Central Neck Dissection for Thyroid Cancer: Should I Do It?

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Outline

• Background
• Definition of central neck (level VI)
• Incidence of central neck metastases in WDTC
• Evaluation
• Impact of central neck metastases on recurrence and survival
• CND technique, complications, outcomes
• Elective CND

The Problem: Lymph Nodes in Thyroid Cancer

• Central compartment
• Lateral compartments
• 20-90% at time of dx
• Grebe and Hay, 1996
• Kouvaraki et al, 2003

Goals of initial therapy for thyroid cancer

1. Remove primary tumor, extrathyroid disease, involved cervical LNs.
2. Minimize morbidity of treatment and disease.
3. Staging
4. Facilitate postop $^{131}$I treatment
5. Permit accurate long-term surveillance
6. Minimize risk of recurrence and metastasis.

American Thyroid Association Guidelines, 2006
American Thyroid Association Guidelines
Cooper et al; Thyroid, 2006

• **Routine** CND should be considered for patients who have papillary thyroid carcinoma and suspected Hürthle carcinoma.
• The 2006 guidelines recommended **routinely** CND for papillary thyroid carcinoma *but* failed to fully define CND or to distinguish between therapeutic and elective indications.

Conventional Therapy 2006

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Conventional Therapy 2009

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2009 ATA Guidelines

• 2009 Consensus Statement on Central Neck Dissection Terminology and Classification for Thyroid Cancer

• ATA website ([http://www.thyroid.org](http://www.thyroid.org)) and in the November 2009 issue of *Thyroid*. 
**Consensus Statement on the Terminology and Classification of Central Neck Dissection for Thyroid Cancer**


*Thyroid. Nov 2009, Vol. 19, No. 11: 1153-1158*

**Revised American Thyroid Association Management Guidelines for Patients with Thyroid Nodules and Differentiated Thyroid Cancer, 2009**


**2009 Revised ATA Guidelines**

- **RECOMMENDATION 27**
  - Therapeutic CND for patients with clinically involved central or lateral neck lymph nodes should accompany total thyroidectomy...

- Prophylactic CND (ipsilateral or bilateral) may be performed in patients with PTC with clinically uninvolved central neck lymph nodes, especially for advanced primary tumors (T3 or T4).

- Near-total or total thyroidectomy without prophylactic CND may be appropriate for small (T1 or T2), noninvasive, clinically node-negative PTCs and most follicular cancer.

- These recommendations (R27a–c) should be interpreted in light of available surgical expertise. For patients with small, noninvasive, apparently node-negative tumors, the balance of risk and benefit may favor simple near-total thyroidectomy with close intraoperative inspection of the central compartment with compartmental dissection only in the presence of obviously involved lymph nodes. This approach may increase the chance of future locoregional recurrence, but overall this approach may be safer in less experienced surgical hands.
Definition: Central Neck (Level VI)

- Superior border - hyoid bone
- Inferior border – innominate artery
- Lateral borders - common carotid arteries
- Dorsal border - prevertebral fascia
- Lymph nodes:
  - prelaryngeal
  - pretracheal
  - paratracheal
  - parathyroid

Central Neck Dissection

- Unilateral
- Bilateral
- Therapeutic
- Elective

Central Neck Metastases: Incidence

- Reported incidence varies
- Patient group
- Preoperative and intraoperative assessment
- Thoroughness of both the surgeon and the pathologist
- Immunohistochemical stains
Central Neck Metastases - Incidence

Clinical Incidence:
• Palestini et al; Langenbeck’s Arch Surg, 2008 21%
• Ito et al; World J Surg, 2006 20%

Incidence with Central Neck Dissection
• Gimm et al; Br J Surg, 1998 69%
• Pereira et al; Surgery, 2005 60%
• Goropoulos et al; World J Surg, 2006 64%

Central Neck Metastases - Microcarcinoma

• Wada et al; Ann Surg, 2003 64%
• Lee et al; Laryngoscope, 2008 31%
• Roh et al; Ann Surg Oncol, 2008 40.3%

Central Neck Metastases – Size of Primary

• Ito et al; World J Surg, 2006
  n = 759
  < 1 cm 38%
  > 4 cm 79%

Central Neck Metastases – Age

• Shindo et al; Arch OHNS, 2006
  n = 100  TT and CND
  33% central nodes positive overall
  < 45 y.o. 29%
  > 45 y.o. 39%
Central Neck Metastases - Elective CND

Shindo et al; Arch OHNS, 2006 33%

Lee et al; World J Surg, 2007 38%
   n = 103, all U/S negative

Son et al; Ann Surg Oncol, 2008 41%
   n = 115, all U/S negative

Presence of Lateral Neck Metastases - Central Neck Involvement

• Khafif et al; Head Neck, 2008
  84% positive central neck nodes

• Roh et al; Head Neck, 2007
  86% positive central neck nodes

Contralateral Central Neck Incidence

• Roh et al; Ann Surg Oncol, 2008
  n = 52 PTC met to lateral neck
  routine CND
  90% had positive central nodes
    85% ipsilateral paratracheal
    46% superior mediastinal
    31% pretracheal
    9% contralateral paratracheal

• Lee et al; World J Surg, 2007
  12%

Central Neck Metastases: Big Picture

• Common, even with microcarcinoma
• Correlation with patient and tumor factors unclear
• Higher rates found with central neck dissection
• Highly likely if lateral neck nodes are clinically positive
• Contralateral central neck incidence low
Central Neck Evaluation

- Ultrasound
- MRI
- Intraoperative inspection and frozen section

American Thyroid Association Guidelines 2006 and 2009

Preoperative neck ultrasound for the contralateral lobe and cervical (central and bilateral) lymph nodes is recommended for all patients undergoing thyroidectomy for malignant cytologic findings on biopsy.

Ultrasound – Detection of Central Neck Metastases

- Limitations due to anatomic structures
  - thyroid, trachea, esophagus, manubrium

    Sensitivity 35% Specificity 85%

    Sensitivity 10% Specificity 99%

MRI

- Gross et al, Laryngoscope, 2001
  Primary and recurrent WDTC
  Sensitivity 95%
  Specificity 51%
  No difference in ability to detect disease in lateral or central neck

- Takashima et al; AJNR, 1998
  PTC
  Criteria: cystic node +/- >13mm
  Specificity 100%, Sensitivity 59%
### Nodal Metastases - Recurrence and Survival

- Impact on survival unclear
- Higher incidence of recurrence (despite postoperative I\(^{131}\) ablation):  
  Mazzaferri and Jhiang; Am J Med, 1994  
  Beasley et al; Arch Otolaryn HNS, 2002
- Matched pair analysis:  
  higher incidence recurrence if >50 years  
  Hughes et al; Head Neck, 1996

### Cervical Metastases - Impact of Surgical Resection

Difficult to demonstrate due to many factors:  
- Indolent behavior of WDTC  
- Low impact of nodal metastases on survival  
- Retrospective, nonrandomized nature of most studies  
- More extensive surgery usually done for more advanced disease  
- Adjuvant therapy inconsistencies

### CND: Technique

- The precrioid and pretracheal tissues are dissected in continuity with the thyroid
- After thyroidectomy, central neck tissue is dissected from carotid artery (laterally) to trachea (medially)
- The tissue is dissected from the prevertebral fascia and esophagus
- En bloc dissection may not be feasible

### Technique

- The recurrent laryngeal nerve is dissected and mobilized as needed to allow for dissection deep to the nerve
- The parathyroid glands are preserved with their vascular pedicles
- Autotransplant any parathyroid gland with compromised blood supply
- In reoperation, lateral approach useful
Central Neck Dissection

Complications - CND

  Total thyroidectomy with CND, n=82
  Perm RLN 4%  Temp hypopara 31% (p=.001)  Perm hypopara 5% (p=.056)

- Palestini et al; Langenbeck’s Arch Surg, 2008
  Total thyroidectomy with bilat. CND, n=64
  Perm RLN 0%  Temp hypopara 31% (p=.003)  Perm hypopara 0%

Ipsilateral vs. Comprehensive CND

- Lee et al; World J Surg, 2007
  Ipsilateral CND
  Temp hypopara 21%  Perm hypopara 0%  Perm RLN 0%
  Comprehensive (Bilateral) CND
  Temp hypopara 48% (p=.009)  Perm hypopara 0%  Perm RLN 0%

- Son et al; Ann Surg Oncol, 2008
  n = 58 ipsilateral CND
  Temp hypopara 27%  Perm hypopara 1.8%  Perm RLN 0%
  n = 56 comprehensive (bilateral) CND
  Temp hypopara 48% (p=.02)  Perm hypopara 5.2% (p=.62)  Perm RLN 1.7%
### Complications – Reoperative CND

**Kim et al; Arch OHNS, 2004**
- n = 20 reoperative CND
  - temp. hypoparathyroidism 20%
  - perm. hypoparathyroidism 6%
  - temp. RNL paralysis 0%
  - perm. RNL paralysis 0%

**Khafif et al; Head Neck, 2008**
- n = 11 hypoparathyroidism/ RLN 0%

**Roh et al; Head Neck, 2007**
- n = 12 bilateral CND
  - temp. hypoparathyroidism 42%
  - perm. hypoparathyroidism 17% (5% de novo)
  - temp. RNL paralysis 17%
  - perm. RNL paralysis 8% (4% de novo)
- n = 10 unilateral CND
  - temp. hypoparathyroidism 0% (p=.04)
  - perm. hypoparathyroidism 0%
  - temp. RNL paralysis 10%
  - perm. RNL paralysis 10%

### CND Effectiveness

**Pereira et al; Surgery, 2005**
- n=43 TT and CND for PTC
- 60% positive central neck nodes
- 79% received I\(^{131}\) postoperatively
- Mean F/U 56 months:
  - No central neck recurrences
  - 5 (11.6%) lateral neck recurrences

### Unilateral CND Effectiveness

**Son et al; Ann Surg Oncol, 2008**
- bilateral CND n=56
- unilateral CND n=58
- 2 year F/U

- No central neck recurrences in either group
- Similar lateral neck and DM recurrence
- Similar Tg levels after I\(^{131}\)
**Elective CND - Rationale**

- Extent of disease information
- Guide adjuvant therapy
- Diminish risk of nodal recurrence
- Avoid morbidity of reoperation in central compartment
- Improve survival

**Occult Central Neck Metastases**

Clinical significance of occult central neck metastases is **unclear**:
- impact of adjuvant therapy
- propensity to progress due to indolent nature
- potential to metastasize

**Clinically Negative Neck**

*Wang et al; Arch OHNS, 2004*

n = 508  
median F/U 68 months  
n = 464 no initial neck dissection  
3% regional recurrence  
n = 216 < 45 y.o.  
5 (2%) regional recurrence, no death  
n = 248 > 45 y.o.  
11 (4%) regional recurrence, 4 died

**Clinically Negative Neck – I$^{131}$**

*Frasoldati et al; Cancer, 2003*

n = 494  
Total thyroidectomy  
post-op I$^{131}$ ablation, T4 suppression  
51 (10%) nodal recurrence, mean 45 mo.  
6% central neck, 4% lateral neck
CND Effectiveness

• Bardet et al; Eur J Endocrinol, 2008
  n=545 PTC > 1 cm
• Group 1 (n=161) TT without ND
• Group 2 (n=181) TT, bilat CND, lateral ND
• Group 3 (n=203) TT, other dissection
• $^{131}$I in 91% of patients
• 78% had no macroscopic nodes
• No significant difference in recurrence rates between groups

Elective CND - Effectiveness

Roh et al; Ann Surg, 2007
n = 82, TT with CND
n = 73, TT alone
mean F/U 52 months

No difference in regional recurrence rates between groups

Elective CND - Effectiveness

Sywak et al; Surgery, 2006
n= 447 clinically node negative PTC

TT alone n=391; median F/U 70 mths
post-ablative Tg 9.3
undetectable Tg in 43%

TT with unilat. CND n=56; F/U 25 mths
post-ablative Tg 0.4 (p=.02)
undetectable Tg in 72% (p<.001)

* similar tumor size and MACIS scores

2009 Revised ATA Guidelines

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Summary: Central Neck Management

- Central neck metastases are common
- **Therapeutic** CND indicated for clinical disease
- Consider CND for lateral neck disease
- **Elective** CND can provide extent of disease information that may guide adjuvant therapy but impact on recurrence and survival unclear
- Weigh risks (primarily temporary hypoparathyroidism) against benefits