Week 4 (Neck)

Clinical case

A 37 year old teacher consults her physician, complaining of a swollen neck. She had first noticed the swelling 2 months ago. Over the last two months, it had been increasing in size. She also had some breathlessness. In the last few days she is complaining of increasing shortness of breath and dysphagia that get worse when lying in bed. On examination, a solitary swelling of firm consistency was found on the right side of the larynx and trachea. The small mass was not attached to the skin and there were no changes to the overlying skin. The swelling moved upward with swallowing.

Question 1: What is the gross form and location of the thyroid gland?

Question 2: Why did the tumor move upward when the patient swallowed?

Question 3: How did the tumor cause breathlessness and dysphagia?

A1: The thyroid has left and right lobes connected by an isthmus. It extends from the thyroid cartilage to about the fourth or fifth tracheal ring. The isthmus lies anterior to the second, third and fourth tracheal rings. A pyramidal lobe may or may not be present, extending superiorly from the region of the isthmus (usually to the left of the median plane).

A2: The thyroid gland is invested in a sheath derived from the pretracheal fascia. This holds the gland onto the larynx and the trachea, so the thyroid follows the movements of the larynx during swallowing. Any pathological swelling of the thyroid will move upwards with swallowing, distinguishing it from a mass in some other part of the neck.

A3: Since the thyroid is anterior to the trachea, an abnormal mass will initially press on the trachea. The enlarged thyroid can partially occlude the lumen of the trachea, causing breathlessness. Pressure will increase when it reaches a large size since the sternothyroid muscle will be forced down to the superior mediastinum, and the trachea and esophagus will be compressed

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Further tests (fine needle aspiration) showed that the mass was a carcinoma of the thyroid gland. It was decided to perform a thyroidectomy. An endotracheal airway was inserted through the mouth before beginning the surgery. The mass was surgically removed. The patient's throat was sore for about 2 days, and her voice was hoarse.

Question 4: Which lymph nodes should the physician examine for metastases if a malignant tumor is suspected?

Question 5: What structures can be damaged during thyroidectomy if the surgeon is not careful?

Question 6: What do you think caused patient's sore throat?

Question 7: What was the likely cause of her hoarseness?

Question 8: What is the second most likely complication that may arise from such an operation?

A4: The thyroid gland is drained primarily by the deep cervical lymph nodes.

A5: The two main arteries supplying the gland are accompanied by nerves that can be damaged during thyroidectomy. The superior thyroid artery is related to the external laryngeal nerve. This nerve supplies the cricothyroid and cricopharyngeus muscles. The inferior thyroid arteries are related to the recurrent laryngeal nerve.

A6: It is common for patients to have a sore throat for 1-3 days after a thyroidectomy because of the insertion of an endotracheal airway. This procedure irritates the mucosal lining of the laryngopharynx, and some inflammation usually occurs.

A7: Injury to the *right* recurrent laryngeal nerve during thyroid surgery is ever present. Near the inferior pole of the thyroid gland, the right recurrent nerve is intimately related to the inferior thyroid artery and its branches: the nerve may cross anterior or posterior to branches of the artery, or it may pass between them (because of this close relationship, the inferior thyroid artery is ligated some distance lateral to the thyroid gland, where it is not close to nerve).

(Although the danger of injuring the left recurrent nerve during surgery is not so great, the artery and the nerve are also closely associated near the inferior pole of the thyroid gland. On the other hand, the *left* recurrent laryngeal nerve is more vulnerable to trauma and disease than the right nerve because of its longer course around the arch of aorta.)

Injury to the right recurrent laryngeal nerve during thyroid surgery could cause hoarseness, but edema and infection developing after surgery may have caused compression of the nerve as well.

Damage to the external laryngeal nerve can result in the inability to tense the vocal folds, producing weakness of the voice (the cricothyroid muscle is unable to contract).

Bilateral damage to the recurrent laryngeal nerves cause paralysis of the vocal folds: the patient can lose speech completely (*aphonia*) and may have difficulty in breathing.

A8: Another possible complication of thyroidectomy is the inadvertent removal of the parathyroid glands, which may cause a severe convulsive disorder known as tetany.

End of Case