Periodontal Pathology in Ophthalmological Practice: Case Report

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Abstract  
Scleritis is a chronic inflammation that involves the outermost coat and the skeleton of the eye. Scleritis may be associated with a systemic or immune mediated disease and it might be caused by an infection, and others pathologies.  
This case presents a female with severe pain in the left eye, and diagnosis of scleritis due to multiple periodontal and periapical inflammations in maxilla and mandible. The most intensive periodontitis was in the left side of maxilla and mandible, in the same side, as the pathology of the left eye - scleritis. In this case we used hormone therapy, which gave us good results considering scleritis. But final optimum results can only be achieved by treating periodontitis.  
Presenting this case we would like to pay attention to periodontal diseases in patients with scleritis, and send patients for a consultation to an odontologist. After the treatment of periodontitis, the main inflammation source will be removed and scleritis will be healed.

Keywords: periodontitis, scleritis, systemic inflammation.
Introduction

Oral health is an integral component of general health and well-being of an individual. Knowledge about the link between periodontal disease and systemic health is growing rapidly [1]. The development of epidemiological studies and statistical analysis, the enhanced understanding of biological plausibility by means of advances in molecular biology, microbiology, immunology and genetics, the possibility of successfully treating periodontal diseases, caries and endodontic infections and retaining teeth instead of extracting them, all these factors have led dental and medical researchers and clinicians to resume the study of the relationship between oral diseases and systemic conditions with a more scientific approach [2]. Periodontal diseases are common and highly prevalent chronic diseases worldwide [3]. It comprises a group of bacterial inflammatory diseases of the supporting tissues of the teeth (gingiva, periodontal ligament, cementum and alveolar bone). Gingivitis is inflammation of the gingiva around the teeth that does not cause a loss of periodontal attachment. Otherwise, periodontitis is characterized by periodontal ligament detachment from the cementum with consequent formation of periodontal pockets, alveolar bone resorption, gingival recession, tooth migration, tooth mobility, abscess formation and tooth loss [4]. The most frequently identified periodontal pathogens include three microaerophilic species (Actinobacillus actinomycetemcomitans, Campylobacter rectus, and Eikenella corrodens) and seven anaerobic species (Porphyromonas gingivalis, Bacteroides forsythus, Treponema denticola, Prevotella intermedia, Fusobacterium nucleatum, Eubacterium, and spirochetes) [5]. The pathogenesis of periodontitis involves inflammatory and immunological processes that elicit the production of cytokines, prostaglandins and in some cases, acute phase reagents, such as C-reactive protein [6]. The mechanisms by which periodontal infections may influence systemic health have been described as follows: 1. Oral-hematogenous spread of periodontal pathogens and direct effects to target organs; 2. Transtracheal spread of periodontal pathogens and direct effects to target organs; 3. Oral-hematogenous spread of cytokines and antibodies with effects at distant organs.

Periodontal pathogens may gain access to the gingiva through the epithelium in periodontal pockets. Within inflamed gingival tissue, a number of inflammatory mediators, including TNF-α, IL-1β, PGE2 and γ-IFN, are produced. These mediators can enter the bloodstream and contribute to systemic inflammation in conditions such as preterm delivery of low-birth-weight fetuses, osteoporosis, diabetes mellitus, renal failure and obesity [4].

Scleritis can be isolated to the eye or it might be associated with a systemic, immune-mediated disease [7, 8]. Patients with scleritis may present either with a known underlying disorder like rheumatoid arthritis, or it can present de novo in the absence of any known systemic illness [9]. The sclera is the white external tunic that envelops the eye from the limbus or corneoscleral junction and to the cribriform plate of the optic nerve head [10]. Scleritis is a chronic inflammation that involves the outermost coat and skeleton of the eye. This form of ocular inflammation can lead to vision-threatening complications, including uveitis, cataract, and glaucoma, as well as various retinal pathologies that can be extremely painful. Scleritis may involve either the anterior sclera or posterior sclera or both. Anterior scleritis is the most common form and it can be diffuse, nodular, or necrotizing [7, 9, 10].

This case presents a patient with scleritis and periodontal disease and points out the possible relationship between scleritis and odontological infection.

Case report

A 55 years old female was investigated in Lithuanian University of Health Sciences, Eye clinic. During her examination, she complained having severe pain in the left eye. Visual acuity by Snellen was 20/20 in her right eye (OD) and 20/200 in her left eye (OS). Fundus was without pathology. Intraocular pressure in both eyes (OU) was normal. During examination, OS episcleral blood vessels were thicker than...
normal. Inflammation and irritation has been observed, especially in upper region of the left eye. Endothelium of cornea and iris had no pathology. Ultrasound examination was done, tumor diagnosis was declined, but thickness of sclera has been increased by 0.32 mm. Anterior and posterior acute scleritis was diagnosed in the left eye (Fig 1.).

**Figure 1. Ultrasound examination, scleritis.**

After a few days, left eye condition was better, the redness became lower, but it was still painful. Ultrasound diagnostics were performed repeatedly, and thickness of posterior wall was increased to 1.26 mm. The patient was treated by tab. Prednisoloni 5mg (from 50mg per day). Treatment for the left eye continued with sol. Flarex and sol. Uniclopheni four times a day. To reduce the pain, tab. Diclac 150 mg was used. The status of the eye started to recover. We tried to determine the reason for scleritis by using anamnesis and complaints. Considering any other pathologies, there were no objections from the patient. After precise anamnesis we decided to look for odontological problems. The patient was sent for a consultation to an odontologist. Patient undergo odontological examination. Orthopantomogram revealed multiple periodontal and periapical inflammations in maxilla and mandible. The most intensive periodontitis was in the left side of maxilla and mandible, in the same side, as the pathology of the left eye - scleritis. According to the patient, she had the problem of periodontitis for more than 2 years, and it hasn’t been treated (Fig 2 and 3).
Figure 2, 3. Orthopantomogram and periodontitis.
In ophthalmological treatment we used hormone therapy, which gave us good results considering scleritis. But final optimum results can only be achieved by treating periodontitis.
Discussion

Periodontal diseases are spread widely across the world. According to epidemiological studies, about 1% of the whole world's population has periodontitis [11]. In 2010, USA, studies were done to determine, how many people have this disease in US. According to results, over 1.3% US citizens have periodontitis [12]. A lot of factors can determine why this disease is spread all across the world: bad oral hygiene, genetic factors like HLA-DRB1 allele [13], obesity, hormones, pesticides, smoking and also systemic diseases. Periodontitis complexity arises from the interplay between microbial pathogens and the host’s inflammatory and immune response as well as environmental and genetic factors [14]. But many people in general require some improvements in oral hygiene. Statistics show, that, for example, 95% of the population in India suffer from periodontal disease, only 50% use a toothbrush, and just 2% visit the dentist [15].

In contrast, the prevalence of scleritis in the general population is lower. It is estimated to be 6 cases per 100,000 people, but has been described in between 0.2% and 6.3% of patients with rheumatoid arthritis and up to 7% of those with Wegener’s granulomatosis, which shows us that underlying pathologies have a direct influence in scleritis prevalence [16]. Also, an infectious cause is responsible for about 5–10% of cases of anterior scleritis. The infecting organisms include bacteria, viruses, parasites, or fungi [17]. As we can see, systemic health pathologies have a lot of influence on scleritis occurrence. Scleritis may involve either the anterior sclera or posterior sclera in both. This case report presents the resolution of ophthalmologic complication following periodontitis. It may be suggested, that increased systemic inflammation, related to periodontitis may have played a role as the initiating factor for scleritis. Ophthalmic complications like scleritis are usually of inflammatory origin and may reflect the overall disease activity [10].

In contrast, current theories speculate, that the oral conditions may negatively affect systemic health. The sublingual subgingival microbiota in patients with periodontitis provides a significant and persistent gram-negative bacterial challenge to the host. It was noted, that periodontal pathogens are able to invade gingival tissues, and from there gain access to the systemic circulation [10].

In the present case it may be concluded, that treatment of periodontal disease led to a decrease in the inflammatory markers and scleritis resolution. According to literature and from our case study it may be speculated, that anterior and posterior scleritis may be initiated by increased systemic inflammation caused by periodontal disease.

A recent hypothesis links chronic subclinical inflammation with insulin resistance, initiating the development of type 2 diabetes. The triggers of inflammation are many and potentially include oral infection, which may lead to a cascade of events, including increased cytokine production, activation of acute-phase protein synthesis, and consequent insulin resistance that produces pathogenic changes resulting in type 2 diabetes. Periodontitis is one of the many complications resulting from type 1 and type 2 diabetes [5]. Presence of at least 1 periodontal pocket ≥4 mm at baseline was associated with a 40% increase in odds of any positive metabolic syndrome components among Japanese adults after 4 years of follow-up [18]. The prevalence of subjects co-morbid with metabolic syndrome and periodontitis varies from 2% to 25% [19].

Cardiovascular diseases (congestive heart failure, cardiac arrhythmias, coronary artery disease) and periodontitis are both chronic and multifactorial diseases, and share some of their risk factors: age, male gender, lower socioeconomic status, smoking and psychosocial factors such as stress. Recently, periodontal disease has been investigated as a potential factor contributing to the onset and development of cardiovascular diseases [2].

Respiratory infections such as pneumonia and certain chronic obstructive diseases are related to aspiration of bacteria from the oropharynx into the lower respiratory tract due to swallowing insufficiency. Current evidence suggests that oral bacteria, poor oral hygiene and periodontitis may influence the initiation
and course of pulmonary infections, including community-acquired, hospital-acquired and ventilator-acquired pneumonia [4].

Conclusion

When anterior and posterior scleritis is diagnosed, and the patient has no systemic or immune-mediated disease, ophthalmologists have to pay attention to periodontal diseases and send him for a consultation to an odontologist. After the treatment of periodontitis, the main inflammation source will be removed and scleritis will be healed.

References.


