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Update in the Approach to Peritonsillar Abscess

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Abstract: *Peritonsillar abscess is the most common infection in the deep spaces of the neck and it represents an important cause of consultations in the emergency room and specialized consultations of Otorhinolaryngology. It's a disease that can occur in any age group but has a higher incidence in young adults. It usually occurs secondary to a complication of suppurative tonsillitis, but currently there is not enough evidence to show the relationship between the two. The anamnesis and an exhaustive and detailed physical examination by the treating physician are fundamental for the diagnosis and adequate treatment and therefore, avoidcomplications such as the extension of the abscess to other deep spaces and hemorrhage due to erosion and necrosis of the carotid sheath; conditions that can be life threatening.*

Key Words*: peritonsillar abscess, infection, drainage, streptococcus, antibiotic*

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I. Introduction

Peritonsillar abscess is the most frequent infection of the deep neck spaces[1]. It's a disease that occurs mainly in young people and it has been described that the peak of incidence occurs on average at 13.6 years[2].

It's a suppurative infection, mostly unilateral, which is located anatomically above the superior pole of the amygdala, just between the amygdala and its capsule and the constrictor muscles of the pharynx[5].

This accumulation of purulent material has been closely related to the previous existence of suppurative acute tonsillitis and it eventually evolves to cellulitis of the tonsil, culminating the infectious process with the formation of the abscess itself[1].

The tonsils are located in the Waldeyer's ring and are made up largely of lymphoid tissue. Being located in the oropharynx, they have a greater exposure to pathogens or microorganisms, which could explain the presence of this infectious disease[3]. Most of them are polymicrobial infections with evidence of the presence of different streptococcus and fusobacterium species as the most frequent agents[2].

The objective of this article is to carry out a literature review on the approach of peritonsillar abscess in order to be able to identify those patients who have a suspicious symptoms in order to make a quick diagnosis and timely treatment, and thus prevent possible complications that may affect morbidity for the patient.

II. Methodology

For the preparation of this review, multiple searches of articles not older than five years were performed in the UpToDate, Elsevier and PubMed databases. The Human Anatomy book, volume one, Head and Neck by Rouvière was also used. A total of 15 bibliographic articles between the years 2015-2019 were reviewed; the vast majority of their original language is English and two correspond to the Spanish language. Countries included: Japan, Turkey, United States of America, Taiwan, South Korea, Mexico, France, Chile, Cuba and Denmark. These articles cover anatomy, etiology, epidemiology, clinic, differential diagnoses, complications, diagnostic tools and treatment in patients with peritonsillar abscess.

III. Epidemiology

In the United States of America (USA) there is an incidence of 30 cases per 100,000 inhabitants[1]. Another study from 2009 pointed to a population under 20 years of age and identified an incidence of 9.4 per 100,000 people[2]. In Chile, the extreme south of the American continent, an incidence of 9-41 cases per 100,000 people annually has been described; and like the U.S. there is a peak incidence in adolescents and young adults[6].

The incidence of a bilateral peritonsillar abscess is rare. In the reported cases, the mean age of presentation was found to be 23 years old and with a 1:1 ratio between female and male. In 5.5% of the cases that required surgical management, a contralateral or bilateral abscess was identified[15].

IV. Anatomy

The palatine tonsils are located on the lateral wall of the oropharynx, just between the palatoglossal arch and the palatopharyngeal arch. They derive embryologically from what is called a double embryological outline, consisting of the endoderm and mesoderm. They are fully formed at birth and gradually increase in size until approximately 7 years of age, at this point they reach their maximum volume. Subsequent to this, they remain stable and during puberty they undergo a transformative process more or less until they are 20 years old. Generally speaking, by this time the size remains minimal[1].

They are lined up by stratified squamous epithelium. They are characterized by having deep invaginations that increase the surface area, which can also be called tonsillar crypts. Beneath the epithelium they are composed of abundant nodular lymphoid tissue located in the ring[3]. Anulus lymphoideus pharyngis is commonly known as the Waldeyer's ring. It is made up of four main structures: the pharyngeal tonsils (adenoids), tubal tonsils, palatine tonsils and lingual tonsils; they also have abundant diffuse lymphoid tissue. It involves a set of structures that perform significant immunological functions, since they face multiple microorganisms that enter through the oral cavity[16].

The palatine tonsils receive blood supply through the ascending palatine artery, ascending pharyngeal artery, and major and minor palatal arteries, which are branches of the internal maxillary artery. It also has input from the palatine artery, which is a branch of the lingual artery. Its venous return is given by the lingual vein and the pharyngeal vein, which flow into the internal jugular vein. Its innervation is given by the glossopharyngeal nerve (ninth cranial nerve) and the lesser palatine nerve[16].

V. Etiopathogenesis

Peritonsillar abscesses are intimately related to acute pharyngotonsillitis symptoms that, due to improper and/or delayed treatment, evolve into tonsillar cellulitis to finally generate an accumulation of purulent material[6]. In Cuba, 15% of patients have been described as having an association with severe viral infections[5]. However, this is not the only reason that is identified as causing the pathogenesis. Some researchers have found evidence that the Weber glands, or also known as the minor salivary glands of the soft palate, could contribute to the formation of peritonsillar abscesses. This glandular group is attached to the palatine tonsil through a duct. It is believed that inflammation of the glands or obstruction of the duct could generate local cellulite, explaining the pathogenesis of this condition[1, 3, 6].

VI. Clinical Manifestations

The vast majority of patients assist to medical consultation or the emergency department with a history of less than a week of evolution of odynophagia and progressive dysphagia, which greatly affects the involved side and generates the accumulation of saliva in the oral cavity, resulting in sialorrhea; fever, changes in the voice, trismus and in some cases referred unilateral or bilateral otalgia, due to the innervation involving the glossopharyngeal nerve. Almost half of the patients have been described as having received antimicrobial therapy in the week prior to the medical consultation[1, 2, 3].

On the physical examination, it is common to find a patient who appears ill, irritated, in pain and, on many occasions, dehydrated due to the impossibility of feeding and hydrating properly. Asymmetric peritonsillar bulge on the affected side, deviation of the uvula to the contralateral side, and tonsillar exudates are evident in the oral cavity. It is common to palpate a painful neck mass with cervical or submandibular lymphadenopathy. The changes in the voice is often described as the voice of 'hot potato'. Trismus is due to secondary involvement due to inflammation and spasm of the masticatory muscles[5, 6].

By examining the oropharynx, erythema and edema of the affected side can be visualized, and if careful manual palpation is performed, the tissue is indurated and taut. The amygdala is frequently displaced medially and inferiorly[1].

VII. Differential Diagnostics

It's important to take into account different pathologies that could resemble the symptoms of peritonsillar abscess in order to make an adequate diagnosis and provide an suitable treatment. It has been shown that severe symptoms of acute tonsillitis can be assimilated to the clinic and findings on the physical examination of the patient with peritonsillar abscess. It should be noted that infectious mononucleosis must be taken into account when approaching the patient. Other differential diagnoses include retropharyngeal abscess, retromolar abscess, and epiglottitis in mainly pediatric patients[1, 3].

Tumors of the minor salivary glands, as well as tonsillar neoplasms such as lymphomas and carcinomas, can be associated with unilateral or bilateral growth of the tonsil tissue. However, patients do not present acute symptoms[3].

VIII. Complications

Without proper diagnosis and treatment, complications can be severe and life-threatening. Among the most described are airway obstruction, aspiration pneumonia due to rupture of the peritonsillar abscess, extension to the deep spaces of the neck and the mediastinum, resulting in mediastinitis. Other complications include hemorrhage secondary to erosion or necrosis of the carotid sheath and post streptococcal sequelae such as rheumatic fever and glomerulonephritis, when group A streptococcus is involved[1, 6].

A less frequent complication but with a higher mortality is also described: cervical necrotizing fasciitis. It's characterized by the rapid spread of necrotic disease to different parts of the body and becomes life threatening. Between the years 1981-2005, only 18 cases of necrotizing fasciitis secondary to peritonsillar abscess had been reported worldwide[12].

IX. Diagnosis

The diagnosis of peritonsillar abscess is fundamentally clinical; an adequate complete medical history and a thorough physical examination are essential and indispensable. Laboratory tests are generally unnecessary, unless it was a case of greater complexity and requiring a surgical approach[2]. Despite the fact that the anamnesis is a categorically necessary tool, there are studies that show that the diagnosis limited to the medical history and physical examination by a specialist doctor, has a specificity of 50% and a sensitivity of 78%[4] .

The use of imaging studies is reserved for those patients where a deep abscess of the neck is suspected, and it is necessary to identify the extent of the purulent collection. A computerized axial tomography can be performed; however,nuclear magnetic resonance is superior by defining the tissue in a more precise way. It is important to highlight that when suspecting complications, the use of imaging studies is recommended[1, 14].

A diagnostic and therapeutic tool that is frequently used is through the aspiration through a needle and syringe the site of the abscess[7]; although due to improper technique or a small volume of pus collection it can give a false negative result. It is for this reason that in Japan a benefit has been found in pharyngeal transoral ultrasound or TOPU, for its acronym. This imaging study allows efficient localization of the peritonsillar abscess and important vascular structures prior to drainage; in this way, the safety of the diagnostic procedure is improved [3, 13].

X. Microbiology

There is a lot of controversy regarding the microorganisms found in the culture of the purulent material obtained from the peritonsillar abscess due to the different analyzes carried out. In Taiwan, most studies describe group A streptococcus as the most common aerobic organism in peritonsillar abscess. Others indicate that *Streptococcus viridans* followed by group A beta hemolytic streptococcus as the most frequent. The most common anaerobic pathogens were *Fusobacterium nucleatum*, *Prevotella spp.*, *Bacteroides spp.* and *Peptostreptococcusspp*[8]. In the USA they describe *Fusobacteriumnecrophorum* in 23% and streptococcus in group A (17%)[15]. Despite knowing the pathogens involved in the formation of the peritonsillar abscess, Mexican studies show that the culture of the aspirated material is not of major clinical relevance[7].

XI. Treatment

The treatment of peritonsillar abscess is based on three fundamental pillars: drainage, by aspiration or incision; antimicrobial therapy and patient support treatment, which involves hydration and analgesia. Drainage is usually performed while the patient is awake and not under sedation; there is debate regarding the use of local anesthetics. Drainage is reserved for those who present with the typical signs and symptoms of an abscess of clinical importance: 'hot potato' voice, sialorrhea and trismus. The size of the abscess is difficult to determine with a physical examination; it is said that if it is less than 1 cm, it only warrants antibiotic treatment[1].

Aspiration through a needle should be done with great caution and always take into account the relevant anatomical structures. Both the patient and the doctor should be in a comfortable position; the physician must ensure that he has the necessary equipment, assistance and access to devices for managing the airway in cases of complications.

First, a careful palpation of the affected side is performed, followed by the use of topical anesthetics. A #18-gauge needle should be used and is usually attached to a 10 mL syringe. Puncture should be performed in the area with the greatest fluctuation and aspirate; it is significant to consider that the needle should not be inserted more than 8 mm deep. If there is a discharge of purulent material, the suction should be continued until it stops coming out. Contrarily, if there is no pus, the needle should be redirected slightly to the bottom, with caution and taking into account that the internal carotid artery is lodged 2 cm posterolateral to the palatine tonsil. If pus is not definitively obtained, the use of imaging studies can be considered to confirm the presence and size of the abscess; and also, coordinate an assessment by the otolaryngologist[1].

If it's decided to drain through an incision, this should be done with a scalpel at the upper pole of the affected amygdala, at the site of greatest prominence, following a lateral to medial direction. Using a mosquito forceps, the sac containing the purulent material should be opened[2].

There is evidence that incision and consequent drainage of the abscess is more effective and does not have major adverse effects or associated risks, compared to needle aspiration. It has also been determined that the use of needle aspiration generates recurrence of the cases and these merit second interventions under general anesthesia[11].

Empirical antibiotic treatment should be started at the time of diagnosis. Penicillin's, cephalosporins, and clindamycin represent adequate empirical therapy. A culture sample should be taken to subsequently direct the antimicrobial therapy respectively. Recommended intravenous antibiotic treatment includes penicillin G used with metronidazole; cephalosporins such as ceftriaxone administered together with metronidazole and clindamycin are reserved for those patients allergic to penicillin. Oral treatment includes amoxicillin with clavulanic acid, penicillin VK, and clindamycin[1, 2].

The use of corticosteroids for the treatment of peritonsillar abscess remains under study. Corticosteroids are drugs that are widely used in otorhinolaryngological pathologies. Studies suggest that trismus caused by inflammation and spasm of the medial pterygoid muscle, odynophagia, and fever may significantly improve with the use of this therapy. One of the main objectives of an adequate and effective diagnosis and treatment is to ensure that the patient achieves oral intake of liquids and food. The use of intravenous steroids has been shown to improve pain severity and therefore, the patient has a faster recovery[9, 10].

XII. Conclusion

Peritonsillar abscess represents a pathology that often arises as a complication of acute tonsillitis. In 35-40% of cases, there is history of treatment with the use of oral antibiotics in the week prior to the diagnosis of the abscess.

Its diagnosis is based mainly on the medical history and the physical examination carried out by the treating physician. Imaging studies are not routinely indicated and are reserved for those cases where complications such as the extension of the abscess to deep neck spaces or the erosion and necrosis of the carotid sheath are suspected.

The treatment of choice is drainage of the abscess either through needle aspiration or through an incision. Studies show that the patient's evolution and recovery is more favorable in those cases where they performed drainage through an incision. It should be noted that it is extremely important to have knowledge of the anatomical structures surrounding the abscess prior to performing these procedures. If there is no such knowledge, it is better to refer the patient to a specialist in order to avoid possible complications. Despite the need to sample the purulent material to cultivate it, empirical antibiotic treatment should be started once the diagnosis has been made; This can be replaced in case the bacteriological result indicates it. Finally, the use of corticosteroids has demonstrated its effectiveness in the patient with peritonsillar abscess, but it's still necessary to continue with its study.

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