Clinical Anatomy of the Thyroid Gland

- External carotid artery
- Superior thyroid artery
- Superior thyroid vein
- Vagus nerve
- Right internal jugular vein
- Left internal jugular vein
- Right innominate vein
- Left innominate vein
- Right subclavian vein
- Left subclavian vein
- Superior vena cava
Anatomical Overview

• Right & left lobes connected by an isthmus
• Occasional pyramidal lobe
• Levator glandulae thyroideae
• Slightly larger in women; may enlarge during menstruation & pregnancy
• Extends from oblique line on thyroid cartilage down to 4th or 5th tracheal ring
• Attaches to cricoid cartilage via suspensory ligament

From Netter’s Atlas
Case Presentation

A 32-year-old woman presents with a swelling on the anterior part of her neck. She also reports that her breathing is sometimes affected by the swelling. On examination, a single, firm, rounded mass can be felt on the left side of the laryngotracheal region. It moves up and down with swallowing. Ultrasound reveals a solid nodule in the left lobe of her thyroid gland. A needle biopsy subsequently indicates that malignant changes have taken place in the cells.

Preliminary Diagnosis:
Tumor of the left lobe of the thyroid
1. Why does the mass move up and down on swallowing?

2. What can explain the difficulty breathing?

3. What structures would be endangered by subtotal or total thyroidectomy?

4. Why is the nature of the patient’s voice of interest postoperatively?
superficial fascia

Skandalakis’ Surgical Anatomy 2004

Moore et al. 2010
Fascia & Spaces

Deep Fascia

1. investing fascia
2. pretracheal fascia
3. prevertebral fascia
4. carotid sheath

Moore et al. 2010
Fascia & Spaces

Deep Fascia

1. investing fascia
2. pretracheal fascia
   a. muscular layer
   b. visceral layer
3. prevertebral fascia
4. carotid sheath

Moore et al. 2010
Fascia & Spaces

pretracheal fascia
thyroid gland
trachea & larynx
esophagus

Moore et al. 2010

**suspensory ligament of Berry**
visceral layer of pretracheal fascia (false capsule)

true capsule
thyroid gland

Skandalakis' Surgical Anatomy 2004
**Fascia & Spaces**

**Deep Fascia**

1. investing fascia
2. pretracheal fascia
3. prevertebral fascia
4. carotid sheath

- common carotid a. (and sympathetic plexus)
- internal jugular v.
- vagus n. (and carotid sinus n.)
- deep cervical lymph nodes

Moore et al. 2010
Fascia & Spaces

- pretracheal fascia
- thyroid gland
- trachea & larynx
- esophagus
- retropharyngeal (retrovisceral) space
- prevertebral fascia
- carotid sheath
- visceral space of Stiles
- trachea

Not discussed today:
- suprasternal space of Burns
- “Danger space” of Grodinsky & Holyoke

Moore et al. 2010

Skandalakis’ Surgical Anatomy 2004
Attachment of sternothyroid to oblique line on thyroid cartilage prevents superior expansion of thyroid

From Netter’s Atlas
Questions

1. Why does the mass move up and down on swallowing?

2. What can explain the difficulty breathing?

3. What structures would be endangered by subtotal or total thyroidectomy?

4. Why is the nature of the patient’s voice of interest postoperatively?
Thyroid CT

From web reference 1

Compression and displacement of trachea by thyroid tumor

From Ellis et al. 1991

normal

Thyroid CT

normal

From Ellis et al. 1991
Questions

1. Why does the mass move up and down on swallowing?

2. What can explain the difficulty breathing?

3. **What structures would be endangered by subtotal or total thyroidectomy?**

4. Why is the nature of the patient’s voice of interest postoperatively?
Vascular Supply & Relations

Anterior View

superior thyroid a.
superior thyroid v.
external laryngeal n.
cricothyroid m.
internal jugular v.
inferior thyroid a.
inferior thyroid v.
pyramidal lobe
middle thyroid v.
pretracheal lymph node
common carotid a.
recurrent laryngeal n.

thyroid

From Netter’s Atlas
Vascular Supply & Relations

superior thyroid a.

inferior thyroid a.

external laryngeal n.

inferior constrictor m.

inferior thyroid a.

recurrent laryngeal n.

recurrent laryngeal n.

parathyroids

common carotid a.

esophagus

From Netter's Atlas
Questions

1. Why does the mass move up and down on swallowing?

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Recurrent Laryngeal N. & Suspensory Lig. of Berry

Variation in recurrent laryngeal nerve position (n = 204)

- 4% intrathyroid
- 42% paratracheal
- 48% tracheoesophageal groove
- 6% paraesophageal

Skandalakis’ Surgical Anatomy 2004
Variation in relationship of recurrent laryngeal n. to inferior thyroid a.

Right:
- 47-50%
- 26-33%
- 18-25%

Left:
- 50-55%
- 33%
- 11-12%

(referenced from Hollinshead 1968)
Recurrent Laryngeal N. & Suspensory Lig. of Berry

Variation in relationship of recurrent laryngeal n. to suspensory lig.

superior thyroid a. & v. (cut)

inferior thyroid a. & branches

recurrent laryngeal n.

parathyroids

thyroid

susp. lig.

superficial to ligament
depth to ligament

passes thru gland

splits around ligament

(from Hollinshead 1968)

From Netter’s Atlas
Recurrent Laryngeal N. & Suspensory Lig. of Berry

Variation in relationship of recurrent laryngeal n. to suspensory lig.

From Sasou et al. 1998

(from Hollinshead 1968)
Case Presentation

A 43-year-old male presents with a swelling in the front of his neck. He first noticed it 9 months ago and it has steadily grown. The lump lies near the midline and moves on swallowing. On palpation, it is firm and lays anterior to the thyroid cartilage. The mass is smooth, non-pulsatile, and non-fluctuant. The dorsum of the tongue was inspected but no thyroid tissue was observed. Ultrasound showed the mass to be cystic and separate from the thyroid gland.

Preliminary Diagnosis:
Thyroglossal Cyst

From Moore & Persaud 2003
Questions

1. What is the embryonic derivation of a thyroglossal cyst?

2. Why did the mass move upwards on swallowing?

3. Why did the surgeon look for thyroid tissue on the tongue?
Thyroid Development

From Moore & Persaud 2003
Thyroid Development

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References

Print

Web
1. Thyroid tumor: http://www.auntminnie.com/ScottWilliamsMD2/nucmed/Tumor/Thallium/Thallium.htm