Thyroid Cancer
Treatment of the Neck

Ashok Shaha
Thyroid Literature

Medline

Thyroid disease  136,053
Thyroid tumors  33,554

- New Paper on Thyroid Disease – Every 3 Hours
- New Paper on Thyroid Cancer – Every 8 Hours

Thyroid Google search  36 million
Thyroid Cancer Google search  21 million
American Thyroid Association (ATA) Consensus Review of the Anatomy, Terminology and Rationale for Lateral Neck Dissection in Differentiated Thyroid Cancers

The ATA Surgical Affairs Committee
Lateral Neck Dissection for Well Differentiated Thyroid Cancer Sub-Committee

- Robert L. Ferris, MD, PhD
- David Goldenberg, MD
- Megan Haymart, MD
- Ashok Shaha, MD
- Sheila Sheth, MD
- Julie Ann Sosa, MD
- Brendan C. Stack, Jr., MD
- Ralph P. Tufano, MD
Lymphatic Drainage of the Thyroid Gland

- Bilateral drainage, extensive
- High incidence of regional metastasis – 40-70%
- Multiple nodal groups at risk
- Lymphatic channels parallel venous drainage
- Must be considered when managing thyroid cancer
AJCC/UICC 2011 Staging

Nodal Staging for Thyroid Cancer

\( N_x \) – regional lymph nodes cannot be assessed

\( N_0 \) – No regional lymph node metastasis

\( N_1 \) – Regional lymph node metastasis

\( N_{1a} \)
- Metastasis to Level VI
- pretracheal,
- paratracheal,
- prelaryngeal,
- delphian

\( N_{1b} \)
- Metastasis to unilateral, bilateral or contralateral
cervical or superior mediastinal lymph nodes
Diagrammatic Representation of the Neck Showing Various Nodal Levels and Sublevels
## Differentiated Carcinoma of the Thyroid Prognostic Factors

<table>
<thead>
<tr>
<th></th>
<th>MSKCC</th>
<th>Mayo</th>
<th>Lahey</th>
<th>Karolinska</th>
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<tbody>
<tr>
<td><strong>GAMES</strong></td>
<td>Grade</td>
<td>Age</td>
<td>Metastases</td>
<td>DNA</td>
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<td><strong>MACIS</strong></td>
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<td>Age</td>
<td>Completeness of resection</td>
<td>Metastases</td>
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<td><strong>AMES</strong></td>
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<td>Metastases</td>
<td>Invasion</td>
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<td>Extension</td>
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Pre-op Evaluation of the Neck

- CT scan
- **Ultrasound:** Suspected nodes
  - Location
  - FNA-Cytology, Thyroglobulin wash
  - Evaluation of contralateral neck
- **Parapharyngeal and retropharyngeal nodes**
Thyroid Node-Met

Detailed histologic characteristics
Probably increases the risk of loco-regional metastases
Extra-thyroidal extension
(minor vs gross)

Multifocality (microscopic vs macroscopic)
Vascular invasion (intrathyroidal, extrathyroidal)
Thyroid- Node Met

Clinico-pathologic features of the primary tumor
Predict loco-regional metastases

Size of the primary tumor
> 0.5 cm in PTC
> 2 cm in FTC/HCC

Histology of the primary tumor
PTC =TCV > FTC = HCC

Age of the patient
Children > Adults

Genotyping
BRAF positive
Differentiated Thyroid Cancer 1930-1985

SURVIVAL: Nodal Status

91% N0

N+ 87%

82%

p = n.s.

N0 n=545
N+ n=493

MSKCC-1038 pts. (DOD)

TIME (years)
Differentiated Thyroid Cancer 1930-1985

N+ - AGE DISTRIBUTION

no. of pts.

Age (years)

0-9 10-19 20-29 30-39 40-49 50-59 60-69 70-79 80-89

MSKCC-1038 pts.

493 PTS
# Differentiated Thyroid Carcinoma 1951-1990: Relationship of Number of Lymph Node Metastases to Outcome

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>1-3 Nodes positive</th>
<th>4-10 Nodes positive</th>
<th>&gt;10 Nodes positive</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>56 (47% of patients)</td>
<td>50 (41% of patients)</td>
<td>14 (12% of patients)</td>
</tr>
<tr>
<td>Young (20-40 yr): Number of cases</td>
<td>5 yr</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>10 yr</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>20 yr</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Old (60-80 yr): Number of cases</td>
<td>19 (63% of patients)</td>
<td>9 (30% of patients)</td>
<td>2 (7% of patients)</td>
</tr>
<tr>
<td></td>
<td>5 yr</td>
<td>78%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>10 yr</td>
<td>71%</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>20 yr</td>
<td>59%</td>
<td>45%</td>
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Differentiated Thyroid Cancer

Survival: Age & Nodal Status

- N1<45
- N0<45
- N0>45
- N1>45

p = 0.06
p = 0.056
Number of LN’s Predicts Recurrence

(148 pts with LN mets, s/p total tx & routine VI, III, IV)

- 0-5 LN+ (n=66) 3%
- 6-10 LN+ (n=29) 7%
- > 10 LN+ (n=19) 21%

Leboulleux, JCEM, 2005
LN Extracapsular Extension & Recurrence

(148 pts with LN mets, s/p total tx & routine VI, III, IV)

Leboulleux, JCEM, 2005
<table>
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<tr>
<th>Factors:</th>
<th>Loco-Regional Recurrence:</th>
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<tr>
<td>Fewer than 5 Metastatic LN’s</td>
<td>3%</td>
</tr>
<tr>
<td>pN1 but cN0</td>
<td>4%</td>
</tr>
<tr>
<td>1-3 LN’s with ENE</td>
<td>4%</td>
</tr>
<tr>
<td>All Metastatic LN’s &lt; 2mm</td>
<td>5%</td>
</tr>
<tr>
<td>6-10 metastatic LN’s</td>
<td>7%</td>
</tr>
<tr>
<td>Fewer than 5 metastatic LN’s</td>
<td>8%</td>
</tr>
<tr>
<td>More than 5 metastatic LN’s</td>
<td>19%</td>
</tr>
<tr>
<td>More than 10 metastatic LN’s</td>
<td>21%</td>
</tr>
<tr>
<td>Any metastatic LN &gt; 1cm</td>
<td>32%</td>
</tr>
<tr>
<td>&gt;3 metastatic LN’s with ENE</td>
<td>32%</td>
</tr>
<tr>
<td>Any metastatic LN &gt; 3cm</td>
<td>73%</td>
</tr>
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</table>
Prophylactic central-compartment neck dissection (ipsilateral or bilateral) may be performed in patients with papillary thyroid carcinoma with clinically uninvolved central neck lymph nodes, especially for advanced primary tumors (T3 or T4.)

Recommendation C
Management of Neck in Thyroid Cancer

Clinically Negative Intraoperative Management

Look for TE groove nodes

Look for sup mediastinal nodes

Look for jugular nodes

If any of these enlarged - do the respective clearance

Central compartment clearance
Management of Neck in Thyroid Cancer

Clinically Positive Intraoperative Management

- “Berry picking” not recommended, higher incidence of neck recurrence
- Modified neck dissection
- Preserving SCM
  - IJV
  - Accessory nerve
- Submandibular sal gland (Level I)
- RND - rarely indicated
Incision for Thyroidectomy and Neck Dissection
Practical Tips for Neck Dissection in Thyroid Cancer

- Review pre-op imaging very carefully – CT/MRI/Ultrasound
- Review thyroid bed and paratracheal area
- Pre-op status of vocal cords and calcium levels
- Necklace incision
- Identify accessory nerve
Practical Tips for Neck Dissection in Thyroid Cancer

- Look for jugulodigastric nodes
- Avoid dissection on the surface of submandibular salivary gland
- Look for supraclavicular and retrojugular node
- Look for pre and paratracheal nodes
- Avoid lymphatic injury – chyle leak, chyloma
Delphian Node Metastases in Thyroid Cancer

- 101 patients with Pap Ca
- 25% had metastatic tumor to the Delphian node
- Relation of Delphian node positivity with primary tumor and extra-thyroidal extension
- Association with additional node metastases to the central and lateral compartment
- Delphian node metastases is associated with heavier nodal burden
Complications

- Paratracheal dissection - Hypoparathyroidism
  - Parathyroid autotransplantation
- Lymphatic/chyle leaks
- RLN injury
- Accessory nerve injury
- Horner’s Syndrome
Neck Dissection

- Modified neck dissection
- Selective neck dissection
- Compartment-oriented neck dissection
- Radical neck dissection
Neck Dissection for Thyroid Cancer

- Role of pre-op ultrasound and U/S-guided FNA
- Microdissection (Tissel)
- Use of Gamma probe for intra-op localization
- Parathyroid autotransplantation
Sentinel Node Biopsy in Thyroid Cancer

- SLN can be located with radionucleide or
- Blue dye
- Limited or no clinical application
Rising Thyroglobulin

- Generally recurrence in nodes
- U/S and FNA
- CT scan
- Neck dissection
- RAI
- Impact on recurrent long term outcome
Good judgment comes from experience; and experience comes from bad judgment!
Elective ND
Radical ND

U/S & U/S FNA
No clinical finding
Rising TGB

Thyroglobulin follow-up

Clinical follow-up

Central compartment ND

No prognostic implication

Only therapeutic ND
# Extent of Metastatic Disease in Neck Nodes from Papillary Ca of the Thyroid

<table>
<thead>
<tr>
<th>Type</th>
<th>Import on Outcome</th>
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<tbody>
<tr>
<td>Micrometastasis</td>
<td>None</td>
</tr>
<tr>
<td>Mini metastasis (by U/S of Tg)</td>
<td>None</td>
</tr>
<tr>
<td>Minivolume metastasis</td>
<td>None</td>
</tr>
<tr>
<td>Large volume metastasis</td>
<td>Maybe (Regional or distant)</td>
</tr>
<tr>
<td>Major metastasis</td>
<td>Yes, older pt (Regional or distant)</td>
</tr>
</tbody>
</table>
Selective Paratracheal Node Dissection

- 304 patients with Papillary Cancer
- No prophylactic node dissection
- Only therapeutic
- 37% had therapeutic central compartment dissection
- Only 3 of 161 low risk patients developed central compartment recurrence (1.8%)

Monchik et al., Surgery 2009
The nodal mets not responding to RAI and not localized by RAI

PET positive

Surgery – preferred approach
Surgery for Recurrent Nodal Disease

- Frequent problem
- May be difficult to find the disease
- Missing neck nodes
- May be many other nodes
- Thyroglobulin may not become normal
- Other nodes may become obvious requiring further surgery
- Higher incidence of complications
- May not have much effect on long term outcome or prognosis
Recurrent Neck Disease

A Scientific Reality
OR
Iatrogenic Problem
Victim of Technology

A Balance Between Risk of the Disease & Risk of the Treatment
Prophylactic central compartment dissection in thyroid cancer: A new avenue of debate

Ashok R. Shaha, MD, FACS, New York, NY

- Surgical experience is an important consideration while debating the issue of central compartment dissection
- Recurrence in the low-risk group necessitating central compartment reoperation is quite rare and in the high-risk group it is probably unavoidable
- It is important to develop a balance between the risk of recurrence against the benefit from elective nodal dissection
- Primum non nocere – FIRST DO NO HARM
“The good physician treats the disease; the great physician treats the patient who has the disease.”

- Sir William Osler
Radiofrequency ablation of regional recurrence from well-differentiated thyroid malignancy

Dupuy DE, Monchik JM, et al
Rhode Island Hospital, Providence, RI
Percutaneous ethanol injection for treatment of cervical lymph node metastases in patients with papillary thyroid carcinoma

Lewis BD, Hay ID, et al
Dept. of Radiology, Mayo Clinic, Rochester, MN
Making something perfectly clear will totally confuse most people.

Hmph. Perfectly clear to anyone...
Summary

- High incidence of nodal mets in differentiated thyroid ca
  - But biologic difference
  - No survival impact

- Elective node dissection - not recommended

- Central compartment clearance - look for paratracheal and sup mediastinal and jugular nodes

- Lateral neck dissection - only if palpable nodes

- Modified neck dissection for clinical nodes

- Preserve SCM, IJV, XI and Level I

- No “berry picking”

- Role of RAI
Summary

Patients with multiple positive neck nodes from papillary ca may have additional paratracheal, sup mediastinal, or lateral neck nodes, and may remain with persistent mild hyperthyroglobulinemia. We may not achieve biochemical cure.