

NEET SS 2024 Diploma Otorhinolaryngology ENT Question Paper 3 with Solutions

Time Allowed :3 Hours	Maximum Marks :100	Total Questions :10
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 3 hours duration.
2. The question paper consists of 10 questions. The maximum marks are 100.
3. Each Question is of 10 marks.

Q1. (a) Enumerate the materials used for medialisation of vocal cords by injection technique.

Solution:

Medialisation of the vocal cords is a surgical procedure used to treat vocal cord paralysis, aiming to restore normal voice and breathing. Various materials are used for this procedure, which are injected into the paralyzed vocal cord to help it move towards the midline. The commonly used materials include:

1. Autologous Fat:
 - Fat harvested from the patient's own body, usually from the abdominal or thigh area.
2. Hyaluronic Acid (Restylane):
 - A biocompatible gel-like substance that is injected into the vocal cord.
3. Calcium Hydroxylapatite (Radiesse):
 - A gel that contains calcium microspheres, which stimulate the formation of new tissue.
4. Teflon:
 - A synthetic material used to improve the vocal cord position by providing a permanent bulk.
5. Collagen:
 - Derived from animal or human tissue, collagen can be injected into the vocal cords to enhance their bulk.
6. Silicone:
 - A material that is injected to fill the space and support the vocal cord's position.
7. Acrylic:
 - Acrylic-based injectable materials are used to medialize the vocal cords and provide long-lasting results.

Quick Tip

Autologous fat and hyaluronic acid are popular choices for vocal cord medialisation due to their effectiveness and biocompatibility.

Q1. (b) Briefly discuss the advantages and disadvantages of these materials.

Solution:

The materials used for medialisation of vocal cords by injection each have distinct advantages and disadvantages, depending on the desired outcomes and patient characteristics.

1. Autologous Fat:

- Advantages:
- Biocompatibility: Since it's taken from the patient's own body, there is no risk of allergic reaction or rejection.
- Natural feel: It provides a more natural texture to the vocal cords.
- Disadvantages:
- Volume loss: Fat tends to absorb over time, which may require re-injection.
- Limited longevity: Fat injections may not provide a permanent solution, and the effect may diminish after a few months.

2. Hyaluronic Acid:

- Advantages:
- Biocompatible: Hyaluronic acid is well-tolerated and has a low risk of causing adverse reactions.
- Immediate effect: Results are seen immediately after the procedure.
- Disadvantages:
- Temporary: Hyaluronic acid is gradually absorbed by the body, so the effect may only last for several months to a year.
- Cost: It can be relatively expensive compared to other materials.

3. Calcium Hydroxylapatite (Radiesse):

- Advantages:
- Long-lasting: The material is known for providing long-lasting results (up to a year or more).
- Natural tissue formation: Stimulates collagen production, improving the overall quality of the vocal cords.
- Disadvantages:
- Risk of granuloma formation: In some cases, granulomas may form at the injection site.
- Technique-sensitive: Requires precise injection techniques to avoid complications.

4. Teflon:

- Advantages:
- Permanent results: Teflon provides long-lasting vocal cord medialisation.
- Disadvantages:

- Risk of migration: Teflon can migrate from the injection site, potentially causing complications.
- Scar tissue formation: In some cases, Teflon can cause scarring and tissue damage.

5. Collagen:

- Advantages:
 - Biocompatibility: Collagen is well-tolerated and reduces the risk of allergic reactions.
 - Readily available: It is easy to inject and can provide immediate results.
- Disadvantages:
 - Temporary: Collagen is absorbed by the body over time, requiring repeat injections.
 - Possible allergic reactions: Some patients may have allergic reactions, although this is rare with human-derived collagen.

6. Silicone:

- Advantages:
 - Long-lasting: Silicone provides a permanent solution for vocal cord medialisation.
 - Stable volume: It does not degrade over time, ensuring consistent results.
- Disadvantages:
 - Foreign body reaction: Silicone can cause a foreign body reaction in some patients, leading to complications.
 - Migration: There is a risk of silicone moving from its original position, causing undesired effects.

7. Acrylic:

- Advantages:
 - Durable: Acrylic provides long-term results and is resistant to absorption.
 - Easily moldable: Acrylic can be shaped to provide the desired vocal cord positioning.
- Disadvantages:
 - Hard texture: It may not provide the natural feel that some patients desire.
 - Potential for migration: Similar to other materials, acrylic can migrate, leading to the need for additional procedures.

Quick Tip

Materials like autologous fat and hyaluronic acid are often preferred due to their biocompatibility, while materials like Teflon and silicone provide more permanent results.

Q2. (a) Classify subglottic stenosis.

Solution:

Subglottic stenosis refers to the narrowing of the subglottic region of the airway, located just below the vocal cords. The classification of subglottic stenosis is based on etiology and severity:

1. Classification by Etiology:

- Congenital Subglottic Stenosis: Present from birth and typically caused by incomplete development of the cricoid cartilage.
- Acquired Subglottic Stenosis: Caused by factors such as trauma (e.g., intubation), infection (e.g., croup), or inflammation.

2. Classification by Severity (Grading):

- Grade I: Mild stenosis, with the narrowing of the subglottic area less than 50% of the airway.
- Grade II: Moderate stenosis, with the narrowing between 51-70% of the airway.
- Grade III: Severe stenosis, with narrowing between 71-99% of the airway.
- Grade IV: Complete obstruction of the subglottic airway, leading to near-total airway blockage.

Quick Tip

Subglottic stenosis can be classified by its etiology (congenital or acquired) and severity (Grade I to Grade IV).

Q2. (b) Briefly discuss the evaluation protocol and surgical management of a case of congenital subglottic stenosis.

Solution:

Evaluation Protocol of Congenital Subglottic Stenosis:

1. Clinical History:

- A detailed history is taken, including prenatal history (e.g., maternal illnesses or medication use), birth history (e.g., premature birth), and any history of breathing difficulty in the newborn period.
- Symptoms of stridor, noisy breathing, and recurrent respiratory infections are common in infants with congenital subglottic stenosis.

2. Physical Examination:

- Stridor: A characteristic high-pitched sound heard during inhalation, indicating upper airway obstruction.
- Signs of respiratory distress: Tachypnea, use of accessory muscles, and retractions during breathing.
- Cyanosis may be seen in severe cases of airway obstruction.

3. Imaging:

- Flexible Laryngoscopy: A key diagnostic tool to directly visualize the airway, assess the degree of stenosis, and determine if there are other abnormalities in the vocal cords or trachea.
- Rigid Bronchoscopy: Used to evaluate the stenosis more thoroughly, particularly if surgical intervention is planned. This can help measure the degree of airway narrowing and determine whether other parts of the airway are involved.
- CT Scan: May be used in more severe cases to assess the extent of the stenosis and any

associated airway anomalies.

4. Pulmonary Function Tests (PFTs):

- In older children, PFTs may be used to assess the functional impact of the stenosis, particularly in terms of airflow and ventilation.

Surgical Management of Congenital Subglottic Stenosis:

1. Endoscopic Procedures:

- Dilation: For mild stenosis, dilation with balloon catheters or other endoscopic tools can help widen the subglottic area and improve airflow.

- Laser Resection: In cases of localized subglottic stenosis, laser surgery can be used to excise scar tissue and reduce stenosis, allowing for better airway patency.

2. Tracheotomy:

- In severe cases of congenital subglottic stenosis, particularly in infants with complete or near-complete airway obstruction (Grade III or IV), a tracheotomy may be required to maintain an open airway and support breathing.

3. Open Surgical Procedures:

- Cricoid Split or Laryngotracheal Reconstruction: For more extensive stenosis, especially when the stenosis involves the cricoid cartilage, surgical procedures like cricoid split or laryngotracheal reconstruction (LTR) may be necessary. These surgeries involve making an incision in the cricoid ring to expand the airway and restore normal airflow.

- Postoperative Care: Close monitoring in the ICU for respiratory support, pain management, and prevention of infections is crucial after surgery.

4. Follow-Up and Long-Term Management:

- Regular follow-up is necessary to monitor for recurrence of stenosis and assess the child's airway function as they grow.

- In some cases, further dilations or surgical interventions may be needed as the child grows, particularly in cases with recurrent stenosis.

Quick Tip

Surgical management, including dilation and reconstructive surgery, is tailored based on the severity of congenital subglottic stenosis and the child's overall health.

Q3. (a) What is selective neck dissection?

Solution:

Selective neck dissection is a surgical procedure used to remove lymph nodes and surrounding tissue from specific levels of the neck while preserving important structures such as the nerves, blood vessels, and muscles. It is typically performed for the treatment of head and neck cancers,

particularly in cases where there is suspected or confirmed metastasis to the lymph nodes.

- Unlike radical neck dissection, which involves the removal of all lymph nodes and adjacent structures, selective neck dissection aims to remove only the nodes at specific levels based on the location of the cancer.
- The goal of selective neck dissection is to achieve adequate treatment of cancer while minimizing morbidity by preserving as much healthy tissue as possible.

Quick Tip

Selective neck dissection is preferred in many head and neck cancers to balance effective treatment and preservation of function.

Q3. (b) Briefly discuss its different types and indications for each type.

Solution:

Selective neck dissection involves the removal of lymph nodes from specific levels of the neck, depending on the type of cancer and its spread. The different types of selective neck dissection are:

1. Type I – Supraomohyoid Neck Dissection:

- Description: This dissection removes lymph nodes from levels I, II, and III (along the jawline and upper neck), including the submental, submandibular, and upper jugular nodes.
- Indications: Typically performed for cancers of the oral cavity, oropharynx, and hypopharynx with limited lymph node involvement.
- Advantages: Preserves the important structures such as the spinal accessory nerve, the sternocleidomastoid muscle, and the internal jugular vein.

2. Type II – Lateral Neck Dissection:

- Description: Involves the removal of lymph nodes from levels II, III, and IV (mid to lower jugular levels).
- Indications: Indicated for cancers of the oropharynx, larynx, and hypopharynx, where lymph nodes from these areas are suspected to have metastasized.

3. Type III – Modified Radical Neck Dissection:

- Description: Involves removal of lymph nodes from levels I-V (entire neck), but crucial structures like the spinal accessory nerve, sternocleidomastoid muscle, and internal jugular vein are preserved.
- Indications: Used when more extensive disease is suspected, such as for cancers of the oropharynx, larynx, and thyroid, with extensive lymph node involvement. It is often used when the cancer has spread beyond the expected levels of lymph node metastasis.

4. Type IV – Comprehensive Neck Dissection:

- Description: This is a more extensive surgery where lymph nodes from all levels of the neck

(I-V) are removed, including the pre-auricular, retroauricular, and submandibular areas. This is considered a more aggressive approach than other selective neck dissections.

- Indications: Often performed when the cancer is extensive or in cases of recurrent disease, or when the spread of the cancer to more distant nodes is suspected.

Quick Tip

The choice of neck dissection type depends on the location and extent of cancer spread, with the goal of removing as much lymphatic tissue as needed while preserving function.

Q4. (a) Genetic testing in medullary thyroid cancer.

Solution:

Genetic testing in medullary thyroid cancer (MTC) is important for identifying hereditary forms of the disease and for guiding treatment and management. The key aspects of genetic testing in MTC include:

1. RET Proto-Oncogene Mutation Testing:

- The majority of sporadic MTC cases are not inherited, but familial MTC is often caused by mutations in the RET (Rearranged during Transfection) proto-oncogene.
- RET mutation testing is recommended for all patients with MTC to determine if they have a hereditary form, specifically Multiple Endocrine Neoplasia type 2 (MEN 2).

2. MEN 2 Subtypes:

- MEN 2A: Associated with MTC, pheochromocytoma, and parathyroid adenomas.
- MEN 2B: A more aggressive form that includes MTC, pheochromocytoma, and marfanoid habitus.

3. Significance of Genetic Testing:

- Positive results for RET mutations help identify at-risk family members who can undergo prophylactic thyroidectomy to prevent the development of MTC.
- Genetic testing is crucial for early detection and surgical intervention, especially in children of affected individuals, to prevent the onset of MTC.

Quick Tip

Genetic testing for RET mutations in medullary thyroid cancer is crucial to identify familial cases and guide early intervention.

Q4. (b) Surgical steps involved in total thyroidectomy and its complications.

Solution:

Surgical Steps in Total Thyroidectomy:

1. Preparation and Anesthesia:

- The patient is placed under general anesthesia. The surgical area is sterilized, and a sterile drape is applied.

2. Incision:

- A horizontal collar incision is made in the lower neck, just above the clavicles. This incision is typically about 4-6 cm in length, depending on the size of the thyroid gland.

3. Dissection:

- The platysma muscle is divided, and the sternocleidomastoid muscle is retracted laterally. The strap muscles of the neck (sternohyoid and sternothyroid) are divided in the midline to expose the thyroid gland.

4. Identification of Critical Structures:

- The recurrent laryngeal nerve (RLN) is carefully identified and preserved. This is a critical structure, as injury can lead to vocal cord paralysis.
- The parathyroid glands are identified and preserved. Care must be taken not to remove or damage the parathyroid glands, as this can lead to hypocalcemia.

5. Removal of the Thyroid Gland:

- The thyroid gland is carefully dissected away from the surrounding structures, including the trachea and esophagus. The gland is removed in total, ensuring complete excision.
- If necessary, central neck dissection is performed to remove involved lymph nodes.

6. Hemostasis:

- The surgical site is checked for bleeding, and hemostasis is achieved using electrocautery or hemostatic agents.

7. Closure:

- The strap muscles are sutured back in place, and the platysma is re-approximated. The skin is closed using absorbable sutures or staples.

Complications of Total Thyroidectomy:

1. Recurrent Laryngeal Nerve Injury:

- Injury to the recurrent laryngeal nerve can result in vocal cord paralysis, leading to hoarseness, airway obstruction, and difficulty swallowing. It is one of the most serious complications.

2. Hypoparathyroidism:

- Removal or damage to the parathyroid glands can lead to hypocalcemia, resulting in tetany and muscle spasms due to low calcium levels in the blood.

3. Bleeding:

- Bleeding from thyroid vessels or the carotid artery can occur, leading to hematoma formation and airway compromise. Careful hemostasis is essential during surgery.

4. Infection:

- Although rare, infection at the surgical site can lead to abscess formation and delayed healing. Proper wound care and prophylactic antibiotics are typically used to prevent infection.

5. Seroma Formation:

- Fluid accumulation in the surgical site can lead to a seroma, which may require drainage.

6. Thyroid Storm:

- A rare but life-threatening complication, thyroid storm can occur due to the release of thyroid hormones during surgery. It can lead to hyperthermia, tachycardia, and arrhythmias.

Quick Tip

Careful identification and preservation of the recurrent laryngeal nerve and parathyroid glands are crucial to prevent serious complications in total thyroidectomy.

Q5. (a) Presentation and management of foreign body right bronchus in a 3-year-old child.

Solution:

Presentation of Foreign Body in the Right Bronchus: Foreign body aspiration in children is a common emergency, and the right bronchus is more commonly affected due to its more vertical and wide structure compared to the left. In a 3-year-old child, the presentation typically includes:

1. History:

- Sudden onset of coughing, choking, or gagging during or after eating or playing with small objects is common.
- Stridor and wheezing may develop, especially if the foreign body is lodged in the bronchus.
- A history of aspiration or playing with small objects like nuts, coins, or toys is essential for diagnosis.

2. Clinical Features:

- Unilateral wheezing: The child may present with persistent wheezing on one side of the chest due to airway obstruction.
- Cough: Persistent or paroxysmal cough that doesn't resolve with typical treatment for respiratory infections.
- Dyspnea: Difficulty breathing, increased respiratory rate, and signs of respiratory distress.
- Tachypnea: Increased breathing rate in the absence of other causes.
- Cyanosis: In severe cases, there may be signs of hypoxia, such as bluish discoloration of lips and extremities.

3. Investigations:

- Chest X-ray: This is the first-line imaging study to look for radiopaque foreign bodies. How-

ever, in some cases, the foreign body may be radiolucent (e.g., plastic, food), and a lateral view or CT scan may be needed for better visualization.

- Bronchoscopy: The gold standard for diagnosis and treatment. It allows direct visualization and removal of the foreign body.

Management of Foreign Body in the Right Bronchus:

1. Initial Management:

- Airway management: Ensuring the child's airway is clear is the priority. In cases of respiratory distress or hypoxia, oxygen should be administered immediately.
- Positioning: If the child is conscious, back blows and chest thrusts can be performed to dislodge the foreign body.

2. Bronchoscopy:

- Rigid bronchoscopy under general anesthesia is the most effective method for removing the foreign body from the bronchus. Rigid bronchoscopy is preferred in children due to better control of the airway and removal of foreign bodies.
- Flexible bronchoscopy may be used in some cases to visualize and remove smaller objects, but it is less effective in managing large or hard foreign bodies.

3. Post-procedural Care:

- After the foreign body is removed, the child is monitored for any complications such as airway swelling, infection, or pneumothorax.
- Antibiotics may be given if there is a concern for infection, especially if the foreign body has been lodged for a prolonged period.
- Follow-up chest X-rays are done to ensure there is no residual foreign body or complications.

Quick Tip

Foreign body aspiration in children often presents with sudden onset of wheezing or coughing. Early recognition and prompt bronchoscopy are crucial for successful management.

Q5. (b) Write briefly about anaesthesia techniques for such patients.

Solution:

Anesthesia for children undergoing bronchoscopy to remove a foreign body must be carefully managed to ensure airway safety, adequate muscle relaxation, and minimal complications. The key anesthesia techniques for such patients include:

1. Preoperative Assessment:

- A thorough history and physical examination should be performed to assess the child's overall health and airway status.
- Preoperative fasting: Ensure the child has been appropriately fasted before the procedure to

reduce the risk of aspiration during anesthesia.

2. Anesthesia Induction:

- Intravenous (IV) induction with agents like propofol or thiopental is commonly used for a smooth induction of anesthesia in children.
- Mask induction: In some cases, especially in younger children, inhalational induction with sevoflurane or desflurane can be used to ease the process.
- Endotracheal Intubation: General anesthesia is maintained with a cuffed or uncuffed endotracheal tube (ETT), which helps secure the airway during the procedure.

3. Maintenance of Anesthesia:

- Balanced anesthesia: Maintenance is achieved with a combination of inhalational agents (sevoflurane, desflurane) and intravenous agents like remifentanyl for analgesia and rocuronium or vecuronium for muscle relaxation.
- Ventilation: Positive pressure ventilation is maintained throughout the procedure, ensuring adequate oxygenation and ventilation.

4. Airway Management:

- Rigid bronchoscopy requires secure airway management to avoid inadvertent displacement of the tube or airway obstruction. The anesthesiologist ensures that ventilation is stable and that the airway remains protected during the procedure.
- Monitoring: Continuous monitoring of oxygen saturation, end-tidal CO₂, and heart rate is essential during the procedure.

5. Postoperative Care:

- Extubation: After the foreign body is removed, the child is carefully extubated once fully awake and able to maintain their own airway.
- Recovery: The child is monitored in a recovery room for any respiratory distress or complications such as laryngospasm or bleeding.

Quick Tip

Careful airway management and adequate anesthesia are crucial during bronchoscopy to prevent complications such as airway obstruction, hypoxia, or aspiration.

Q6. (a) Discuss the anatomy of the parapharyngeal space of the neck.

Solution:

The parapharyngeal space is a deep fascial compartment in the neck, located adjacent to the pharynx and lateral to the airway structures. It is important in understanding infections, tumors, and surgical interventions in the neck. The key anatomical details are:

1. Boundaries:

- Medial boundary: The pharynx, including the lateral wall of the oropharynx and the tonsils.

- Lateral boundary: The medial pterygoid muscle and the ramus of the mandible.
- Anterior boundary: The pretracheal fascia, separating the parapharyngeal space from the anterior neck structures.
- Posterior boundary: The carotid sheath, containing the common carotid artery, internal jugular vein, and vagus nerve.
- Superior boundary: The base of the skull, including the petrous part of the temporal bone.
- Inferior boundary: The hyoid bone and the laryngopharynx.

2. Contents:

- The parapharyngeal space contains fat, lymph nodes, and important neurovascular structures:
- Glossopharyngeal nerve (CN IX)
- Vagus nerve (CN X)
- Sympathetic nerves
- Internal carotid artery and its branches
- Internal jugular vein

3. Clinical Relevance:

- The parapharyngeal space is important in the spread of infections, such as peritonsillar abscesses or deep neck infections.
- Tumors in the parapharyngeal space, such as pleomorphic adenomas, can also cause lateral neck swelling or discomfort.

Quick Tip

The parapharyngeal space is a critical area for understanding the spread of infections and tumors in the neck due to its proximity to important neurovascular structures.

Q6. (b) Describe the diagnosis and management of a parapharyngeal space abscess in a 60-year-old diabetic patient.

Solution:

Diagnosis of Parapharyngeal Space Abscess:

1. Clinical History:

- Fever, painful swallowing (odynophagia), and neck pain are common symptoms of a parapharyngeal space abscess.
- Difficulty breathing or a change in voice (due to compression of the airway) may also occur, particularly in the supine position.
- In diabetic patients, these symptoms may be more severe and prolonged due to impaired immune function.

2. Physical Examination:

- Fever and tachycardia are common signs of systemic infection.
- Neck swelling or tenderness over the lateral neck may be observed.
- Trismus (difficulty opening the mouth) can be a sign of a deep neck space infection affecting

the muscles of mastication.

- Dysphagia and dyspnea may be present depending on the size and location of the abscess.

3. Imaging:

- Contrast-enhanced CT scan or MRI of the neck is essential for confirming the diagnosis. These imaging studies help delineate the extent of the abscess and identify other structures involved.
- The parapharyngeal space will show a well-defined collection of fluid, with possible air-fluid levels if the infection is extensive.

4. Laboratory Tests:

- Complete blood count (CBC): Leukocytosis (elevated white blood cell count) is typical.
- Blood cultures: Should be taken to identify the causative organism, especially in diabetic patients who are more susceptible to infections.
- Culture of abscess material: If drainage is performed, cultures of the purulent material are critical for identifying the pathogen and selecting appropriate antibiotics.

Management of Parapharyngeal Space Abscess:

1. Initial Supportive Care:

- Hydration, antipyretics, and analgesics are provided for symptom relief.
- Oxygen supplementation and monitoring may be necessary if respiratory compromise is present.

2. Antibiotic Therapy:

- Broad-spectrum intravenous antibiotics (e.g., ampicillin-sulbactam or piperacillin-tazobactam) are initiated to cover common pathogens such as *Streptococcus* species, *Staphylococcus aureus*, and anaerobes.
- Once the culture results are available, antibiotics can be adjusted according to the specific pathogen.

3. Surgical Drainage:

- Drainage of the abscess is essential for resolving the infection. This is typically performed under general anesthesia with either needle aspiration or incision and drainage (I&D) via an external approach or through the oral cavity, depending on the location and size of the abscess.
- If the abscess is large or located deep, image-guided aspiration may be performed.

4. Management of Diabetic Patients:

- Close monitoring of blood glucose levels is crucial in diabetic patients, as infection can cause blood sugar to rise, complicating the management.
- Insulin adjustments may be required to control hyperglycemia.

5. Post-Procedure Care:

- After drainage, the patient should be closely monitored for signs of complications such as airway obstruction, bleeding, or spread of the infection.
- If there are any signs of recurrent or persistent infection, further imaging and surgical interventions may be required.

Quick Tip

Early drainage and appropriate antibiotic therapy are key to managing parapharyngeal space abscesses, especially in diabetic patients who are at higher risk for complications.

Q7. (a) Classify different types of free flaps used in head and neck reconstruction.

Solution:

Free flaps are commonly used in head and neck reconstruction to repair defects resulting from trauma, tumor resection, or congenital anomalies. The classification of free flaps is based on the type of tissue being transferred and the blood supply used. The main types of free flaps used in head and neck reconstruction include:

1. Skin Flaps:

- Radial Forearm Free Flap: A versatile flap that provides skin and subcutaneous tissue for reconstruction. It is harvested from the forearm, using the radial artery as the vascular supply.
- Anterolateral Thigh Flap: A large skin flap with reliable blood supply, used for reconstructing large defects in the head and neck area.

2. Muscle Flaps:

- Latissimus Dorsi Free Flap: A muscle flap that provides both muscle and skin. It is used for large defects requiring bulk tissue reconstruction, such as in the oropharyngeal area.
- Serratus Anterior Free Flap: A muscle flap used for reconstructing defects in the oropharyngeal and cervical regions.

3. Fasciocutaneous Flaps:

- Forehead Flap: A fasciocutaneous flap that is commonly used for nasal reconstruction, particularly in patients who need large soft tissue coverage.
- Temporalis Muscle Fasciocutaneous Flap: A useful flap for the reconstruction of smaller defects in the cheek or jaw region.

4. Composite Flaps:

- Radial Forearm Free Flap with Bone: A composite flap that includes skin, subcutaneous tissue, and bone, often used for oral cavity or maxillary reconstruction.
- Fibula Free Flap: This flap involves transferring a portion of the fibula along with its skin and muscle components to reconstruct both soft tissue and bony defects.

5. Osteocutaneous Flaps:

- Fibula Osteocutaneous Flap: A reliable flap used to reconstruct both soft tissue and bone defects, commonly used in jaw reconstruction.
- Scapular Free Flap: This flap includes skin and bone from the scapula and is used for reconstructing defects in the mandible or midface.

Quick Tip

Free flaps are chosen based on the tissue type required (skin, muscle, bone), the defect location, and the available blood vessels for the flap.

Q7. (b) Discuss in brief about radial artery forearm flap and its clinical indications.

Solution:

The radial artery forearm flap is a commonly used free flap in head and neck reconstruction. It is particularly beneficial for small to medium-sized defects, especially in the oral cavity, oropharynx, and neck.

Radial Artery Forearm Flap:

1. Anatomy:

- The flap is based on the radial artery, which provides the blood supply to the skin and subcutaneous tissues of the forearm.
- It includes skin, subcutaneous tissue, and optionally, fascia or tendon depending on the requirements of the defect.

2. Harvesting:

- The flap is harvested from the radial side of the forearm, ensuring that the radial artery is well preserved for vascular anastomosis.
- The flap can be harvested in a longitudinal or transverse orientation, depending on the defect's size and shape.

3. Advantages:

- Thin and pliable: The forearm flap is thin and pliable, making it ideal for reconstructing areas that require a flexible, well-vascularized tissue cover.
- Easy to harvest: It is relatively easy to harvest with a single incision and minimal morbidity at the donor site.
- Good blood supply: The radial artery provides a reliable and robust blood supply, ensuring that the flap remains viable.
- Aesthetic donor site: The donor site is generally well-hidden on the forearm, and a skin graft can be used to close the site.

Clinical Indications:

1. Oral Cavity Defects:

- Used to reconstruct defects in the oral cavity, such as after resection of oral cancers.

2. Oropharyngeal Reconstruction:

- Effective for reconstructing defects in the oropharynx, especially after the removal of tumors or after radiation damage.

3. Neck Defects:

- The radial forearm flap is also used for reconstructing defects in the neck following tumor excision, especially in patients with smaller, superficial defects.

4. Facial Reconstruction:

- Used in facial reconstruction for covering small to moderate skin defects, including areas around the mouth or cheeks.

5. Mandible Reconstruction:

- In some cases, the radial artery forearm flap is combined with bone (osteocutaneous) to help reconstruct mandibular defects, particularly those requiring a small amount of bone along with soft tissue.

Quick Tip

The radial artery forearm flap is particularly useful for small to medium-sized head and neck defects due to its pliability and reliable vascular supply.

Q8. Discuss surgical anatomy of pterygopalatine fossa and draw a suitable labelled diagram.

Solution:

The pterygopalatine fossa (PPF) is a key structure in the head and neck, particularly for surgical approaches in otolaryngology and maxillofacial surgery. It is a small, pyramidal-shaped space located in the infratemporal region of the skull, with important neurovascular structures passing through it.

Boundaries of the Pterygopalatine Fossa:

1. Medial Boundary:

- The palatine bone forms the medial boundary of the fossa. Specifically, the vertical plate of the palatine bone separates the fossa from the nasal cavity.

2. Lateral Boundary:

- The lateral wall of the PPF is formed by the infratemporal fossa. The fossa opens into the infratemporal fossa through the pterygomaxillary fissure.

3. Anterior Boundary:

- The maxilla forms the anterior boundary of the fossa. It is the area where the infraorbital nerve exits the fossa through the infraorbital foramen.

4. Posterior Boundary:

- The pterygoid process of the sphenoid bone forms the posterior boundary. The fossa communicates with the middle cranial fossa through the foramen rotundum, which transmits the

maxillary nerve (V2).

5. Superior Boundary:

- The superior boundary is formed by the sphenoid bone (specifically, the greater wing of the sphenoid), which separates the fossa from the middle cranial fossa.

6. Inferior Boundary:

- The palatine bone also forms the inferior boundary of the fossa, and it is continuous with the hard palate.

Contents of the Pterygopalatine Fossa:

1. Maxillary Nerve (V2):

- The maxillary nerve passes through the foramen rotundum to enter the PPF, providing sensory innervation to the cheek, upper lip, maxillary teeth, palate, and nasal cavity. The nerve also gives off branches to the infraorbital nerve and zygomatic nerve.

2. Pterygopalatine Ganglion:

- The pterygopalatine ganglion, a parasympathetic ganglion, is located within the PPF. It is involved in innervating the lacrimal gland, nasal and palatal mucosa, and certain blood vessels.

3. Arteries:

- The maxillary artery gives off several branches in the PPF, including the sphenopalatine artery, which supplies the nasal cavity, and the descending palatine artery, which supplies the hard and soft palate.

4. Veins:

- The veins in the PPF drain into the pterygoid venous plexus, which communicates with the cavernous sinus and the inferior ophthalmic vein.

5. Other Nerves:

- Greater petrosal nerve: Carries parasympathetic fibers to the lacrimal gland.

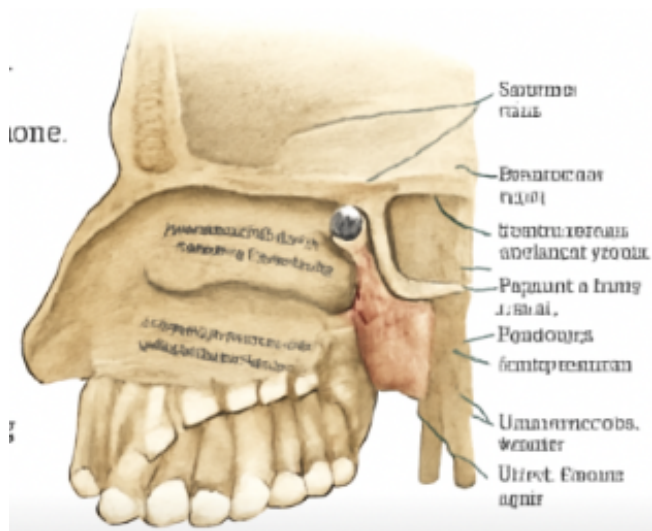
- Deep petrosal nerve: Contains sympathetic fibers and joins the greater petrosal nerve to form the vidian nerve, which enters the PPF and provides sympathetic innervation.

Clinical Relevance:

- The PPF is important in surgeries involving the maxilla, nasal cavity, and orbits. Surgical approaches to these areas often involve access to the PPF through the pterygomaxillary fissure or infraorbital foramen.

- The pterygopalatine ganglion, located within the fossa, is a target for nerve block procedures used to treat conditions such as trigeminal neuralgia and cluster headaches.

- Trauma to the PPF or its contents can lead to serious complications, including facial nerve paralysis, loss of sensation, or vascular damage.



Quick Tip

The pterygopalatine fossa serves as an important conduit for sensory nerves, vascular structures, and autonomic fibers, making it a key area for various surgical approaches and interventions.

Q9. (a) Metastatic neck disease with unknown primary.

Solution:

Metastatic neck disease with unknown primary refers to the presence of lymph node metastases in the neck without an identifiable primary tumor site after a comprehensive workup. This condition is also known as cervical lymphadenopathy of unknown origin (CUP syndrome).

Evaluation and Diagnosis:

1. Clinical History and Physical Examination:

- A detailed history and thorough physical examination are essential, focusing on symptoms such as unexplained weight loss, voice changes, dysphagia, or cough.
- A complete head and neck examination should be performed to detect any subtle signs of a primary tumor.

2. Imaging:

- Contrast-enhanced CT/MRI of the neck: Used to assess the extent of the neck nodes and rule out the primary tumor in the head and neck region.
- PET-CT scan: This is helpful in detecting metabolically active regions that could represent the primary tumor, as well as assessing distant metastases.

3. Endoscopic Evaluation:

- Panendoscopy (direct laryngoscopy, esophagoscopy, bronchoscopy) is performed to visualize the oropharynx, larynx, nasopharynx, and other potential sites for a hidden primary tumor.

4. Biopsy:

- Fine Needle Aspiration (FNA): The most common method for obtaining tissue from lymph nodes to confirm metastatic cancer.
- Core needle biopsy or excisional biopsy may be necessary in certain cases, especially if FNA is inconclusive.

5. Molecular and Immunohistochemical Testing:

- Immunohistochemistry (IHC): Used to identify the type of cancer based on the staining of tumor markers.
- Next-generation sequencing (NGS) and HPV testing: These can help identify rare cancers or HPV-related oropharyngeal cancers that might not be apparent on initial examination.

Management:

1. Treatment:

- If no primary is identified after a thorough workup, treatment is usually based on the histopathological features of the metastatic tumor.
- Radiation therapy (RT): Used for definitive management of the neck disease, often combined with chemotherapy if the primary site is suspected to be from an undetected head and neck cancer.
- Surgical treatment: If the tumor is accessible and has a well-defined location, neck dissection may be performed to remove affected lymph nodes.

2. Prognosis:

- The prognosis depends on the site of metastasis, the histology of the tumor, and whether a primary site can be identified.
- In some cases, targeted therapy or immunotherapy may be used if specific molecular markers are found.

Quick Tip

Metastatic neck disease with an unknown primary requires a multidisciplinary approach, including imaging, endoscopy, and molecular analysis to determine the optimal treatment plan.

Q9. (b) Applications of trans-oral robotic surgery (TORS).

Solution:

Trans-oral robotic surgery (TORS) is a minimally invasive surgical technique that uses robotic systems, like the da Vinci Surgical System, to perform surgeries through the mouth (oral cavity) without external incisions. It is particularly beneficial in the treatment of head and neck cancers, offering several advantages over traditional surgery.

Applications of TORS:

1. Oropharyngeal Cancer:

- TORS is primarily used in the treatment of cancers located in the oropharynx, including the tonsils, base of tongue, and soft palate.
- It allows for precise tumor resection with minimal damage to surrounding tissues, helping preserve speech and swallowing function.

2. Laryngeal Cancer:

- TORS can be used in early-stage laryngeal cancers, especially for vocal cord lesions, where it helps to preserve the vocal cords and improve functional outcomes.
- It is also beneficial in salvage surgery after radiation failure in the laryngeal area.

3. Base of Tongue and Tonsil Tumors:

- TORS is effective for resecting tumors in the base of the tongue and palatine tonsils, especially for patients with HPV-related oropharyngeal cancers.
- It allows for clearance of the tumor while minimizing morbidity associated with more traditional open surgery.

4. Minimally Invasive Neck Dissection:

- TORS is utilized in neck dissection procedures for the removal of lymph nodes in the neck. The procedure is minimally invasive, leading to quicker recovery and reduced hospital stay.

5. Salvage Surgery:

- TORS is used in salvage surgeries for recurrent or residual head and neck cancers after radiation therapy, particularly in the oropharynx and larynx.
- It is beneficial for removing small recurrences while preserving the function of the oral cavity and pharynx.

6. Sleep Apnea Surgery:

- TORS has applications in surgical treatment of obstructive sleep apnea, especially in resecting the soft tissue of the palate or base of the tongue that contributes to airway obstruction during sleep.

7. Robotic-Assisted Resection of Benign Lesions:

- TORS can be used to remove benign lesions in the mouth and throat, such as fibromas, hemangiomas, or papillomas, with precision and minimal morbidity.

Benefits of TORS:

- Precision: Robotic systems provide high-definition visualization and precision in surgery, allowing for better outcomes.
- Minimally Invasive: The trans-oral approach avoids external incisions, reducing the risk of complications and improving recovery time.
- Reduced Blood Loss: The robotic system's precision minimizes tissue damage, leading to less bleeding during surgery.
- Faster Recovery: Patients typically have a shorter hospital stay and quicker return to normal activities compared to traditional open surgery.

Quick Tip

TORS allows for more precise resection of tumors, reducing postoperative complications and improving recovery times, making it ideal for head and neck cancer treatment.

Q10. (a) Management of primary hyperparathyroidism.

Solution:

Primary hyperparathyroidism (PHPT) is a condition characterized by an overproduction of parathyroid hormone (PTH), usually caused by a benign parathyroid adenoma, hyperplasia, or, rarely, parathyroid carcinoma. The management of PHPT depends on the severity of the disease, symptoms, and laboratory findings.

Management of Primary Hyperparathyroidism:

1. Surgical Management (Parathyroidectomy):

- Surgery is the definitive treatment for symptomatic PHPT or in cases with high calcium levels (serum calcium \geq 1.0 mg/dL above normal) and reduced bone mineral density.
- Neck exploration: This involves the surgical removal of the parathyroid gland(s) responsible for excess hormone production. In most cases, a single adenoma is removed, but in some instances, multiple glands may need to be removed in the case of hyperplasia.
- Minimally invasive parathyroidectomy: This is performed when the localization of the abnormal parathyroid gland(s) is determined using imaging techniques (e.g., sestamibi scan or ultrasonography).

2. Medical Management:

- Observation: Asymptomatic patients with mild hypercalcemia and no significant evidence of complications (e.g., osteoporosis, kidney stones) may be monitored with regular calcium and PTH levels.
- Bisphosphonates (e.g., zoledronic acid) or denosumab: Used to treat osteoporosis or bone loss in patients with PHPT.
- Cinacalcet: A calcimimetic agent used in patients who are not candidates for surgery, it works by increasing the sensitivity of the parathyroid glands to calcium, thus lowering PTH levels.

3. Management of Hypercalcemia:

- Hydration: IV saline hydration is the first step in treating acute hypercalcemia.
- Loop diuretics: After proper hydration, furosemide may be used to promote calcium excretion in the urine.
- Calcitonin and bisphosphonates can be used as adjuncts in severe cases to rapidly lower calcium levels.

4. Long-term Follow-up:

- Patients who undergo surgery require regular monitoring of calcium and PTH levels post-operatively.

- Bone mineral density testing is also important to monitor for osteoporosis and the effects of hypercalcemia on bone health.

Quick Tip

Parathyroidectomy is the most effective treatment for symptomatic primary hyperparathyroidism. Medical management may be considered in asymptomatic or inoperable cases.

Q10. (b) Management of chyle leak after neck dissection.

Solution:

Chyle leak after neck dissection is a rare but potentially serious complication, typically caused by inadvertent injury to the thoracic duct or cervical lymphatic vessels during dissection. The management of chyle leak depends on the severity of the leak and the patient's condition.

Management of Chyle Leak:

1. Initial Assessment:

- Clinical signs: Patients with a chyle leak typically present with a persistent, milky drainage from the surgical drain after neck dissection.
- Laboratory Tests: Chyle fluid analysis shows high triglyceride levels (typically > 110 mg/dL), which is a distinguishing feature from serous fluid. A lipoprotein electrophoresis can be performed to confirm the presence of chylomicrons.

2. Conservative Management:

- Dietary Modifications: Initially, a low-fat diet is recommended, as this decreases chyle production. The patient may be given a medium-chain triglyceride (MCT) diet or parenteral nutrition if dietary changes alone are insufficient.
- Octreotide: This somatostatin analogue can be used to decrease chyle production by reducing lymphatic flow.
- Drainage: Close monitoring of the surgical drains for chyle output is essential. Drain suction may be used in some cases to facilitate the collection of chyle and reduce pressure on the lymphatic vessels.

3. Surgical Management:

- If conservative management fails (e.g., if the chyle leak persists for more than 7-10 days or if there is a large volume of chyle leakage), surgical intervention is required.
- Surgical repair involves ligating the injured lymphatic vessel or thoracic duct. In some cases, lymphaticovenous anastomosis may be performed to divert the chyle flow into the venous system.

4. Postoperative Care:

- Nutritional support: The patient may require total parenteral nutrition (TPN) if the chyle

leak is persistent and cannot be managed by oral intake.

- Follow-up: Regular follow-up with ultrasonography or CT lymphangiography may be used to monitor for recurrence of the leak.

5. Prognosis:

- Most cases of chyle leak resolve with conservative management, but if the leak persists, surgical repair is usually successful.

Quick Tip

Early recognition and dietary modifications (low-fat diet or MCT) are key to managing chyle leak. Surgical repair is considered if conservative measures fail.
