CHAPTER 40

Hoarseness

Dr. Fareed Al-Zahrani

A 70-year-old male patient presents to the laryngology clinic with a history of persistent hoarseness for 6 months. The problem started suddenly following an URTI 1-week earlier. He said he did not have any history of throat pain, odynophagia, difficulty breathing, fever, weight loss or symptoms of gastroesophageal reflux. He has no known allergies. He is a known diabetic and has hypertension, but otherwise, his history is unremarkable. He has been a smoker for the past 20 years.

Examination shows a malnourished patient with hoarseness. A flexible laryngoscopy shows leukoplakia of the anterior one-third of the right vocal fold, which was not moving. A CT scan of the neck shows a mass eroding the thyroid cartilage and spreading into the soft tissue of the neck as well as multiple enlarged lymph nodes. Biopsy obtained by direct laryngoscopy; and its histology shows an invasive squamous cell carcinoma. The patient agrees with the tumor board's recommendation to proceed with total laryngectomy, dissection of the neck lymph nodes and post-operative radiation.

* * * * *

Q1. What is the voice box?

The larynx is also called the voice box. It is an organ in the neck of mammals that is located between the pharynx and trachea. It extends vertically from the tip of the epiglottis to the inferior border of the cricoid cartilage (Figure 40.1).

Q2. What are the regions of the larynx?

The larynx can be divided into three parts:

1. Supraglottis
2. Glottis
3. Subglottis

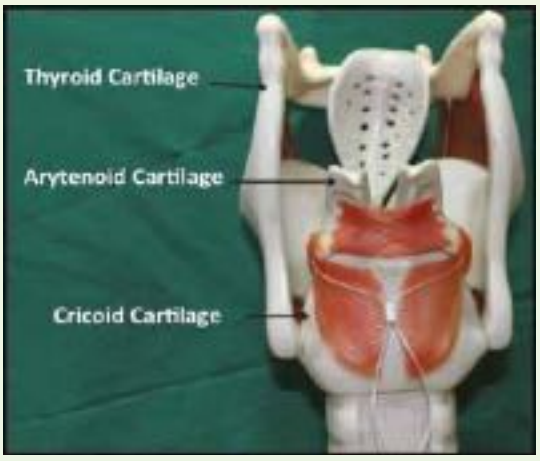

Figure 40.1: *Coronal-axis view of the larynx.*

Q3. The larynx consists of four basic anatomical components. What are they?

They are as follows (Figure 40.2):

1. Cartilaginous skeleton
2. Membranes and ligaments
3. Muscles
4. A mucosal lining

Figure 40.2: *Laryngoscopic view of the larynx.*

Q4. What cartilages form the skeleton of the voice box?

The larynx is composed of five main cartilages:

1. Two arytenoids
2. Thyroid cartilage
3. Cricoid cartilage
4. Epiglottis

Q5. What are the important muscles of the larynx?

The muscles of the larynx can be divided into the intrinsic and extrinsic groups.

A. The intrinsic laryngeal muscles include the cricothyroid, posterior cricoarytenoid, lateral cricoarytenoid, transverse arytenoid, vocalis and thyroarytenoid.

B. The extrinsic laryngeal muscles include the following:

- Three muscles, the sternothyroid, thyrohyoid and inferior pharyngeal constrictor, attach directly to the larynx.
- Additional pairs of extrinsic muscles do not insert directly on the larynx but contribute to laryngeal movements. These muscles include the omohyoid, sternohyoid, digastric, stylohyoid, mylohyoid, geniohyoid and hyoglossus.

Q6. What type of mucosal lining is present in the larynx?

Most of the endolarynx is lined by respiratory epithelium, which is a ciliated columnar epithelium with interspersed goblet cells. A stratified, generally non-keratinized but sometimes keratinized squamous epithelium is found in the laryngeal epiglottis, ventricular folds and vocal folds.

Q7. What is leukoplakia?

It is a whitish colored patch that is a potentially pre-cancerous disease.

Q8. If the patient is suspected of having lymph node metastasis, which lymph nodes are more likely to be involved first?

The lymphatic drainage of the larynx is lateral to the deep cervical and paratracheal lymph nodes and medial to the prelaryngeal and pretracheal lymph nodes.

Q9. What are the sensory and motor innervations of the larynx?

The vagus nerve provides sensory and motor innervation to the larynx. Sensation above the vocal folds is carried by the internal laryngeal branch from the superior laryngeal nerve, which comes from the vagus nerve, while sensation below the vocal folds is carried by the recurrent laryngeal nerve, which is also a branch of the vagus nerve. muscles of the larynx is carried by the Motor innervation of all the intrinsic recurrent laryngeal nerve, except for the cricothyroid muscle, which is innervated by the external laryngeal nerve, a branch of the superior laryngeal nerve.

Q10. What are the functions of the larynx?

The main two functions of the larynx are serving as an airway and protection of the lower respiratory tract during swallowing. An additional important function is phonation (voice production).

CHAPTER 41

I Can't Swallow

Dr. Mohamed Farahat Ibrahim

A 73-year-old male patient presents to the ER with sudden-onset right upper and lower limb weakness associated with a decreased level of consciousness and the inability to communicate. He gives a history of hypertension, diabetes and a cerebrovascular accident that left him with left-sided weakness two years ago, from which he recovered completely. The patient is drowsy, disoriented, not responding to his name and unable to follow commands. He is 12/15 on the GCS. A brain MRI shows multiple small recent infarcts in the frontal lobes with more infarcts on the left side and multiple small old infarcts in the cerebral hemispheres and the left cerebellar hemisphere. He is admitted with a diagnosis of left middle cerebral artery (MCA) stroke. The patient is started on nasogastric tube (NGT) feeding on admission. A bedside swallowing assessment is performed by a speech language pathologist, who finds an absent swallowing reflex trigger.

* * * * *

Q1. What is the definition of dysphagia?

Dysphagia is any pain, discomfort and/or difficulty in initiating or completing the act of swallowing.

Q2. What are the organs of swallowing?

The organs of swallowing are (Figure 41.1) as follows:

- Oral cavity
- Soft palate
- Pharynx
- Larynx
- Esophagus

Figure 41.1: Sagittal section of the head and neck.

Q3. What are the phases of swallowing?

The different phases of swallowing (Figure 41.2) are as follows:

– Oral phase
– Pharyngeal phase
– Esophageal phase

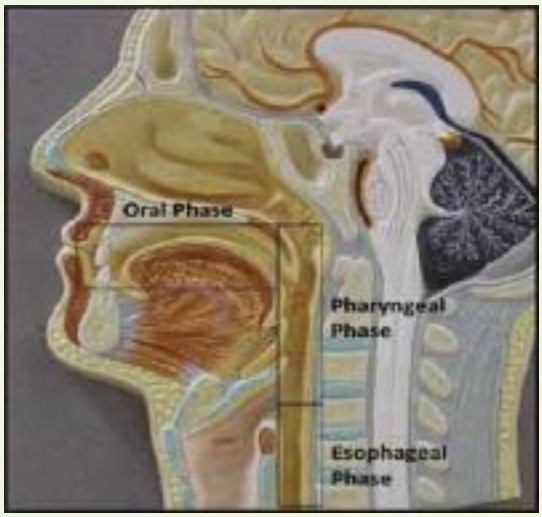

Figure 41.2: *Section of the head and neck showing the phases of swallowing.*

Q4. Which phases of swallowing are under involuntary control?

– Pharyngeal phase
– Esophageal phase

Q5. What is the neural control of swallowing?

– Receptors: mechanoreceptors, thermoreceptors, nociceptors and chemoreceptors
– Afferent nerve fibers: cranial nerves V, IX and X
– Swallowing center: reticular formation, pons and medulla oblongata
– Efferent nerve fibers: cranial nerves V, VII, IX, X and XII (Figure 41.3)

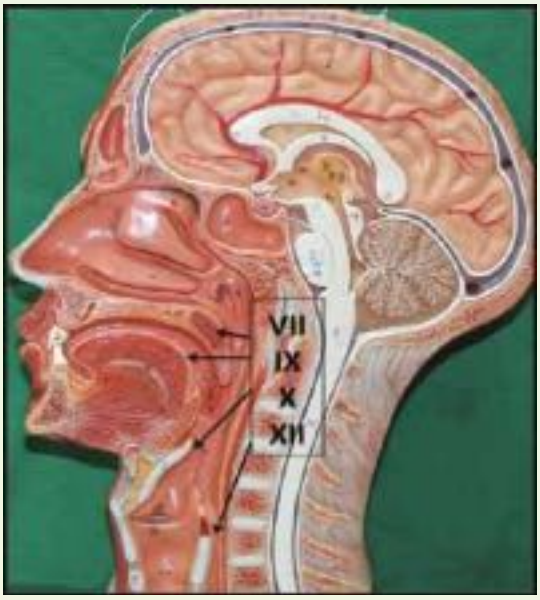

Figure 41.3: *Sagittal section of the head and neck showing the neural control of the swallowing mechanism.*

Q6. What are the causes of dysphagia?

Dysphagia is classified (Figure 41.4) as follows:

1. Oropharyngeal dysphagia, which is subdivided as follows:
   a. Structural (anatomical) dysphagia, as in cases of head and neck surgeries
   b. Functional (neurogenic) dysphagia, as in cases of cerebrovascular stroke
2. Esophageal dysphagia, which is subdivided as follows:
   a. Mechanical (obstructive) dysphagia, as in cases of tumors of the esophagus
   b. Neuromuscular (esophageal dysmotility), which will lead to achalasia of the esophagus, and oropharyngeal, esophageal and neuromuscular motility disorders pharyngeal, oesophageal and neuromuscular motility disorders.

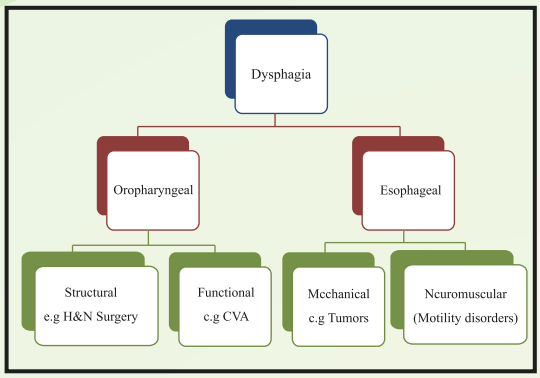

Figure 41.4: *Classification of dysphagias.*

Figure 41.6: *Modified barium swallow setup.*

Q7. What are the most common findings of sphincteric dysfunction of the swallowing mechanism? (Figure 41.5)

- Velopharyngeal dysfunction, leading to nasal regurgitation of food and liquids
- Laryngeal dysfunction (incomplete airway protection), leading to penetration with or without aspiration
- Upper esophageal sphincter dysfunction, leading to regurgitation of the bolus from the esophagus to the pharynx

Figure 41.5: *Swallowing mechanism.*

Q8. What test can the speech language pathologist (SLP) use?

A modified barium swallow (MBS), which is performed in the fluoroscopy room in the radiology department (Figure 41.6).

Q9. What test should the phoniatrician use?

Fiber-optic endoscopic evaluation of swallowing (FEES), which is performed in the swallowing outpatient clinic (Figure 41.7).

Figure 41.7: *Fibre-optic endoscopic evaluation of swallowing (FEES).*

Q10. Can we use the MBS and FEES in the management of cases of dysphagia?

Yes, both MBS and FEES are assessment tools that can also be used as management tools by modifying the following different aspects:

A. Swallowing variables

I. Modification of the swallowing maneuvers

II. Modification of the food variables by changing food consistency /

viscosity

III. Change the manner of feeding

B. Intraoral prosthetics

C. Medical treatment

D. Surgical intervention

E. Alternative routes of alimentation

Q11. What are the consequences of dysphagia?

– Dehydration

– Weight loss

– Aspiration pneumonia

– Airway obstruction

– Loss of joy of eating

– Effects on post-treatment recoveries

Q12. What are the objectives of treating patients with swallowing problems?

– Prevent pulmonary aspiration

– Maintain adequate food and fluid intake

– Correct nutritional deficiencies (when present)

Q13. What are the different modalities of the management of dysphagia?

A. Treatment of the underlying cause

B. Behavior readjustment therapy (BRAT):

I. Postural techniques

II. Augmentation of the oral sensory input before or during swallowing (sensory enhancement techniques)

III. Augmentation of the motor control of swallowing (exercises for the muscles involved in swallowing)

IV. Modification of maneuvers of swallowing (exercises for the muscles involved in swallowing)

V. Modification of the food variables by changing food consistency/ viscosity

VI. Change the manner of feeding

C. Intraoral prosthetics

D. Medical treatment

E. Surgical intervention

F. Alternative routes of alimentation

Q14. Mention some alternative routes of alimentation.

– Nasogastric tube

– Nasojejunal tube

– Nasoduodenal tube

– Cervical esophagostomy

– Gastrostomy tube

Q15. What is the recent update in dysphagia treatment?

The newest treatment is VitalStim® therapy, which uses surface electrodes to transmit a small electric current to stimulate the muscles of swallowing to strengthen and train these muscles to regain their activities (Figure 41.8).

Figure 41.8: *VitalStim® therapy.*

CHAPTER 42

I Feel Like I'm Choking

Dr. Tamer Mesallam

A 52-year-old female teacher presents to the ENT clinic with frequent attacks of choking for 2 months. The choking attacks usually occur after a few hours of sleeping. The patient experiences attacks of a choking sensation that awakens her followed by vigorous non-productive coughing and chest wheezes for 1-2 hours. The patient reports the occurrence of similar episodes during the daytime of lesser severity. Between the episodes, the patient is completely symptom free.

She states that the episodes are annoying and could prevent her from teaching if they occurred during her working hours. The patient also previously experienced heartburn, frequent throat clearing and a sour taste in her mouth. She was examined by her primary health care physician who diagnosed her with asthma and prescribed a bronchodilator.

Despite taking the medication, these episodes continue to occur with no significant improvement in the symptoms except for the chest wheezing that follows the choking attacks. Although there is a family history of asthma, the patient had never complained of asthma or chest-related problems;. The patient has experienced no dysphagia, vomiting, exertional symptoms or weight loss. Her past medical history is non-contributory.

The patient is slightly overweight (weight is 91 kg and height is 163 cm). Her ear and nose examinations are unremarkable. A laryngoscopic examination shows bilateral arytenoid edema, hypertrophied interarytenoid tissue and bilateral subglottic edema (pseudo-sulcus). The patient is empirically treated with proton-pump inhibitors (PPIs) for 3 months with anti-reflux lifestyle changes. At the follow-up appointment, the patient reports significant improvement in her choking symptoms with the persistence of mild, infrequent episodes of throat clearing.

* * * * *

Q1. What are the most likely etiologies that can lead to the complaints reported by the patient?

1. Reflux laryngitis (laryngopharyngeal reflux disease)
2. Post-nasal discharge (chronic sinusitis)
3. Allergy

Q2. What are the most common risk factors for developing reflux laryngitis?

1. Obesity (high body mass index)
2. Hiatus hernia
3. Old age

Q3. What factors prevent gastric contents from reaching the larynx and injuring it?

1. Lower esophageal sphincter (LES)
2. Esophageal peristalsis
3. Esophageal acid clearance and buffering mechanism
4. Upper esophageal sphincter (UES)
5. Tissue resistance

Q4. What are the pathophysiological theories of reflux laryngitis?

1. Direct contact of refluxate materials with the larynx (micro-aspiration)
2. Indirect vasovagal reflex, which can initiate a tracheal-bronchial reaction.

Q5. Is heartburn a constant presentation in patients with reflux laryngitis?

No, 50% of patients with reflux laryngitis can present without heartburn, which is called silent reflux.

Q6. What are the most common presentations of reflux laryngitis?

1. Choking episodes
2. Dry irritative coughing
3. Asthma refractory to bronchodilators
4. Dysphonia
5. Globus sensation

Q7. What laryngeal signs could be related to reflux laryngitis?

1. Contact ulcer/granuloma (Figure 42.1)
2. Subglottic edema (pseudo-sulcus)
3. Arytenoid edema and erythema
4. Interarytenoid pachydermia (Figure 42.2)

Figure 42.1: *Laryngoscopic view of the larynx showing right contact granuloma on the right vocal process (a reflux laryngitis-related sign).*

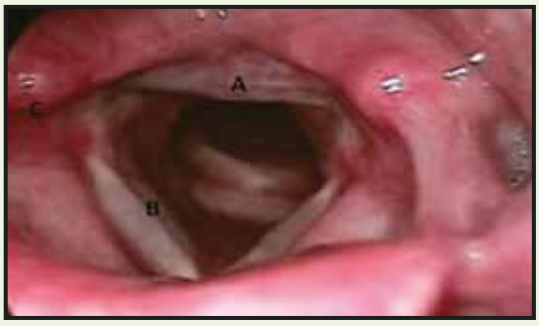

Figure 42.2: *Laryngoscopic view of a larynx showing reflux laryngitis-related signs. (A) Interarytenoid pachydermia (Inter-arytenoid bar). (B) Subglottic oedema (pseudo- sulcus). (C) Arytenoid erythema and oedema.*

Q8. What are most common tests for reflux laryngitis?

1. Empirical therapeutic trials of PPIs
2. 24-hour double-probe pH monitoring
3. Impedance manometry with pH testing
4. 24-hour pharyngeal airway pH monitoring (Figure 42.3)
5. Oesophageal manometry
6. Upper GI endoscopy

Q9. Are there any materials in the gastric contents other than acid that could be injurious to the laryngeal tissue?

Yes, acid is not the only injurious material in the gastric contents that can affect the larynx. Pepsin and bile salts have been shown to have a potent injurious effect on the laryngeal tissue.

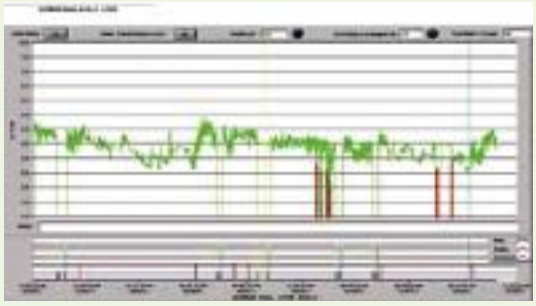

Figure 42.3: *Traces from 24-hour pharyngeal pH monitoring in a reflux laryngitis patient showing frequent acidic pharyngeal reflux episodes (marked by red).*

Q10. What are the treatment options in reflux laryngitis?

1. Lifestyle changes and antacids
2. PPIs
3. H2 antagonists in combination with PPIs
4. Surgical intervention (fundoplication)

Q11. What are the most common lifestyle modification instructions given to reflux laryngitis patients?

1. Avoid heavy meals before bedtime (at least 3 hours between the last meal and bedtime).
2. Avoid caffeinated beverages, spicy food, fatty meals, mint and citrus juices.
3. Elevate the head of the bed 15-20 cm or lie on the left side.
4. Reduce weight.

Q12. What types of patients with reflux laryngitis do you refer for surgery?

1. Patients who do not respond to a maximal dose of PPIs and lifestyle modifications
2. Young patients who prefer surgery over life-long medication use
3. Patients who suffer complications with acid-suppressive medications

Q13. What is the prognosis of reflux laryngitis?

Most patients treated with PPIs will experience symptom relief, while a few patients will respond only to lifestyle changes and antacids.

CHAPTER 43

My Voice Has Changed

Dr. Khalid H. Al Malki

A 35-year-old female teacher presents to the voice clinic with a history of change of voice for 3 months with a gradual onset and slowly progressive course. Her voice worsens at the end of her workday at school. She reports throat dryness and pain during teaching as well as throat clearing. She is an active, talkative and energetic teacher. She has no history of breathing or swallowing complaints. She is not a smoker. She has no history of allergies, chronic cough, diabetes mellitus or laryngeal trauma. Her medical and surgical history is otherwise negative.

Physical examination by her phoniatrician (a physician managing voice, swallowing, language and speech disorders) shows that her voice is strained and leaky with dysphonia of grade 2 of 3. Her voice pitch is relatively reduced with a loud voice and hard glottal attacks. Her mouth, nose, ears and neck examinations are normal.

* * * * *

Q1. What is the source of voice production in our body?

The larynx is situated in the neck (Figure 43.1). It includes the two true vocal folds (Figure 43.2), which are the source of voice production. Voice is produced by the vibration of the two true vocal folds in the larynx during their adduction (approximation) (Figure 43.3). The true vocal fold is a multi-layered structure (Figure 43.4).

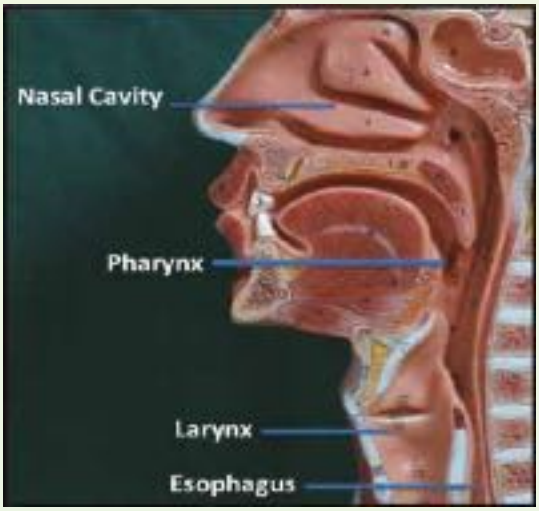

Figure 43.1: *Sagittal section of the head and neck.*

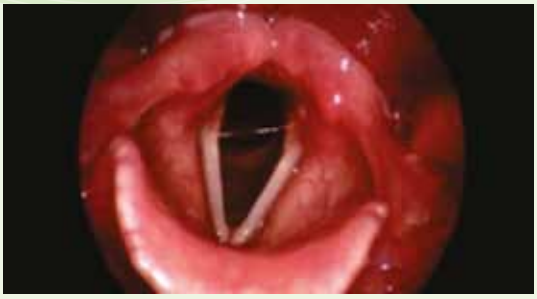

Figure 43.2: *Endoscopic view of the larynx showing the two true vocal folds during breathing.*

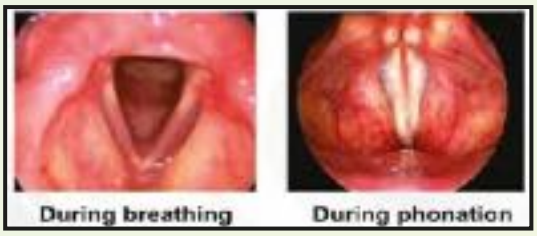

Figure 43.3: *True vocal folds during breathing and phonation.*

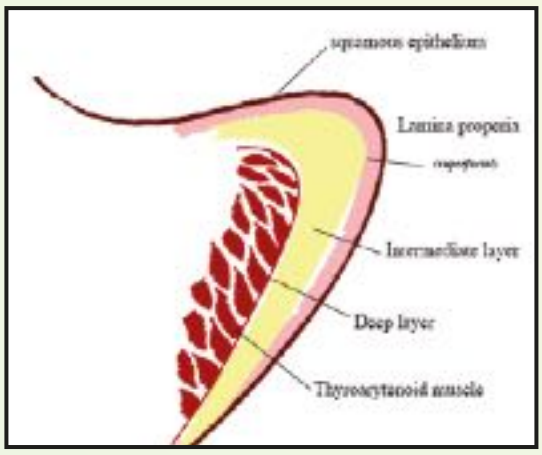

Figure 43.4: *The layers of the true vocal fold.*

Q2. How is the voice generated?

To accomplish phonation, we must achieve three basic laryngeal adjustments. Before phonation, we inhale (Figure 43.5). To start phonation, we adduct (approximate) the true vocal folds, which moves the folds into the air stream during exhalation. We hold the air stream during exhalation. We then hold the vocal folds in a fixed position (adduction) in the airstream because the aerodynamics of phonation control the actual vibrations associated with sustained phonation. Finally, we abduct (separate) the true vocal folds to terminate phonation.

Figure 43.5: *Voice production (phonation).*

Q3. Name the four functions of the larynx. (Figure 43.6)

1. airway
2. protection
3. phonation
4. increase intrathoracic pressure

Figure 43.6: *The functions of the larynx.*

Q4. What is the next and most important investigative tool that the phoniatrician should use?

Endoscopic examination of the larynx using a laryngostroboscopic system (Figure 43.7).

Figure 43.7: *A laryngostroboscopy system.*

Q5. Name two additional voice evaluation tools.

1. Acoustic analysis of the voice
2. Aerodynamic analysis of the voice

Q6. What is the basic concept of laryngostroboscopy?

The basis of stroboscopic examination is to produce rapid pulses of light that illuminate consecutive points along the vocal cycle. If the illumination flashes more frequently than every 0.2 seconds, the human eye processes these images into a continuous, "slow-motion" sequence. The perceived stroboscopic motion of the vocal folds is an optical illusion created by fusing multiple points of several successive vibratory cycles (Figure 43.8). In contrast, high-speed imaging records multiple points within the same vibratory cycle.

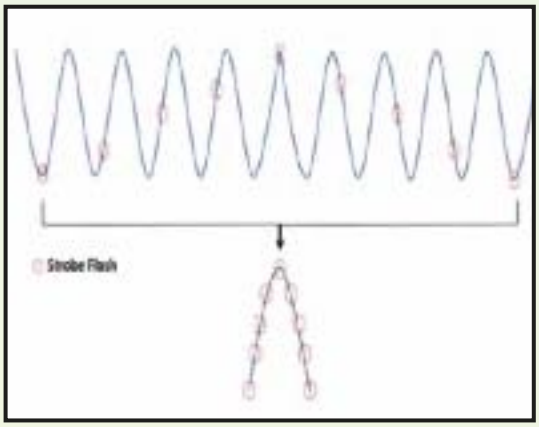

Figure 43.8: *Laryngostroboscopy*

Q7. If laryngeal examination reveals bilateral, small, nearly symmetrical true vocal fold lesions (Figure 43.9), what is the most likely diagnosis?

Vocal fold nodules.

Figure 43.9: *Vocal fold nodules*

Q8. What are the three main categories of voice disorders?

1. Organic voice disorders, in which a clear organic pathology is visualized during laryngeal endoscopic examination. One example is vocal fold immobility.
2. Non-organic voice disorders, in which

no clear organic pathology is visualized during laryngeal endoscopic examination. One example is phonasthenia (voice fatigue).

3. Some authorities classify a third category, minimal-associated pathological lesions (MAPLs), which are organic voice lesions that result from non-organic voice pathologies. The MAPLs include vocal fold nodules, vocal fold cysts, vocal fold polyps, Reinke's edema and vocal process granulomas. The classification of voice disorders is shown in (Figure 43.10).

Q9. What is the differential diagnosis of a unilateral vocal fold lesion?

1. Vocal fold cyst
2. Vocal fold polyp
3. Vocal process granuloma
4. Vocal fold tumor

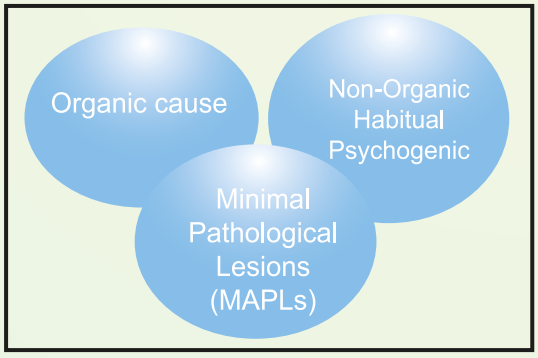

Figure 43.10: *Classification of voice disorders.*

Q10. What are the four main lines of management for voice disorders?

1. Vocal hygiene advice (for all voice disorders)
2. Voice therapy (for all non-organic lesions and some organic lesions)
3. Phonosurgery (for some organic voice lesions)
4. Drug treatment (for laryngopharyngeal reflux disease)

Q11. What is the management of the above-mentioned teacher's case?

Her management plan should include the following:

- Vocal hygiene advice, with emphasis on vocal hygiene when teaching
- Voice therapy

Phonosurgery (excision of nodules) is the last option in cases of refractory fibrotic or grossly asymmetrical vocal fold nodules.

Q12. Name at least three points of vocal hygiene advice for this teacher.

- Consumption of plenty of fluids, especially water
- Use of a microphone and speakers when teaching
- Economy of voice and relative voice rest at home
- Avoidance of foods and activities that can upset the larynx and stomach (examples include tea, coffee, carbonated drinks, fatty foods, spicy foods, chocolate, mint, tomatoes, smoking, alcohol and citrus drinks)
- Avoidance of sleeping sooner than 3 to 4 hours after meals

Q13. Name five risk factors for change of voice (dysphonia).

– Vocal misuse and abuse
– Smoking
– Alcohol
– Foods that can upset the larynx and stomach
– Sleeping sooner than 3 hours after meals

Q14. What is the basic concept of voice therapy?

Voice therapy is a group of vocal techniques used in the management of voice disorders. These techniques may eliminate vocal misuse and abuse behaviors, improve voice production processes and/or enhance vocal fold tissue healing following injury. It can be used pre- or post-operatively. Because these techniques aim to improve vocal behaviors through successive weekly therapy sessions, the patient should be compliant and highly motivated. One important voice therapy technique is the Accent Method of voice therapy.

Q.15 Name three vocal fold lesions for which phonosurgery (laryngeal surgery) is the main management modality.

– Vocal fold polyps
– Vocal fold cysts (Figure 43.11)
– Reinke's edema

Figure 43.11: *A vocal fold cyst. (Courtesy of Dr. Tamer Mesallam*

Q16. What is the maximum duration of change of voice (dysphonia) before referring the patient to a phoniatrician or a laryngologist?

Any patient with a history of change voice of 2 weeks or more should be referred to a phoniatrician or a laryngologist, especially if the patient is a smoker.

Q17. What is the nerve supply to the larynx?

The laryngeal innervation is shown in (Figure 43.12).

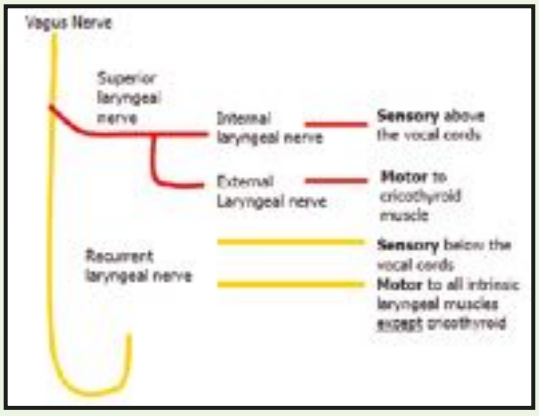

Figure 43.12: *Nerve supply of the larynx.*

CHAPTER 44

Stuttering

Dr. Sabah Mohammed Hassan

A 19-year-old female university student attends the clinic complaining of hesitation of her speech for the previous 4 years. Her condition deteriorated when she started a new level of education and was faced with a new environment and new colleagues. Her problem started when she was 10 years old; but at that time her speech problem was not associated with avoidance of difficult speech situations such as speaking to strangers or with her classmates. Her problem emerged when she felt tense while speaking to people of authority, such as the school's headmaster or a teacher when she was asked to answer oral questions or when reading aloud in front of her classmates. Asking her to recite the Qur'an or any recited reading materials is not associated with any problem. The patient has a positive family history with one brother and one aunt who have presented with the same problem. When she was a child, her parents sought medical advice at the speech clinic. Family and patient counseling were given along with advice to start active speech therapy to learn how to address her problem. Only a few therapy sessions were given because the patient did not take the problem seriously.

* * * * *

Q1. What is the most probable diagnosis?

Stuttering Bloodstein IV (stuttering Blood IV).

Q2. What is the most popular classification system used to classify stuttering?

The Bloodstein classification system is considered the most popular form to classify stuttering. Bloodstein (1975) identified four phases for the categorization of stuttering:

Phase I: The stuttering is episodic mainly in the form of repetitions and the patient (usually a child) is unaware of the problem.

Phase II: The child is aware of the stuttering but pays it no attention.

Phase III: The stuttering appears mainly in special situations such as a classroom reaction and speaking to strangers but there is no avoidance.

Phase IV: Avoidance is the most marked situation. The patient avoids anticipation and frequently substitutes words for the difficult words and circumlocutions.

Q3. What is the degree of stuttering in the illustrated patient?

Just the presence of avoiding difficult speech situations classifies the patient as stuttering Blood IV, which can be considered a severe form of stuttering.

Q4. Does the stutterer have specific commonly difficult words?

Yes. The most common difficult words are the stutterer's own name, address and the pronoun "I." In addition, initial position words are typically involved more frequently in stuttering than medial or final words.

Q5. Does the clinician depend on certain features in the patient's speech that help in diagnosing stuttering?

Yes, particularly when there is a core behavior of stuttering in the form of intraphonemic disruption causing partial sound, partial syllable and partial word repetition. The reaction to this core behavior is often in the form of prolongation of the words or the presence of blocks, struggling and avoidance of speech situations.

Q6. What is the most common cause of stuttering?

The main cause of stuttering is unknown at present. However, many theories try to explain the occurrence of stuttering. The organic theory supposes the presence of a genetic predisposition; and this theory explains why stuttering can run in families and can be more common in left-handed people due to the disturbance of cerebral dominance. However, the most accepted theory is that stuttering is a learned behavior augmented by the presence of a genetic predisposition.

Q7. How can we assess the severity of stuttering?

There are many tools for assessing stuttering. The most common tool is called a stuttering severity instrument (SSI). It measures the following:

1. The frequency of repetitions and prolongations of sounds and syllables
2. The estimated duration of the longest stuttering event
3. Any observable physical concomitants

Q8. Can this scale be applied to children?

Q9. How can stuttering be treated?

Stuttering can be treated using speech therapy. The most popular and effective therapy is fluency-shaping therapy, which is used to teach the stutterer how to use slow and easy speech and gradually shape his disfluencies into fluencies to produce speech more easily.

Q10. Is the same therapy used for both children and adults?

No. The modes of therapy differ between children and adults. Even among children themselves, the mode of therapy depends on whether the child is aware of his stuttering.

Q11. Can stuttering be completely cured using speech therapy?

Speech therapy in stuttering can be considered a method of behavioral modification. If the patient adheres to the method learned during the therapy sessions, the patient can typically overcome the stuttering. Otherwise, stuttering cannot be cured.

Q12. Is there any available tool or instrument that can eradicate stuttering other than speech therapy?

There are many tools, including delayed auditory feedback (DAF) (Figure 44.1) and frequency-altered feedback (FAF). These methods depend on delaying the normal auditory feedback, which is usually disturbed in stutterers. In addition, a new prosthetic device (SpeechEasy) that fits in the ear has also been used.

All of the devices are undergoing trials and even the oldest ones (the DAF and FAF) are associated with many problems. None of these devices can eradicate stuttering because the patients may discontinue the use the tool and will become handicapped with stuttering again.

Figure 44.1: *Delayed auditory feedback.*

CHAPTER 45

I Am Bringing Food Back Up

Dr. Michael S. Timms

A 69-year-old female patient complains of bringing back up recently eaten food and coughing during swallowing of both solids and liquids for 2 months. She also complains of dysphagia and weight loss which have been slowly progressive over 12 months. She had one recent episode of pneumonia, which was treated with antibiotics. She has no history of hoarseness. There is no history of acid reflux. There is no known history of anemia. She has no history of smoking or alcohol consumption, and she is otherwise healthy with no symptoms or signs of neurological disease.

Q1. She thinks she has cancer. Is this a likely diagnosis?

No, not with this length of history and the lack of causative factors.

Q2: What is the differential diagnosis?

- Pharyngeal pouch (hypopharyngeal diverticulum)
- Esophageal stricture
- Neurological disease
- Barrett's esophagus
- Plummer-Vinson syndrome

Q3. What tests are indicated?

Complete blood count (CBC), chest X-ray (CXR), contrast swallow and endoscopy.

Q4. Radiology shows a hypopharyngeal diverticulum and aspiration. What is the anatomical defect?

Failure of relaxation or spasm of the cricopharyngeus muscle and outpouching of the mucosa of the hypopharynx posteriorly through the Killian's dehiscence of the inferior constrictor muscle.

Q5. What abnormalities may be found on examination?

- Signs of weight loss.
- A gurgling sound on neck palpation

· Pooling of saliva in the hypopharynx on flexible or 70 degree rigid endoscopy.

Q6. What additional findings may be present in contrast swallow?

- Visible pouch
- Cricopharyngeal spasm
- Bronchogram due to aspiration.

Q7. What is the natural history of this condition?

Inevitable progression and ultimately death from cachexia and pneumonia.

Q8. What are the treatment options?

Surgery.

1. External pouch removal with cricopharyngeal myotomy
2. Endoscopic diverticulotomy by elec trosurgery, laser or stapling (Figures 45.1, 45.2 and 45.3)

Figure 45.1: *Patient under general anesthesia with a suspension laryngoscope.*

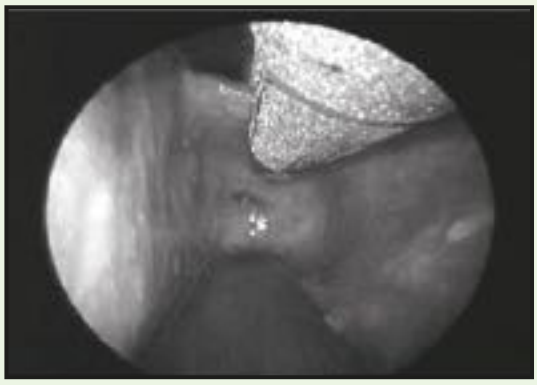

Figure 45.2: *A diverticuloscope with the cricopharyngeus stretched between the pouch posteriorly and esophagus anteriorly prior to stapling.*

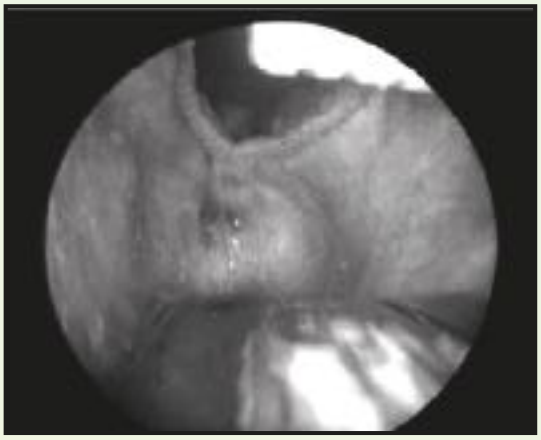

Figure 45.3: *Endoscopic view of the diverticulum before and after the application of the staple gun, dividing the cricopharyngeus and opening the pouch.*

Q9. What is the most important step in all of these methods?

Division of the cricopharyngeus muscle (myotomy) to allow normal swallowing and prevent recurrence.

Q10. Why it is important to inspect the interior of the pouch regardless of the surgical technique?

There is a small chance of a malignant change within the pouch.

Q11. What are the surgical complications?

1. Recurrent laryngeal nerve palsy causing hoarseness and aspiration
2. Pharyngocutaneous fistula
3. Esophageal leak and mediastinitis

Q12. What is the combined incidence of these complications with an open procedure?

Approximately 25%.

CHAPTER 46

Laryngeal Trauma

Dr. Manal Bukhari

A 40-year-old female presents to the ENT outpatient clinic complaining of a change of voice since she woke up following thyroidectomy 3 months ago. Her pre-operative laryngeal examination was normal. Immediately after the operation, she was not able to phonate, but her voice improved slightly over the following 2 weeks. Her voice has not recovered to a normal level. Her breathing is normal, but she has a history of on-and-off chokoing while drinking fluids. She has no reported history of pneumonia, smoking or any symptoms suggesting laryngopharyngeal reflux. She has no history of other surgery or diabetes.

* * * * *

Q1. What is the most likely diagnosis?

Vocal fold "immobility" with a glottic gap. Vocal fold palsy is an important complication after thyroid surgery; and patients must be pre-operatively counseled regarding this potential complication. Vocal fold immobility can also be the result of mechanical pathology at the cricoarytenoid joint.

Q2. Is it necessary to perform routine pre-operative laryngoscopy assessment for patients undergoing thyroid surgery?

Yes, particularly in patients with voice changes and when malignancy is suspected. The pre-operative laryngoscopy provides valuable data to compare pre- and post-operative laryngoscopic findings.

Q3. Is post-operative laryngoscopy required in all thyroidectomy patients?

Yes. It is possible to have a normal voice in the presence of a mild unilateral vocal fold paresis with a minimal phonatory glottic gap. The use of routine post-operative laryngoscopy offers a reliable assessment of vocal fold function following surgery.

Q4. Why is the recurrent laryngeal nerve (RLN) prone to injury during thyroid surgery?

The course of the RLN differs on the right and left sides of the neck. The left RLN branches from the vagus nerve at the level of the aortic arch. It then passes below the arch and reverses its course to continue superiorly, posterior to the aortic arch and into the visceral compartment of the neck. It travels near or in the tracheoesophageal groove until it enters the larynx just behind the cricothyroid articulation and the left lobe of the thyroid gland. The right RLN branches from the vagus nerve more superiorly than the left at the level of the subclavian artery. It loops behind the right subclavian artery and ascends superomedially toward the tracheoesophageal groove. It continues superiorly until it enters the larynx behind the cricothyroid articulation and the right lobe of the thyroid gland.

Q5. What is the cause of vocal fold immobility if the RLN is documented to be intact at the end of the thyroid surgery?

It is possible to experience postoperative vocal fold weakness or even immobility despite seeing an apparently intact RLN during surgery. Causes other than direct surgical trauma to the nerve should be considered, such as local anesthesia, nerve stretching, nerve edema or nerve pressure caused by suturing or local bleeding. Cricoarytenoid joint fixation should also be considered as a mechanical cause of vocal fold immobility after thyroid surgery.

Q6. What is the innervation of the intrinsic muscles of the larynx?

All the intrinsic laryngeal muscles receive their motor supply from the RLN except the cricothyroid muscle, which is innervated by the superior laryngeal nerve (Figure 46.1).

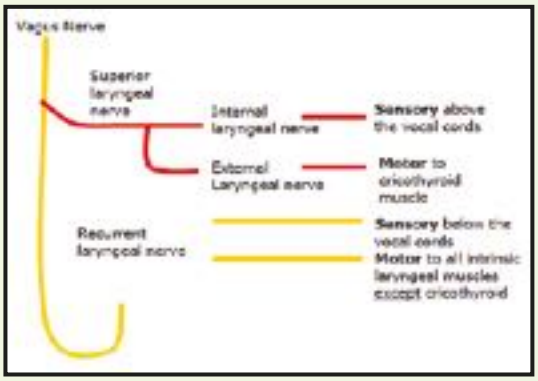

Figure 46.1: *Innervation of the intrinsic muscles of the larynx.*

Q7. How do you explain the patient's symptoms?

The two true vocal folds contact each other during phonation, and they are sealed together during swallowing. This normal closure is lost if there is a glottic gap during vocal fold adduction as a result of true vocal fold immobility.

Q8. What is the best tool for voice assessment?

Laryngostroboscopy is the best method. Other assessment modalities include

acoustic and aerodynamic voice analysis and high-speed laryngeal camera imaging.

Q9. What are the general causes of vocal fold immobility?

1. Neurological causes, including RLN trauma (e.g., iatrogenic after thyroidectomy), neoplastic (lung tumor, thyroid tumor, etc.) and idiopathic
2. Mechanical causes, including cricoarytenoid joint pathology

Q10. How do we differentiate between neurological and mechanical causes of vocal fold immobility?

1. Electromyography (EMG)
2. Intra-operative palpation of the cricoarytenoid joint

Q11. How can you diagnose isolated superior laryngeal nerve paralysis after thyroidectomy based on its function?

Superior laryngeal nerve function can be divided into its sensory and motor components. The sensory function provides a variety of afferent signals from the supraglottic larynx. The motor function involves the motor supply to the ipsilateral cricothyroid muscle. This muscle tilts the cricoid lamina backward at the cricothyroid joint, causing lengthening, tensing and adduction of the vocal folds to increase the pitch of the voice generated. If superior laryngeal nerve paralysis occurs, the vocal folds lack their normal tone and will not lengthen sufficiently during attempts at increased pitch production. Therefore, people with a superior laryngeal nerve paralysis have difficulty increasing loudness and reaching a high pitch. This defect becomes clear in a noisy area, where the voice fatigues easily and during singing. However, it may not be readily observable and is often difficult to ascertain.

Q12. What is the management of unilateral vocal fold paralysis?

Management options of unilateral vocal fold paralysis include observation for 6-12 months (giving a chance for spontaneous re-innervation), voice therapy and laryngeal surgery. Many patients improve spontaneously during the following 6-12 months. During this period, voice therapy can help to restore the voice. Usually, surgical treatment is postponed 6-12 months after the onset of paralysis.

Q13. What are the general indications for early surgical treatment (before 6 months)?

1. If the RLN was intentionally cut, e.g., during thyroidectomy because of of involvement in malignancy.

2. If the patient is suffering from distressing laryngeal complaints, such as difficulty in breathing or recurrent distressing choking during feeding
3. If the patient needs his voice for his/her professional

Q14. What is the surgical treatment for unilateral vocal fold immobility with glottic gap?

Vocal fold medialization procedures, which may include the following:

1. Injection (augmentation) laryngoplasty: A suitable compatible material (fat, calcium hydroxyapatite, hyaluronic acid, etc.) is injected into the lateral aspect of the immobile true vocal fold.

2. Medialization thyroplasty: Under local or general anesthesia, a cut is made in the thyroid cartilage of the affected side, and a suitable material (e.g., silicone) is inserted (Figure 46.2) to push the paralyzed vocal fold medially to approximate the normal contralateral true vocal fold and close the gap between the two during phonation and swallowing.

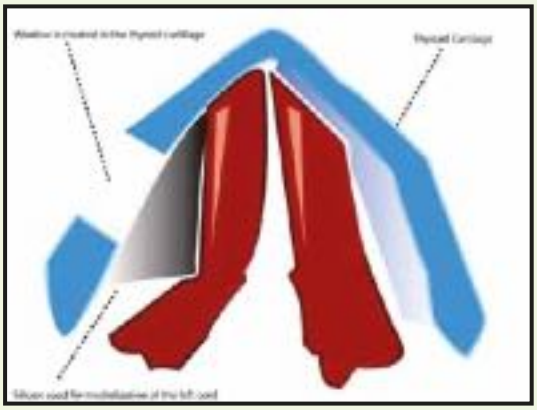

Figure 46.2: *Medialization thyroplasty using silicone.*

CHAPTER 47

I Have A Lump In My Neck

Dr. Khalid Al-Sebeih

A 50-year-old male who is hypertensive and a chronic smoker complains of left neck swelling in the anterior triangle for 2 months. The mass is painless and slowly growing. The patient also complains of on-and-off left-sided otalgia. He was examined by a family doctor and was given two courses of antibiotics. There was no reduction in the size of the mass.

Physical examination shows a 2x3-cm firm mass medial to the sternocleidomastoid muscle and inferior to the angle of the mandible. The mass was not tender or fixed to the underlying structures. He also has thyroid swelling of both lobes (goiter) that moves with deglutition. An oral cavity examination shows poor dentition and an approximately 1-cm ulceration in the left tonsillar area. The remaining head and neck examinations are normal.

* * * * *

Q1. What are the important anatomical structures in the neck?

Skin, muscles, lymph nodes, blood vessels, thyroid gland, parathyroid glands, aero-digestive tract, vertebrae, spinal cord and the connective tissue between them.

Q2. What are the components of the aero-digestive tract in the neck?

Mouth, pharynx, larynx, trachea, esophagus and salivary glands.

Q3. Where could this neck mass come from?

Any neck structure can cause this mass, which may be due to a congenital, neoplastic or inflammatory process.

Q4. What is the most likely diagnosis, considering the history and examination?

- Squamous cell carcinoma (SCCa) of the tonsil
- Lymphoma of the tonsil
- Papillary carcinoma of the thyroid

Inflammatory and congenital processes are unlikely in this patient.

Q5. What other examination you would like to do for this patient?

A 0-degree scope of the nasal cavity: Infection and tumor in this area can present with cervical lymph node enlargement as the initial presentation. A 70 degree or 90 degree scope of the base of the tongue, hypopharynx and larynx is needed to rule out other primary malignancies.

Q.6. What tests would you request for this patient?

- Imaging studies: CT and MRI of the neck are very helpful to visualize the anatomy of the neck and determine the origin of this mass, the local lymph node involvement and its effect on the nearby structures.
- Fine needle aspiration cytology (FNAC) from the mass and the thyroid will help to confirm the diagnosis and differentiate the subtypes.
- Biopsy or excision of the left tonsil (Figure 47.1): The presence of more than one pathology is possible in head and neck masses; and all serious and common possibilities should be considered.
- Thyroid function tests (TFTs) will help to differentiate the different types of thyroid disease (See Chapter 51).

Figure 47.1: *Excised left tonsil.*

Q7. What are the types of neck masses in relation to the lymph nodes?

Neck lesions can be classified using different methods. One method is based on their relationship to the lymph nodes because lymph nodes are the most common cause of a neck mass.

Extranodal

- Congenital: cystic hygroma or hemangioma
- Intrinsic: thyroid or parotid
- Paraganglioma, schwannoma, or hemangioma
- Inflammatory
- Neoplastic: metastasis or lymphoma

Q8. What are the groups of cervical lymph nodes?

The lymph nodes have been classified into six groups (Figure 47.2).

Q9. What is the proper treatment of tonsillar SCCa?

Early stages of tonsil SCCa may be treated with radiation therapy (most of tonsillar tumors are radiosensitive).

Figure 47.2: *The groups of cervical lymph nodes*

Advanced cases need surgical excision with or without neck dissection (Figures 47.3 and 47.4) and radiation with or without chemotherapy.

Figure 47.3: Neck dissection of lymph nodes.

Figure 47.4: Neck lymph nodes in one specimen that was sent for histopathology.

Q10. After post-operative radiotherapy, the patient develops dry mouth and halitosis, and swallowing becomes very difficult. Why?

Saliva is excreted from three pairs of salivary glands (parotid, submandibular and sublingual) and many minor salivary glands in the digestive tract. Saliva is needed for chewing, swallowing, tasting and talking. Dry mouth usually occurs due to damage of the salivary glands during radiation therapy. This damage is a common side effect of radiation treatment for head and neck cancers. Dry mouth (xerostomia) can be emotionally frustrating and physically painful. The saliva becomes very thick, and acids cannot be neutralized. Bacteria can also bloom in the mouth, causing other complications such as tooth decay and bad breath (halitosis).

Q11. Years later, the patient presents with a neck mass that is diagnosed as a lymphoma. What types of lymphoma can affect the head and neck?

Hodgkin's and non-Hodgkin's lymphomas.

Q12. What are the presentations of lymphoma?

Hodgkin's lymphoma: Mainly nodular dissemination; these lesions are usually located in the lower cervical or supraclavicular lymph nodes.

Non-Hodgkin's lymphoma: Nodular and extranodal; the most common extranodal site is Waldeyer's ring (tonsils, nasopharynx, base of the tongue).

CHAPTER 48

Neck Pain

Dr. Ahmed Argabi

An 8-year-old boy presents to your clinic with neck pain, dysphagia and fever for 7 days. The mother has noticed neck swelling on both sides for one day. The mother says that he has taken antibiotics for a few days without improvement. She is worried that her child may have lymphoma.

* * * * *

Q1. How do you examine the neck?

The neck, like any part of the body, has a system for examination: inspection, palpation and auscultation.

Q2. How do you do the inspection?

The patient should sit on a chair with the neck exposed down to both clavicles. The examiner should wash his/her hands, introduce himself/herself and obtain permission to proceed.

Inspect the neck for scars (which may be hidden in skin folds), asymmetry, swelling and skin discoloration. Do not forget to inspect the back of the neck.

Q3. How do you perform the palpation?

Use both hands while standing behind the patient to better feel for swelling and better control the fingers. Palpate for masses first in the anterior triangle and then in the posterior triangle. Remember to check all the way down to the clavicles and as far posteriorly as the trapezius. If you find a mass, you should assess the "10 Ss":

1. Site: Either the anterior or posterior neck in relation to the sternocleidomastoid muscle.
2. Size: In centimeters.
3. Shape: Round, oval or irregular.
4. Structure (consistency): Soft masses will tend to be fluid filled. Hard nodular masses may be a malignant tumor. Firm smooth masses may be enlarged organs or tissues.
5. Sensation (tenderness): A tender mass is more likely to be an acute inflammatory problem.
6. Surrounding (fixed, lymph node): Fixed masses are more likely to

be malignant; while benign masses are more likely to be mobile. A carotid body tumor usually moves in the horizontal plane only. Enlargement of the surrounding lymph nodes suggests either an inflammatory process or malignancy.

7. Surface: A smooth surface often suggests a benign tumor, while an irregular surface is more worrisome.
8. Skin: Involvement can be due to a skin lesion or malignant expansion.
9. Single: A single mass or multiple masses.
10. Sound: Listen for turbulence of air or blood flow.

Q4. What is the importance of the relationship of neck swellings to the trachea?

Thyroid swelling is a common cause of neck swelling, and the thyroid is attached to the trachea. Therefore, thyroid swelling is easily confirmed if the swelling moves when the trachea moves during swallowing. The trachea also moves easily in the horizontal plane. Neck cancer can limit tracheal movement.

Q5. What is the importance of the relationship of neck swellings to the hyoid bone?

The hyoid bone ascends when the tongue is protruded. It moves only slightly during swallowing. If the swelling in the neck moves as the tongue protrudes, then it must be fixed t o the hyoid bone. This finding is almost pathognomonic for a thyroglossal duct cyst.

Q6. What is the importance of superficial swellings?

Swellings or lumps that are superficial to the underlying muscle and fascia are commonly caused by the following:

Sebaceous cysts
Lipomata
Carbuncles
Neurofibromata

Q7. Give some examples of neck swellings.

– Thyroglossal cyst
– Dermoid cyst
– Pharyngeal pouch
– Laryngocele
– Carcinoma of the larynx, trachea and esophagus
– Plunging ranula (Figure 48.1)
– Thyroid swellings
– Branchial cysts
– Salivary gland swellings (Figure 48.2)
– Lymph node enlargement (look for lymphadenopathy elsewhere)
– Carotid body tumor
– Cystic hygroma

Figure 48.1: *A ranula. (Courtesy of Dr. Ameen Al-Herabi)*

Figure 48.2: A submandibular stone. (Courtesy of Dr. Ameen Al-Herabi)

Q8. Are there any landmarks that can provide orientation during a neck examination?

Yes, midline structures such as the hyoid bone, thyroid cartilage, cricoid and tracheal rings. The sternocleidomastoid muscle and carotid artery are also important landmarks.

CHAPTER 49

Drooling

Dr. Alyaa Al Mutairy

The family of a 24-year-old male patient with a diagnosis of cerebral palsy and psychomotor retardation requests a medical consultation due to a problem with drooling that requires changing the patient's bib every hour.

Physical examination of the patient confirms the presence of drooling, which is exacerbated by a dolichofacial pattern characterized by significant mandibular prognathism, maxillary hypoplasia and an anterior open bite (Figure 49.1). The lack of cooperation on the part of the patient prevents the consideration of treatments requiring active participation such as physiotherapy or behavioral control techniques.

* * * * *

Figure 49.1: *Maxillofacial deformity with anterior open bite.*

Q1. What is the pathogenesis of drooling?

Drooling saliva appears to be the consequence of a dysfunction in the coordination of the swallowing mechanism, resulting in excess pooling of saliva in the anterior portion of the oral cavity and the unintentional loss of saliva from the mouth. Drooling can produce significant negative effects on physical health and quality of life, especially in patients with chronic neurological disabilities.

Q2. What is the difference between sialorrhea and drooling?

Sialorrhea is defined as saliva production in excess of normal production, which is approximately 1,500 ml per day. Drooling may occur in the presence of either normal or excess saliva production. Typically, weak or uncoordinated oropharyngeal muscles, rather than overproduction of saliva, causes drooling.

Q3. When can excessive salivation and drooling be a normal occurrence?

Excessive salivation and drooling can be a normal occurrence in the first 6 to 18 months of life until oral-motor function has developed. It is considered abnormal if a child older than 4 years is exhibiting persistent drooling.

Q4. How is saliva produced?

There are three major pairs of salivary glands drains into the mouth: the submandibular, sublingual and parotid glands. It is estimated that 500 to 2,000 ml of saliva is produced per day. The submandibular glands produce most of the saliva in the mouth (approximately 65%), and their secretions are watery. The sublingual glands produce a small amount of saliva that is thick and mucus -like. The salivary glands are controlled by the autonomic nervous system; activation is mediated by adrenergic and cholinergic nerve endings, and they are primarily under parasympathetic control.

Q5. What are the major functions of saliva?

- Lubricates food to assist with chewing and turns food into a bolus (soft ball) for easy swallowing.
- Lubricates the tongue and lips during speech.
- Cleanses the teeth and gums and assists with oral hygiene.
- Regulates acidity in the esophagus.
- Destroys microorganisms and clears toxic substances.
- Facilitates taste.
- Initiates carbohydrate digestion.

Q6. What are the causes of drooling?

The etiology of drooling is multifactorial. It is generally caused by conditions resulting in the following:

1. Excess production of saliva due to local or systemic causes (oral inflammation, drugs).
2. The inability to retain saliva within the mouth due to poor head control, a constantly open mouth, poor lip control, disorganized tongue mobility, decreased tactile sensation, macroglossia, dental malocclusion or nasal obstruction.
3. Problems with swallowing that result in excess pooling of saliva in the anterior portion of the oral cavity (e.g., a lack of awareness of the buildup of saliva in the mouth, infrequent swallowing and inefficient swallowing).

Q7. What is the classification of drooling?

Depending on the duration of the drooling, it can be classified as follows:

1. Acute (e.g., during infections like epiglottitis and peri-tonsillar abscess)
2. Chronic (e.g., due to neurological causes)

Q8. What do you think is the cause of the drooling saliva in the above-mentioned patient?

1. Cerebral palsy
2. A dolichofacial pattern characterized by significant mandibular prognathism, maxillary hypoplasia and an anterior open bite

Q9. What are the effects of untreated drooling of saliva?

Drooling of saliva can affect patients' quality of life and/or their careers. It is important to assess the severity of the symptoms (skin maceration with secondary infection, halitosis, decreased self-esteem) and their impact on the patients' quality of life.

Q10. How is drooling managed?

Drooling of saliva is a challenging condition which is better managed with a multidisciplinary team approach. The team should include a primary care physician, speech therapist, occupational therapist, dentist orthodontist, otolaryngologist, pediatrician and neurologist. After the initial assessment, a management plan can be made for the patient. The person/caregiver should understand that the goal of treating drooling is a reduction in excessive salivary flow while maintaining a moist and healthy oral cavity. The avoidance of xerostomia (dry mouth) is important. There are four main methods of managing saliva control problems:

1. Conservative methods: These methods include observation, postural changes, biofeedback, motor therapy of the mouth and acupuncture.
2. Appliances: Chin cups and dental appliances can help achieve mandibular stability, better lip closure (Figure 49.2), tongue positioning and swallowing.

Figure 49.2: *Oral screen is used to obtain a lip seal. (Courtesy of Abdurabu Gomawi Dimensions Secrets Clinic*

3. Drug therapy: The use of oral anticholinergic drugs in the treatment of drooling has been limited. Transdermal scopolamine (1.5 mg/2.5 cm^2) offers advantages (Figure 49.3). A single application is sufficient to yield a stable serum concentration for 3 days. Glycopyrrolate studies have shown 70-90% response rates but with a high side-effect rate. Antimuscarinic drugs such as benzhexol, antireflux medications and botulinum toxin type A (BTx-A) have also been used. A dose of 30-40 units of BTx-A injected into the parotid and submandibular glands is sufficient for the symptoms to subside. The injection is usually given under ultrasound guidance to avoid damaging the underlying vasculature/nerves. The main side effects from this form of treatment are dysphagia due to diffusion into nearby bulbar

muscles, weak mastication, parotid gland infection, damage to the facial nerve/ artery (Figure 49.4) and dental caries.

4. Surgery: Surgery can be performed to remove the salivary glands (Figure 49.5). Most surgical procedures focus on the parotid and submandibular glands. Surgical options include ligation or rerouting of the salivary gland ducts or interrupting the parasympathetic nerve supply to the glands.

Figure 49.3: *Detail of the application of the scopolamine skin patch.*

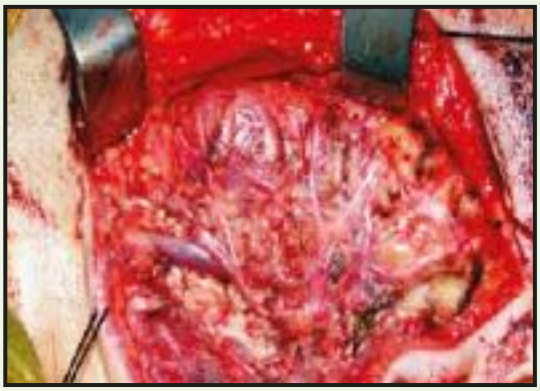

Figure 49.4: *The facial nerve divides the parotid gland into the superficial and deep lobes. (Courtesy of Dr. Ameen Al-Herabi)*

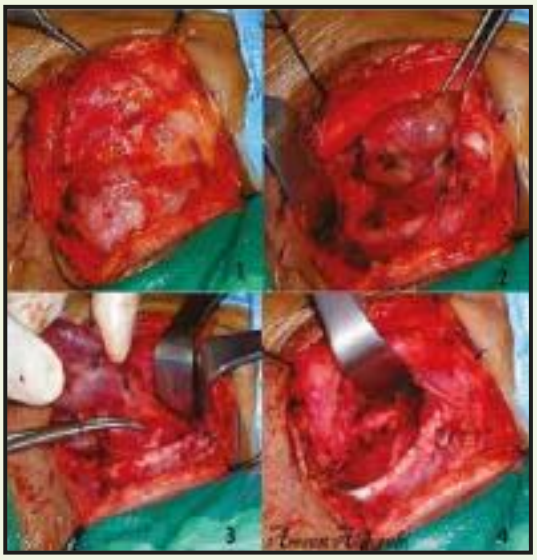

Figure 49.5: *Submandibular gland resection. (Courtesy of Dr. Ameen Al-Herabi)*

CHAPTER 50

Neck Stiffness

Dr. Basel Alsabah

A 12-year-old boy presents with complaints of sore throat and severe dysphagia of 10 days' duration. He received penicillin to treat acute tonsillitis 5 days before. Since then, his symptoms have progressed with associated fever, poor oral intake and neck stiffness. He says he does not have a history of chronic tonsillitis or recent dental work. His medical history is not significant.

Physical examination reveals hyperpyrexia of 40°C, mild respiratory distress and hot-potato voice. He is noted to have drooling of saliva and trismus. The pharynx is erythematous and diffusely swollen, narrowing the lumen of the oropharynx. The left tonsil appears to be displaced anteromedially with fullness in the posterolateral pharyngeal wall. However, the uvula is in the midline without any asymmetry of the soft palate.

Palpation of the neck reveals fullness and tenderness in the left retromandibular and upper cervical regions without fluctuance or discrete adenopathy. He has restricted neck movements, but there are no signs of meningismus. A flexible fiber-optic examination confirms the above findings and detects fullness in the left pyriform sinus. His vocal folds' mobility is normal. A blood work-up is within normal limits except for an elevated WBC count to 20,000 cells/ml.

* * * * *

Q1. Is this a case of peritonsillar abscess?

The presence of symptoms such as persistent fever, trismus and drooling of saliva with a history of tonsillitis suggest diagnosis of a peritonsillar abscess. However, the absence of deviation of the uvula and the absence of the asymmetric fullness of the soft palate are not going with the such diagnosis. Moreover, the medial displacement of the tonsil and pharyngeal wall suggests that the infection has spread deep to the tonsil.

Q2. What features suggest a parapharyngeal abscess?

Medial displacement of the posterolateral pharyngeal wall just behind the posterior tonsillar pillar and fullness in the retromandibular region with trismus and restricted neck movements.

Q3. What is the mode of spreading infection from the tonsils to the parapharyngeal space?

1. Direct penetration from the tonsillitis through the buccopharyngeal fascia
2. Retrograde thrombophlebitis

Q4. Why palpation of the neck has not revealed fluctuance?

Fluctuation was not elicited even though neck fullness is present because of the deep location of the abscess.

Q5. Briefly discuss the anatomy of the parapharyngeal space.

The parapharyngeal space is pyramidal in shape with its base at the skull base and its apex at the hyoid bone. The posterior wall is the prevertebral fascia, the medial wall is the buccopharyngeal fascia and the lateral wall is the superficial layer of deep fascia. Its contents include the internal carotid artery, internal jugular vein, sympathetic trunk, the last four cranial nerves and lymph nodes.

Q6. What causes trismus and neck stiffness in parapharyngeal abscesses?

Inflamation causes spasm of the medial pterygoid muscle and prevertebral muscles result in trismus and torticollis, respectively.

Q7. What are the possible sources of parapharyngeal space infections?

- Infections of the tonsils and adenoids, dental infections
- Ear infections, a Bezold's abscess, apical petrositis
- Spread from the parotid (Figure 50.1), retropharyngeal and submandibular spaces
- Penetrating injuries of the neck, the injection of local anesthesia for tonsillectomy or mandibular nerve block, or other external trauma
- Sialadenitis, suppurative lymphadenitis or infected congenital cysts (recurrent abscesses)

Figure 50.1: *A parotid mass can extend into the parapharyngeal space. (Courtesy of Dr. Ameen Al-Herabi)*

Q8. What are the complications of parapharyngeal abscesses?

- Acute edema of the larynx with respiratory obstruction
- Thrombophlebitis of the jugular vein with septicemia
- Retropharyngeal abscess

- Mediastinitis through the carotid space (Lincoln's highway)
- Mycotic aneurysm of the carotid artery
- Carotid blow out with massive hemorrhage
- Rupture of abscess (pneumonia/ lung abscess)

Q9. What is the imaging modality of choice?

A CT enhanced with contrast reveals the abscess cavity and delineates the uni- or multi-loculated area of attenuation with contrast enhancement of the abscess wall. Cellulitis is suspected when there is only soft-tissue swelling with obliteration of regional fat planes.

Q10. What are the indications for MRI?

- When confusion arises between cellulitis and an abscess
- To diagnose vascular complications

Q11. Discuss the management strategies for parapharyngeal space abscesses.

- The airway should be assessed, and if compromise is imminent, the air way should be secured by intubation/tracheostomy.
- Conservative treatment with systemic antibiotics alone is preferred only in the early cellulitis stage. The microbiology of parapharyngeal space infection is polymicrobial and reflective of the oropharyngeal flora. Hence, both aerobic and anaerobic coverage is important.
- Radiological evidence of an abscess indicates surgical drainage. However, if a CT/MRI scan suggests only cellulitis but the patient deteriorates despite aggressive antibiotic therapy, surgical exploration is necessary.
- An external approach is preferred over an intraoral approach to the parapharyngeal space because exposure is inadequate in the later with risk of vascular injury.
- Image-guided aspiration is indicated for small uniloculated abscesses.
- The cause of the parapharyngeal space abscess (oral/dental/congenital cysts) should be addressed either concurrently or immediately following resolution of the deep neck infection.

CHAPTER 51

My Father Is Depressed And Slow

Dr. Anwar Ali N. Jammah

A 66-year-old male presents to your clinic with a history of weight gain of 15 kg over the last 5 months that is associated with poor appetite and constipation. His son mentions that he displays significant poor memory and mental slowness. He has also noticed a depressed mood lately. His sister in Jeddah was diagnosed with a thyroid problem and was started on a daily medication, but the patient was not able to remember the name of the drug even though she told him many times.

The patient has a blood pressure of 140/100 mmHg, a temperature of 36°C and a pulse of 50 beats per minute. He is obese with a BMI of 36, has a deep voice and is slow in answering questions. He also has peripheral edema with puffy eyes and loss of the eyebrows. He has dry skin and hair (Figure 51.1). His tendon reflexes are delayed, and he had cold peripheries.

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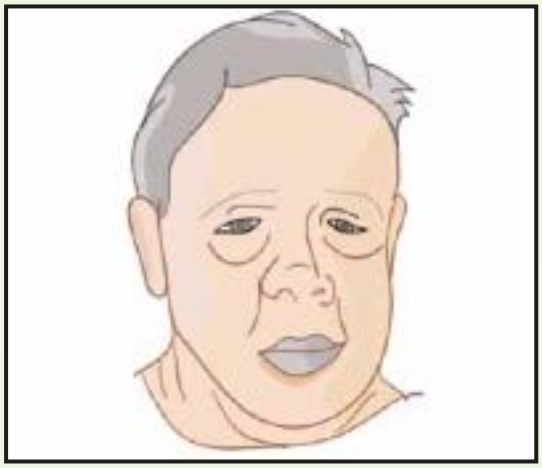

Figure 51.1: *Case 51.*

Q1. What is the most likely diagnosis?

Hypothyroidism.

Q2. What are the most common causes of this disorder?

1. Thyroiditis caused by autoimmune disorder (e.g., Hashimoto's thyroiditis)
2. Complications of thyroid surgery
3. Congenital thyroid defect
4. Treatments for hyperthyroidism (radioiodine or the effects of anti-thyroid drugs)
5. Iodine deficiency
6. Pituitary/hypothalamic disorders
1. 7. Peripheral resistance

Q3. What is the best next step to confirm the diagnosis?

Thyroid function tests including TSH (thyroid-stimulating hormone) and free T_4 levels.

Q4: His thyroid function tests yields the following results: TSH 49 mIU/mL (normal: 0.25-5.0) and FT_4 3 pmol/L (normal: 10.3-25.8). What management will you use?

Start thyroxin and titrate it up every 6 weeks until he reaches a normal TSH level.

Q5. The patient missed his follow-up appointment and came to the emergency room with chest pain. The doctor in the emergency department suspects hyperthyroidism. What symptoms may support this diagnosis?

The patient may be nervous, moody, weak or tired and may experience weight loss, trouble sleeping and palpitations. He may also feel hot and sweaty. A younger female patient might have light or absent menstrual periods.

Q6. If it is hyperthyroidism, what is the most likely cause?

This result may be due to over-medication. However, other common causes should not be overlooked, such as Graves' disease, adenoma and thyroiditis.

Q7. If the patient denies taking the medication for 2 months, what do you think is the cause?

In this case, Graves' disease should be excluded first because it is the most common cause of hyperthyroidism.

Q8. If the TSH receptor antibody (TSHR-Ab) level was undetectable and a neck ultrasound showed a solitary nodule that was hot on a thyroid scan, what would be your diagnosis?

Most likely a thyroid adenoma.

Q9. The patient undergoes a fine-needle aspiration, and the results "suggest follicular neoplasm." Is this lesion a benign or a malignant?

Follicular carcinoma has capsular and vascular invasion properties that cannot be evaluated on a cytology study.

Q10. The patient undergoes a thyroid lumpectomy (Figure 51.2), and the diagnosis of carcinoma is confirmed. Does he need any further intervention?

Yes, the patient needs a total thyroidectomy (Figure 51.3) and post-operative radioiodine ablation with follow-up thyroglobulin (Tg) testing combined with a neck ultrasound.

Figure 51.2: *Thyroid lumpectomy. (Courtesy of Dr. Ameen Al-Herabi)*

Figure 51.3: *A total thyroidectomy is needed in many thyroid diseases. (Courtesy of Dr. Ameen Al-Herabi)*

CHAPTER 52

Neck Mass

Dr. Ameen Al-Herabi

A 40-year-old female was referred to you for evaluation of a neck mass. She is in good health and is not taking any medications. Two of her sisters have had thyroid disease, but she is uncertain about the exact nature of the disease. The physical examination is significant for a 4x3-cm thyroid nodule. The lesion moves with deglutition. There is no palpable cervical adenopathy (Figure 52.1).

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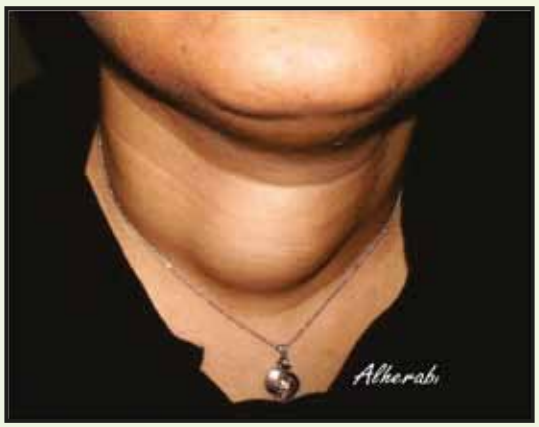

Figure 52.1: *Case 52.*

Q1. What is the aim of this patient's evaluation?

The aim in evaluating her will be to determine whether this lesion has a significant malignant potential and therefore requires surgery. Women are more likely than men to develop thyroid masses. However, even though thyroid cancer is more likely in women, a thyroid mass in a male is more worrisome because benign lesions are less common in men. The patient is 40 years old; and at this age both benign and malignant lesions have a high incidence of occurrence.

Q2. What clinical features might suggest a hypo- or hyper-functioning thyroid?

Hyperthyroidism	Hypothyroidism
Irritability	Mental slowness
Heat intolerance	Cold intolerance
Insomnia	Hypersomnolence
Sweatiness	Dry skin
Amenorrhoea	Menorrhagia
Weight loss	Weight gain
Diarrhoea	Constipation
Palpitations	Bradycardia
Hyperreflexia	Slow relaxing reflexes
Tremor	Loss of the outer third of the eyebrow
Atrial fibrillation	Hoarse voice

Q3. What are the risk factors for thyroid cancer?

Age < 20 or > 60 years old, male sex, nodule > 4 cm, a hard mass, mass fixation to adjacent tissue, rapid growth, cervical lymphadenopathy, a history of hoarseness, radiation therapy, Hashimoto's thyroiditis, Gardner's syndrome (colonic polyposis) or Cowden's disease (familial goiter, skin hamartomas).

Q4. What are the important points to check during a physical examination?

A. General:

I. Vital Signs: pulse, blood pressure

II. Tremors: fine

III. Eye signs: lid retraction, lid lag, exophthalmos, ophthalmoplegia

B. Local: The examination can be performed from the front or the back of the patient after relaxing the sternocleidomastoid muscle and fixing one hand to one side while feeling with the other hand (Figure 52.2).

I. Inspection: swallowing, tongue protrusion, skin

II. Palpation: site, shape, size, solitary or multiple, surface, consistency, tenderness, mobility and cervical lymph node examination

III. Percussion: dull for retrosternal goiter

IV. Auscultation: thrill for vascular swellings

Q5. What other important physical examination should be performed by by the otolaryngologist?

Laryngoscopy to evaluate vocal fold mobility.

Figure 52.2: *Physical examination of the thyroid.*

Q6. What is the standard evaluation of a thyroid nodule to reach a surgical decision?

A. Labs: Thyroid function tests

B. Radiological:

I. Ultrasonography

- Advantages: Help differentiate single vs. multiple, solid vs. cystic, size, guide an FNA, visualize cervical lymphadenopathy, follow up.
- Ultrasonic features associated with thyroid cancer: microcalcifications, hypoechogenicity, irregular margins, no halo, solid, intranodular vascularity and a nodule taller than it is wide.

II. Radionuclide iodine scanning: is of limited value in the preoperative evaluation and in evaluating the risk of malignancy.

III. CT scan:

- Useful in pre-operative surgical evaluation of cervical and paratracheal / mediastinal lymph node

metastasis, soft-tissue and tracheal compression or invasion, retrosternal goiter and in recurrent disease.

C. Fine needle aspiration (FNA):

- Main method of evaluating thyroid masses
- Success of FNA depends on adequate sampling and correlation with the clinical picture and the experience of the cytologist.
- Results of FNA: benign (40%), malignant (20%), suspicious, indeterminate, follicular neoplasm, non-diagnostic
- Limitations: difficult to distinguish between follicular adenoma and follicular carcinoma. This distinction relies on demonstrating capsular or vascular invasion, which is impossible based on cytological features alone.

Q7. What are the types of thyroid cancer?

There are 4 main types of thyroid cancer:

1. Papillary (80%)
2. Follicular (15%)
3. Anaplastic (3%)
4. Medullary (2%)

Q8. What are the indications for thyroid surgery?

A. Total thyroidectomy (Figure 52.3)

I. Suspected or confirmed thyroid cancer

II. Multinodular goiter with compression symptoms

Figure 52.3: *Total thyroidectomy*

III. Thyrotoxicosis unresponsive to antithyroid drugs or radioactive iodine

B. Hemithyroidectomy:

I. A follicular neoplasm on FNA.

II. Single nodule 1-4 cm, with non-diagnostic FNA and normal contralateral thyroid lobe

C. Subtotal thyroidectomy: no longer performed in this era of modern surgery.

Q9. What percentage of papillary thyroid cancer (PTC) can present with nodal cervical metastasis, and when neck dissection is indicated?

Cervical metastases are present in about 20-30% of cases. Neck dissection is indicated when a pre-operative clinical, radiological or cytological diagnosis of lymph node(s) cervical metastasis is suspected or confirmed.

Q10. What are the possible complications of thyroid surgery?

A. Hematoma: May present as respiratory compromise due to its compressive effect. It is treated by removing the sutures and opening the wound.

B. Vocal fold paralysis: Caused by intraoperative injury to the recurrent laryngeal nerve. The incidence can be reduced by positive identification of the nerve intraoperatively (Figure 52.4).
    1. Unilateral: presents with hoarseness
    2. Bilateral: presents with stridor
C. Hypocalcemia: Transient or permanent. It can be prevented by identifying the parathyroid glands and keeping them attached using a vascular pedicle or implantation if accidently removed.

Figure 52.4: Note the close relationship between the nerve and thyroid.

Q11. What standard adjuvant therapies are given to patients with thyroid cancer after surgery?

A. Radioactive iodine (RAI)
B. TSH suppression

Q12. What surveillance methods are usually applied to patients with thyroid cancer?

A. Clinical examination
B. Tumor marker: Thyroglobulin (TG)
C. Radiology: Radionuclide iodine scanning and/or ultrasound

Q13. What are the prognostic risk classifications for patients with well-differentiated thyroid cancer?

Many scoring systems exist to determine the prognosis for thyroid cancer. The two most commonly used are as follows:

1. AGES - age, grade, extent of disease, size
2. AMES - age, metastasis, extent of disease, size

CHAPTER 53

Weight Loss

Dr. Nigel Richard Pashley

A 75-year-old male smoker presents with a 4-week history of a bloody productive cough. The coughing occurs daily and produces mixed saliva/sputum. There is a 6-week history of a 3 kg weight loss. There is no pain, but the patient has an irritation or foreign body sensation in the left side of the throat. There is no frank dysphagia. Physical examination of the ears, nose and throat is normal. A mirror examination is difficult due to a brisk gagging reflex. Palpation reveals a firm 2-cm mobile lymph node on the left side of the neck at level 3. Auscultation reveals clear lung fields with a few diffuse wheezes.

* * * * *

Q1. What additional examination is required in the outpatient setting?

- Fiber-optic or rigid endoscopic examination of the nose, larynx and hypopharynx.
- Palpation of the tongue base.

All of these examinations are normal, although the pyriform fossae are not well visualized.

Q2. What is the differential diagnosis at this stage?

Although posterior epistaxis and periodontal disease remain possibilities, more advanced pathologies must be pursued, e.g., carcinoma of the pyriform fossa, lung or nasopharynx.

Q3. What tests are indicated at this stage?

CBC, chest X-ray, FNA of the swollen lymph node and CT scan of head and neck.

The CXR is clear. The CT scan shows no primary pathology but does confirm the palpable node and three other, smaller nodes. The FNA shows moderately differentiated squamous carcinoma cells.

Q4. What is the next step in identifying the primary lesion?

Panendoscopy (Figure 53.1) of the upper aerodigestive tract with biopsy of

the fossa of Rosenmuller, tongue base and left pyriform fossa.

A fungating lesion in the floor of the left pyriform fossa is found and biopsied.

Figure 53.1: *Panendoscopy and biopsy of upper airway and digestive tract.*

Q5. If there had been no lymph node or pyriform fossa lesion, what further steps would be needed?

A CT scan of the chest and follow-up at regular intervals.

Q6. From the description, this lesion is clearly a cancer of the pyriform sinus (hypopharynx) with nodal metastasis. The best treatment will be determined by the score assigned to such tumors. This score is called the _____ score.

TNM (Tumor, Node, Metastasis score).

Q7. How can the treating physician best determine whether a distant metastasis has occurred?

A positron emission tomography (PET) scan.

Q8. Can the patient communicate following laryngectomy?

Yes, the patient can use a hand-held electric larynx or a voice prosthesis inserted at the time of surgery. Alternatively, he can learn to generate esophageal speech after healing.

CHAPTER 54

I Am Crying All The Time

Dr. Talal Alandejani

A 50-year-old male comes to the clinic complaining that he has been tearing from his left eye constantly for the last 6 months. He states that the other eye is normal, and he cannot think of any aggravating factors that have led to this problem such as trauma or surgery to the eye. He wears glasses but states that his vision has not changed, and he does not have any eye pain or other eye symptoms. He states that his breathing from the nostril on the same side has decreased but is not completely blocked. He has experienced some left-sided intermittent nasal bleeding that stops spontaneously and has only occurred a few times; it has never needed medical attention.

Examination shows a mass in his left nasal cavity filling most of the nasal cavity. The mass appears to be a polyp but is white in color and looks more solid than a nasal polyp. The right nasal cavity is normal, and the examination of the nasopharynx is normal. The remainder of the ENT and head and neck exams are normal. The eye exam is normal, and the cranial nerve exam is normal.

* * * * *

Q1. What are the causes of excessive tearing (epiphora)?

Excessive tearing can be due to either of the following:

1. Overproduction of tears
2. Blockage of the tear drainage system

Q2. What is the tear drainage system?

Tears are produced by the lacrimal glands and drain out of the eye through two small openings called puncta (Figure 54.1). There is one punctum on each of the upper and lower lids. From the puncta, the tears drain into small tubes called lacrimal ducts or canaliculi and then into a small pouch called the lacrimal sac. The tears gather there and drain through the nasolacrimal duct, which opens in the inferior meatus inside the nasal cavity.

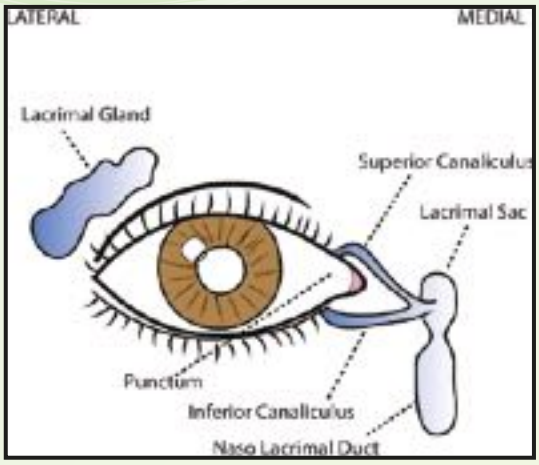

Figure 54.1: *Two puncta in each eye.*

Q3. Can the opening of the nasolacrimal duct be observed in the nasal cavity?

Yes, the opening can be observed in the inferior meatus below the inferior turbinate by using an endoscope in the clinic or in the operating room.

Q4. What are the causes of blockage of the tear drainage system?

The main causes of blockage can be divided as follows:

1) Congenital: due to underdeveloped of the nasolacrimal ducts

2) Acquired: either from diseases of the nasolacrimal duct itself or from diseases causing compression from outside the duct (e.g., nasal tumors)

Q5. What is the treatment of epiphora?

All epiphora cases should have an ophthalmology consultation to rule out ocular diseases (e.g., eye irritation or inflammation), test vision and confirm nasolacrimal duct stenosis and/or obstruction.

According to the cause, the epiphora is treated. If it is due to nasolacrimal duct stenosis, a surgery called dacryocystorhinostomy (DCR) can be performed. This surgery can be performed either by an open or by an endoscopic technique.

Q6. What are the causes of a unilateral mass in the nasal cavity?

- Congenital: e.g., encephaloceles or meningoceles
- Idiopathic or iatrogenic: e.g., mucoceles, antrochoanal polyp
- Infectious: e.g., fungal rhinosinusitis
- Inflammatory: e.g., Wegener's granulomatosis
- Neoplastic

Q7. What tumors can arise from the sinonasal cavity?

A tumor can arise from any type of tissue present in the nasal cavity or sinuses. These tissues include squamous epithelium, bone, cartilage, blood vessels, nerves, lymphatic system, and salivary glands.

Q8. What are the most common types of benign tumors?

The most common benign tumors are the following: osteoma, fibro-osseous lesions (e.g., ossifying fibroma and fibrous dysplasia), inverted papilloma, juvenile angiofibroma, hemangioma and schwannoma.

Q9. What are the most common malignant tumors of the sinonasal cavity?

The most common malignant tumors are squamous cell carcinoma, adenocarcinoma, adenoid cystic carcinoma, lymphoma, malignant melanoma, sarcoma (osteosarcoma, chondrosarcoma and rhabdomyosarcoma), hemangiopericytoma and olfactory neuroblastoma.

In addition, metastasis can also occur in the sinonasal cavity. The most common origin site is the kidneys, followed by the lungs, breasts and gastrointestinal tract.

Q10. What are the treatment options for tumors of the sinonasal cavity?

Treatment is tailored according to the type, grade and stage of the tumor.

The treatment options include surgery, radiotherapy and chemotherapy. These treatments can be performed individually (for benign tumors) or in combination (for malignant tumors).

CHAPTER 55

I Am Coughing Up Blood

Dr. Yaser Alrajhi

A 55-year-old male is worried about the presence of blood in his sputum whenever he coughs for the last 6 weeks. He sought medical attention at the start of the presentation and took antibiotics for 2 weeks for acute tonsillitis, but there was no improvement. The patient also complains of some intermittent bleeding from his nose and nasal obstruction for the prior 3 months. He also mentions that he has noticed some fullness in his neck with no pain. The patient has lost his appetite and some weight over the last few weeks. The patient has no dysphagia, no shortness of breath or hoarseness. The patient is otherwise healthy with no previous medical conditions. He is a non-smoker, has no known allergies and has no previous surgeries. His family history is unremarkable. The patient is worried and needs your opinion.

* * * * *

Q1. Do you have any concerns that this patient has a serious condition and why?

Yes, this patient has many red flags in his history that should alarm a physician. First, many cancers present between the fourth and sixth decades of life. Second, the duration of his presentation spans more than 4 weeks. Third, he has some constitutional symptoms, such as weight loss and loss of appetite. Finally, the patient has symptoms that require more clinical attention, such as painless neck swelling with nasal obstruction.

Q2. As an otolaryngologist, what types of cancers are you worried about?

Any of the tumors that arise from the aerodigestive tract mucosa can lead to this presentation, particularly if they arise from the lower part of the upper airway, such as tumors of the larynx (supraglottic, glottic and subglottic). Tumors of the oropharynx and hypopharynx can also lead to this type of presentation. Because this patient has

nasal complaints, you cannot exclude any nasal or nasopharyngeal pathologies. Oral tumors can also present with hemoptysis, but to a lesser extent.

Q3. What will be the appropriate next step?

You should start with a physical examination, and during this exam, you should perform a complete head and neck exam to look for any lesions in the nasal or oral mucosa. Upon palpation of the neck to look for any lymph nodes or masses, you should also note the level and the location of the lymph nodes according to the anatomical levels of the neck because you can predict the location of the primary lesion from the draining lymph node's group. The use of a fiber-optic scope is important to visualize the entire aerodigestive tract.

Q4. What other tests can you order to confirm your diagnosis?

A. Imaging studies such as CT scans or MRIs. A CT scan might be more useful in this specific case.

B. FNA, which is a useful test with a high specificity and sensitivity for different head and neck cancers if there are lymph nodes present.

C. Metastatic work-up such as a chest CT scan, liver CT scan or PET-CT scan.

A fiber-optic examination shows an ulcerating lesion in the nasopharynx, and CT scan shows a large mass lesion occupying mainly the right side of the nasopharynx, as shown in (Figure 55.1).

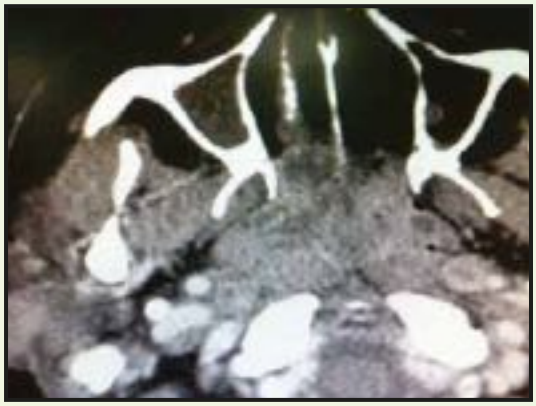

Figure 55.1: Case 55.

Q5. What is the diagnosis and what will be your next step to confirm your diagnosis?

Nasopharyngeal carcinoma (NPC), and we should perform a biopsy of the lesion to confirm the diagnosis.

Q6. What are the most common presentations of nasopharyngeal carcinoma?

- Neck mass located at the mandibular angle (70%)
- Aural fullness (41%)
- Hearing loss (37%)
- Epistaxis (30%)
- Nasal obstruction (29%)

Q7. What factors are thought to be responsible for this cancer?

A combination of genetic and environmental factors are thought to be responsible for increased susceptibility to NPC.

- NPC susceptibility genes have been linked to the human leukocyte antigen (HLA) region on chromosome 6
- Dietary factors: salt-preserved foods, dried salted fish
- Cigarette smoking (weak association)
- EBV: 80-90% of non-keratinizing SCCas have abnormally increased antibody titers to the EBV viral capsid antigen (VCA) and early antigen (EA)

Q8. What is the treatment of nasopharyngeal carcinoma?

- Radiation therapy
- Surgical treatment
- Chemotherapy
- Vaccines: future potential development of vaccines for EBV-related lesions

CHAPTER 56

White Tongue

Dr. Fahd Ali Alharbi

A 60-year-old female patient presents to the head and neck clinic with a history of a mass on the tongue that is associated with pain for approximately 2 months. The clinical examination of the patient reveals a hard, exophytic mass on the right side of the tongue with impairment of tongue movement. The mass bleeds easily when touched. Further clinical examination shows palpable cervical lymph nodes on both sides.

Staging of the tumor shows a localized tumor of the tongue with multiple bilateral neck lymphadenopathies. The remainder of the staging examination reveals no evidence of systemic metastasis. Panendoscopy with biopsy is performed to confirm the clinical diagnosis and to rule out a second primary tumor in the upper aerodigestive tract. The histopathological examination shows a moderately differentiated squamous cell carcinoma of the tongue. After completion of the necessary clinical, laboratory and radiological testing, the patient consents to surgical tumor resection and neck dissection with a reconstructive procedure. After complete wound healing, the patient receives post-operative radiation therapy.

* * * * *

Q1: What are the precancerous lesions of the tongue?

– Leukoplakia (Figure 56.1)

– Erythroplakia

Q2. What is the most common malignancy of the tongue?

Squamous cell carcinoma

Figure 56.1: *Leukoplakia of the tongue. (Courtesy of Dr. Ameen Al-Herabi)*

Q3. What are the risk factors for developing tongue cancer?

- Nicotine abuse
- Alcohol abuse
- Tobacco chewing
- Poor oral and dental hygiene
- Genetic predisposition

Q4. What are the clinical manifestations of tongue cancer?

– Pain while chewing or swallowing

– Ulcer or a sore tongue

– Mass on the tongue (Figure 56.2)

– Blood-tinged saliva

– Fetid breath odor

– Difficulty swallowing

– Impairment of tongue movement

– Unexplained and excessive weight loss

– Enlarged neck lymph nodes

Figure 56.2: *A large hard mass on the right side of the tongue.*

Q5. How is tongue cancer diagnosed?

Visual inspection can raise suspicion for a malignant neoplasm. This inspection should be followed with bimanual palpation.

The clinical examination should also include palpation of the regional cervical lymph nodes to exclude metastases.

The following imaging procedures are beneficial: ultrasound, computed tomography (CT) (Figure 56.3) and magnetic resonance imaging (MRI)

A biopsy should be taken for histopathological examination.

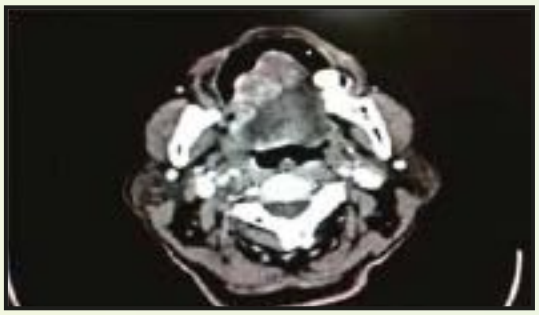

Figure 56.3: *A CT scan showing a lesion in the anterior and right lateral side of the tongue.*

Q6. How is tongue cancer staged?

There are different systems for staging. The two main systems are the TNM system and the number system.

Q7. What is the TNM system?

T: Tumor Size, N: Lymph node, M: Metastases

Tx: Unable to assess primary tumor

T0: No evidence of primary tumor

Tis: Carcinoma in situ

T1: Tumor is <2 cm in the greatest dimension

T2: Tumor >2 cm and <4 cm in the greatest dimension

T3: Tumor >4 cm in the greatest dimension

T4: Tumor invades adjacent structures

Nx: Unable to assess regional lymph nodes

N0: No evidence of regional lymph node metastasis

N1: Metastasis in a single ipsilateral lymph node, <3 cm in the greatest dimension

N2a: Metastasis in single ipsilateral lymph node, >3 cm and <6 cm

N2b: Metastasis in multiple ipsilateral lymph nodes, all nodes <6 cm

N2c: Metastasis in bilateral or contralateral lymph node, all nodes <6 cm

N3: Metastasis in a lymph node >6 cm in the greatest dimension

Mx: Unable to assess for distant metastases

M0: No distant metastases

M1: Distant metastases

Q8. What is the histopathological grading for tongue cancer?

GX - Grade of differentiation cannot be assessed

G1 - Well-differentiated

G2 - Moderately differentiated

G3 - Poorly differentiated

G4 - Undifferentiated

Q9. How is tongue cancer treated?

- The treatment of choice in most cases is surgical removal of the primary tumor.
- The resulting defect is either closed primarily or reconstructed using pedicled flaps or a microvascular free-flap transfer (e.g., a radial forearm flap).
- A unilateral or bilateral neck dissection (Figure 56.4) may be necessary depending on the location and the T category of the primary tumor.
- Radiation of the tumor site and lymph node areas is frequently indicated following surgery.
- Primary radiotherapy or combined radiochemotherapy may be considered as an alternative for T3 and T4 tumors.

Figure 56.4: *Bilateral neck dissection is required for a midline tongue cancer. (Courtesy of Dr. Ameen Al-Herabi)*

Q10. What is the prognosis for tongue cancer?

The prognosis depends on the location and stage of the disease. The five-year survival rate varies accordingly, ranging from 0% to 80%.

CHAPTER 57

Husky Voice

Dr. Mohammed Algarni

A 52-year-old female patient presents to the clinic with a history of persistent neck pain for 9 months despite many courses of antibiotics. Four months previously, she started to experience dysphagia with occasional painful swallowing and a noticeable swelling in the upper neck. She has noted progressive difficulties in swallowing solid food more than fluids. She has also noticed a change in her voice over the last six weeks. In addition, she also has recurrent right ear pain with no change in her hearing level or tinnitus. She says she does not smoke and has no co-morbidities.

On physical examination, the patient weighs only 50 kg and has no stridor or shortness of breath. There is a noticeable hard non-tender mass in the right jugulodigastric area. Her nose, ears and oral cavity are normal; and flexible laryngopharyngoscopy shows a mass involving the right pyriform sinus and immobility of the right vocal fold (Figure 57.1).

* * * * *

Figure 57.1: *A mass at the right pyriform sinus invading the larynx and obscuring the vocal folds.*

Q1. What would be the next step to reach the diagnosis?

Radiologic testing is the appropriate next step to reach the diagnosis. A CT scan of the neck with contrast (Figure 57.2) is preferable because it will delineate the mass and help to determine the extent of the lesion. It also helps to define any involvement of the larynx and the extent of neck lymph node

involvement. An MRI may add some information, especially in cases of tumors of the laryngopharynx. However, MRIs have limitations due to artifacts during swallowing.

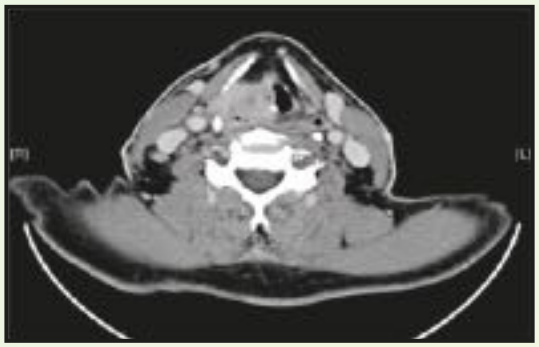

Figure 57.2: *A mass at the right pyriform sinus invading the thyroid cartilage and extending through the paraglottic space.*

Q2. What would be the most likely diagnosis?

Squamous cell carcinoma of the hypopharynx is the most likely diagnosis based on the history and physical examination. However, other types of tumors, including lymphoma, minor salivary gland tumors and sarcoma or chronic granulomatous infection, should be considered in the differential diagnosis.

Q3. How would you confirm the diagnosis?

Biopsy of the mass for histopathologic examination.

Q4. What are the most common tumors of the hypopharynx?

At least 95% of hypopharyngeal tumors are squamous cell carcinoma; less than 60% are keratinizing, and 33% are non-keratinizing.

Q5. What are the risk factors for hypopharyngeal carcinoma?

- Smoking
- Alcohol consumption
- Plummer-Vinson syndrome
- Human papilloma virus (less common in the hypopharynx compared with the oropharynx)
- Genetic predisposition
- Asbestosis
- Gastroesophageal reflux disease

Q6. Define the hypopharynx.

The hypopharynx (laryngopharynx) is the third and lowest part of the pharynx. It lies behind and surrounds the larynx on each side (Figure 57.3). It opens at the upper esophagus, and it is a critical dividing point in separating solids and fluids from the air entering the region. It has three components:

1. Pyriform sinuses: two, one in each side of the larynx
2. Post-cricoid area: behind the larynx and immediately above the upper esophageal sphincter
3. Posterior pharyngeal wall

Figure 57.3: *Hypopharynx is the third and lowest part of the pharynx.*

Q7. The above-mentioned patient has right ear pain. What is the explanation for this phenomenon?

This pain is referred otalgia, and it is mediated through the vagus nerve, which supplies both the laryngopharynx and part of the external auditory canal and the pinna.

Q8. What are the most common presentations of hypopharyngeal tumors?

- Odynophagia
- Progressive dysphagia (first with solids then with liquids)
- Neck mass
- Referred otalgia

Q9. What are the phases of swallowing, and which phase is the most important?

The phases of swallowing are as follows:

1. Oral preparatory phase
2. Pharyngeal phase
3. Esophageal phase

The pharyngeal phase is considered critical in the swallowing process because it has many steps that control the passage of the food to the right tract. These steps include

A. Preparation of the pharynx to receive the bolus

B. Closure of the nasopharynx to prevent regurgitation of food up to the nose

C. Closure of the larynx to protect the lungs

D. Elevation of the laryngopharyngeal complex to direct the food to the esophagus

Q10. Mention the causes of dysphagia.

There are two main categories of causes of dysphagia:

1. Neurologic causes

– CVA
– MS
– Laryngeal paralysis
– Parkinson's disease
– Achalasia

2. Mechanical causes

A. *Intrinsic*

– Esophagitis
– Stricture
– Benign tumors (e.g., leiomyoma)
– Malignant tumors (e.g., squamous cell carcinoma)

B. Extrinsic

– Compression by a benign or malignant lymph node
– Compression by a vascular malformation (in childhood)
– Compression or invasion by tumors from neighboring structures (e.g., anaplastic carcinoma of thyroid)

Q11. What are the steps for evaluating a patient with dysphagia?

The work-up steps include the following:

1. Detailed history
2. Physical examination including flexible fiber-optic examination of the laryngopharynx (Figure 57.4)
3. Functional evaluation of swallowing with sensory testing (FEES)
4. Barium swallow (Figure 57.5) or modified barium swallow
5. Radiological testing including neck and chest CT scans (Figure 57.6)
6. Flexible or rigid esophagoscopy and biopsy of the lesion

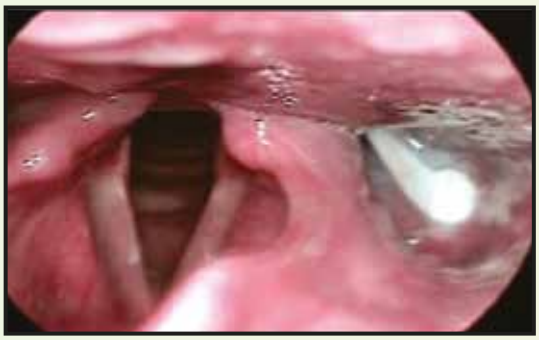

Figure 57.4: *A fiber-optic examination of the larynx showing a chicken bone that is causing dysphagia. (Courtesy of Dr. Tamer Mesallam)*

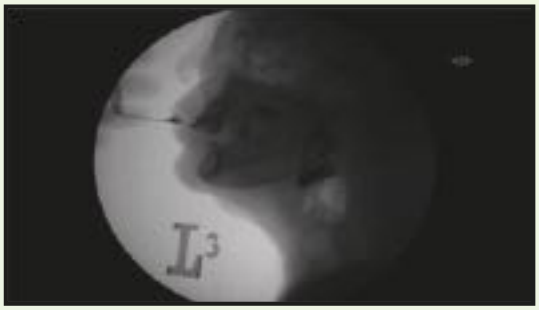

Figure 57.5: *A barium swallow showing vallecular residue.*

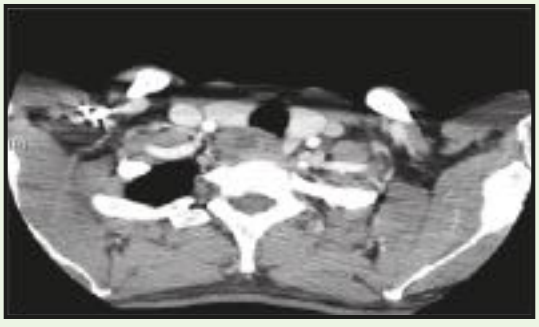

Figure 57.6: *Squamous cell carcinoma of the upper esophagus.*

Q12. If the above-mentioned patient has a biopsy and the diagnosis is squamous cell carcinoma, what are the steps for management?

The steps for managing this patient include the following:

1. Determine the nutritional status of the patient. If the patient is malnourished or underweight, nutritional supplementation should be started.
2. Dehydration and electrolyte imbalances should be corrected immediately.
3. Determine the disease staging and the resectability of the tumor by radiological testing and direct visualization of the tumor through endoscopic examination.
4. If the tumor is small and resectable and there is no lymph node involvement, then surgery or radiotherapy alone is the mainstay of treatment.
5. If the tumor is large or there is lymph node involvement as in this case, curative chemoradiotherapy is the treatment of choice.
6. Distant metastasis is considered a contraindication for curative treatment. Palliative treatment should be considered in the form of securing the airway and insuring feeding by a gastrostomy tube. Pain control should be provided with or without palliative chemotherapy and/or radiotherapy depending on the patient's performance status.

Q13. What are the laryngopharyngeal manifestations of gastroesophageal reflux disease (GERD)?

- Heart burn
- Odynophagia
- Dysphagia
- Hoarseness
- Frequent throat clearing
- Foreign body sensation
- Globus

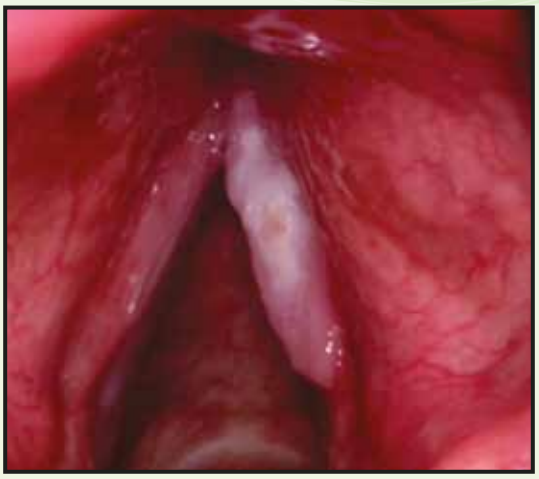

Figure 57.7: *Squamous cell leukoplakia of the vocal folds. (Courtesy of Dr. Khalid H. Al-Malki*

Q14. GERD may predispose patients to many laryngopharyngeal diseases. Give examples of those diseases.

- Laryngitis
- Pachydermia laryngitis
- Contact ulcer
- Granuloma
- Leukoplakia (Figure 57.7)
- Carcinoma in situ or invasive carcinoma

Q15. How would you manage GERD?

The first line of therapy Includes the following:

- Weight reduction
- Head elevation at bedtime
- Avoidance of food and drugs that precipitate reflux
- Antacids
- H2 blockers

If these simple measure do not work, second-line therapy should be considered:

- PPIs
- Referral to an endoscopist if there is no improvement, if alarm symptoms such as weight loss or anemia develop, if GERD symptoms have developed after the age of 50 years old or if there is severe abdominal pain or dysphagia.
- Fundoplication surgery for significant hiatal hernias can be considered in certain cases.