LESSON № 3 Inflammatory diseases of maxillofacial and neck tissue

The problem of maxillofacial and neck tissue inflammatory diseases constantly draws attention of otolaryngologists and maxillofacial surgeons in association with steady frequency of pathology, the increased number of serious clinical courses of infection sometimes with atypical clinical manifestations, and also due to a prolonged course of the disease[4]. The phlegmons of the face and neck are considered to be the most severe. They are caused by complex anatomical and topographical features of the given area, fast spread of the inflammatory process in the cellular spaces with the development of mediastinitis and generalization of the infection [5, 6, 8]. Despite a modern antibiotic therapy, there still exist cases in which an initial delay in diagnosis and treatment may result in a life-threatening situation.

Ludwig's angina

Ludwig's angina, otherwise known as angina ludovici, is a serious, potentially life-threatening infection of the tissues of the floor of the mouth, usually occurring in adults with concomitant dental infections. It is named after the German physician, Wilhelm Frederick von Ludwig who first described this condition in 1836. Other names include "angina Maligna" and "Morbus Strangularis."

Ludwig's angina should not be confused with angina pectoris, which is also otherwise commonly known as "angina". The word "angina" comes from the Greek word ankhon, meaning "strangling", so in this case, Ludwig's angina refers to the feeling of strangling, not the feeling of chest pain, though there may be chest pain in Ludwig's angina if the infection spreads into the retrosternal space.

Causes: The cause is usually a bacterial infection, most often Actinomyces israelii and other actinomyces spp, although other bacteria can also cause this (occurring mainly in the submandibular space which is followed by infection entering into the submaxillary space and further). Since the advent of antibiotics, Ludwig's angina has become a rare disease.

The route of infection in most cases is from infected lower third molars or from pericoronitis, which is an infection of the gums surrounding the partially erupted lower third molars. Although the wide-spread involvement seen in Ludwig's is usually seen to develop in persons with a state of lowered immunity, it can develop in otherwise healthy individuals also. Thus, it is very important to obtain dental consultation for lower third molars at the first sign of any pain, bleeding from the gums, sensitivity to heat/cold or swelling at the angle of the jaw. Post-procedural infection of tongue frenulum (mouth floor) piercing can lead to the life-threatening Ludwig's angina.

Symptoms: The symptoms include swelling, pain and raising of the tongue, swelling of the neck and the tissues of the submandibular and sublingual spaces, malaise, fever, dysphagia (difficulty swallowing) and, in severe cases, stridor or difficulty breathing. Swelling of the submandibular and/or sublingual spaces are distinctive in that they are hard and classically 'boardlike'. Important signs include the patient not being able to swallow his/her own saliva and the presence of audible stridor as these strongly suggest that airway compromise is imminent.

Treatment: Treatment involves appropriate antibiotic medications, monitoring and protection of the airway in severe cases, and, where appropriate, urgent maxillo-facial surgery and/or dental consultation to incise and drain the collections. A nasotracheal tube is sometimes warranted for ventilation if the tissues of the mouth make insertion of an oral airway difficult or impossible. In cases where the patency of the airway is compromised, skilled airway management is mandatory. This entails management of the airway according to the American Society of Anesthesiologists' "Difficult Airway Algorithm" and necessitates fiberoptic intubation.

Lymphadenitis

Lymphadenitis is the inflammation of a lymph node. It is often a complication of a bacterial infection of a wound, although it can also be caused by viruses or other disease agents. Lymphadenitis may be either generalized, involving a number of lymph nodes; or limited to a few nodes in the area of a localized...
infection. Lymphadenitis is sometimes accompanied by lymphangitis, which is the inflammation of the lymphatic vessels that connect the lymph nodes.

Lymphadenitis is marked by swollen lymph nodes that are painful, in most cases, when the doctor touches them. If the lymphadenitis is related to an infected wound, the skin over the nodes may be red and warm to the touch. If the lymphatic vessels are also infected, there will be red streaks extending from the wound in the direction of the lymph nodes. In most cases, the infectious organisms are hemolytic Streptococci or Staphylococci. Hemolytic means that the bacteria produce a toxin that destroys red blood cells.

The extensive network of lymphatic vessels throughout the body and their relation to the lymph nodes helps to explain why bacterial infection of the nodes can spread rapidly to or from other parts of the body. Lymphadenitis in children often occurs in the neck area because these lymph nodes are close to the ears and throat, which are frequent locations of bacterial infections in children.

**Causes and symptoms**

Streptococcal and staphylococcal bacteria are the most common causes of lymphadenitis, although viruses, protozoa, rickettsiae, fungi, and the tuberculosis bacillus can also infect the lymph nodes. Diseases or disorders that involve lymph nodes in specific areas of the body include rabbit fever (tularemia), cat-scratch disease, lymphogranuloma venereum, chancroid, genital herpes, infected acne, dental abscesses, and bubonic plague. In children, tonsillitis or bacterial sore throats are the most common causes of lymphadenitis in the neck area. Diseases that involve lymph nodes throughout the body include mononucleosis, cytomegalovirus infection, toxoplasmosis, and brucellosis.

The early symptoms of lymphadenitis are swelling of the nodes caused by a buildup of tissue fluid and an increased number of white blood cells resulting from the body's response to the infection. Further developments include fever, often as high as 101-102°F (38-39°C) together with chills, loss of appetite, heavy perspiration, a rapid pulse, and general weakness.

**Diagnosis**

**Physical examination**

The diagnosis of lymphadenitis is usually based on a combination of the patient's history, the external symptoms, and laboratory cultures. The doctor will press (palpate) the affected lymph nodes to see if they are sore or tender. Swollen nodes without soreness are often caused by cat-scratch disease. In children, the doctor will need to rule out mumps, tumors in the neck region, and congenital cysts that resemble swollen lymph nodes.

Although lymphadenitis is usually diagnosed in lymph nodes in the neck, arms, or legs, it can also occur in lymph nodes in the chest or abdomen. If the patient has acutely swollen lymph nodes in the groin, the doctor will need to rule out a hernia in the groin that has failed to reduce (incarcerated inguinal hernia). Hernias occur in 1% of the general population; 85% of patients with hernias are male.

**Laboratory tests**

The most significant tests are a white blood cell count (WBC) and a blood culture to identify the organism. A high proportion of immature white blood cells indicates a bacterial infection. Blood cultures may be positive, most often for a species of staphylococcus or streptococcus. In some cases, the doctor may order a biopsy of the lymph node.

**Treatment**

The medications given for lymphadenitis vary according to the bacterium or virus that is causing it. If the patient also has lymphangitis, he or she will be treated with antibiotics, usually penicillin G (Pfizerpen, Pentids), nafcillin (Nafcil, Unipen), or cephalosporins. Erythromycin (Eryc, E-Mycin, Erythrocin) is given to patients who are allergic to penicillin.
Supportive care of lymphadenitis includes resting the affected limb and treating the area with hot moist compresses.

Cellulitis associated with lymphadenitis should not be treated surgically because of the risk of spreading the infection. Pus is drained only if there is an abscess and usually after the patient has been started on antibiotic treatment. In some cases, a biopsy of an inflamed lymph node is necessary if no diagnosis has been made and no response to treatment has occurred.

The prognosis for recovery is good if the patient is treated promptly with antibiotics. In most cases, the infection can be brought under control in three or four days. Patients with untreated lymphadenitis may develop blood poisoning (septicemia), which is sometimes fatal.

Prevention of lymphadenitis depends on prompt treatment of bacterial and viral infections.

**Dental abscess**

An inflamed, pus filled lump in the bone or soft tissues of the jaw. The abscess may be caused by tooth decay or by an injury to the tooth. The condition is often painful and if untreated, the infection can spread to other parts of the mouth or even the body.

**Symptoms**

The list of signs and symptoms mentioned in various sources for Dental abscess includes the 14 symptoms listed below:

- Fever
- Swollen gums
- Red gums
- Swollen cheek
- Red cheek
- Lump in gum
- Warm lump in gum
- Tooth pain
- Mouth pain
- Loose tooth
- Difficulty closing mouth fully
- Facial swelling
- Swollen neck
- Chest swelling

**Pericoronitis** (Infection Near Wisdom Tooth)

Your wisdom teeth (third molars) usually start to erupt (enter your mouth) during late adolescence. Sometimes, there's not enough room for them, and they come in partially or not at all. This condition can lead to pericoronitis, inflammation of the tissue surrounding the tooth. When only part of the tooth has erupted into the mouth, it can create a flap of gum tissue that easily holds food particles and debris and is a hotbed for bacteria. Pericoronitis also can occur around a wisdom tooth that has not erupted at all and is still under the gums.

Symptoms include:
- Painful, swollen gum tissue in the area of the affected tooth, which can make it difficult to bite down comfortably without catching the swollen tissue between your teeth
- A bad smell or taste in the mouth
- Discharge of pus from the gum near the tooth

More serious symptoms include:

- Swollen lymph nodes under your chin (the submandibular nodes)
- Muscle spasms in the jaw
- Swelling on the affected side of the face

**Diagnosis**
Pericoronitis is diagnosed during a clinical exam. Your dentist will see inflamed gum tissue in the area of the unerupted or partly erupted wisdom tooth. The gums may be red, swollen or draining fluid or pus. Pericoronitis can be managed with antibiotics and warm salt water rinses, and the condition should go away in approximately one week. However, if the partially erupted tooth fails to completely enter the mouth and food debris and bacteria continue to accumulate under the flap of gums, pericoronitis will more than likely return.

**Prevention**
You can help to prevent pericoronitis by practicing good oral hygiene on any erupting wisdom tooth to make sure that food particles and bacteria do not accumulate under the gums. However, if these steps do not work and pericoronitis returns, it may be necessary to have the overlying flap of gum tissue removed. In some cases, the wisdom tooth may need to be extracted.

**Treatment**
Pericoronitis can be tricky to treat because the flap of gum tissue won't go away until the wisdom tooth emerges naturally or until the tissue is removed. Your dentist will clean the area thoroughly to remove damaged tissue or pus. If the area is infected, you'll be given oral antibiotics. Your dentist will give you instructions for keeping the area clean, which is the best way to prevent the problem from returning. This usually involves brushing and flossing daily and rinsing your mouth with water several times a day. This will help prevent food particles from accumulating in the area. In some cases, your dentist may suggest you have your tooth extracted once pericoronitis is under control. If your dentist thinks the tooth may erupt fully into the mouth without problems, he or she may leave it alone. However, if pericoronitis recurs, the tooth may be extracted. Pericoronitis that causes symptoms should be treated as soon as possible. If it is not, the infection can spread to other areas of your mouth. The most severe cases are treated in a hospital and may require intravenous antibiotics and surgery. If you are experiencing symptoms of pericoronitis, make an appointment to see your dentist. If your wisdom teeth are coming in, visit your dentist at least twice a year for regular checkups. During those visits, he or she can check on the progress of your wisdom teeth.

**Prognosis**
Pericoronitis does not cause any long-term effects. If the affected tooth is removed or erupts fully into the mouth, the condition cannot return. For advanced cases requiring hospitalization, antibiotics usually will treat the infection, after which the tooth can be removed.

**Arthritis**

With osteoarthritis, aching jaw pain increases with activity (talking, eating) and subsides with rest. Other features are crepitus heard and felt over the TMJ, enlarged joints with a restricted range of motion, and stiffness on awakening that improves with a few minutes of activity. Redness and warmth are usually absent.

Rheumatoid arthritis causes symmetrical pain in all joints, including the jaw. The joints display limited range of motion and are tender, warm, swollen, and stiff after inactivity, especially in the morning. Myalgia is common. Systemic signs and symptoms include fatigue, weight loss, malaise, anorexia, lymphadenopathy, and mild fever. Painless, movable rheumatoid nodules may appear on the elbows,
knees, and knuckles. Progressive disease causes deformities, crepituation with joint rotation, muscle weakness and atrophy around the involved joint, and multiple systemic complications.

**Osteomyelitis**
Osteomyelitis of the jaw- an inflammation of the bone (medullary space) and the muscles around it. More commonly affects the mandible.

**Etiology**: polymicrobial (Gram-negative rods, anaerobic streptococci, *Actinomyces israelii*)

**Manifestations** Restricted jaw motion, pseudoparalysis; Soft tissue around the inflamed bone, which is hyperemic, warm, edematous, and tender. Actinomycosis may also present with a localized swelling at the angle of the mandible.

**Diagnosis** Radiographs can take up to 3 weeks to be positive and yield a “moth eaten” appearance. CT scans are more sensitive. MRI can detect early changes. Bone scans with gallium to detect early disease. Tissue samples and culture may help in identifying the causative agents. In the case of actinomycosis needle aspiration of the abscess can be helpful. Look for the presence of sulfur granules in the aspirate following by Gram stains to show Gram-positive branching filamentous bacteria.

**Prevention** - encourage good dental hygiene, regular visits to the dentist, and prompt treatment of oral/dental infections.

**Suppurative parotitis**
With suppurative parotitis, bacterial infection of the parotid gland by *Staphylococcus aureus* produces abrupt onset of jaw pain, high fever, and chills. Other findings include erythema and edema of the overlying skin; a tender, swollen gland; and pus at the second top molar (Stensen’s ducts). Infection may lead to disorientation; shock and death are common.