgeons remain the leaders of the interdisciplinary care of squamous carcinomas of the head and neck...however
  - Except for oral cavity, other sites of squamous carcinoma are largely non-surgical