

# MEDIASTENITIS AS COMPLICATION OF ACUTE DENTAL INFECTION

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Quantity of patients with pyoinflammatory processes of odontogenic etiology underwent treatment in Clinic for Maxillofacial diseases in 2000 – 2005 in 2<sup>nd</sup> Department of Cranio-maxillofacial Surgery of «City Clinic №9» remains considerable and composes 2520 patients. At the same time, quantity of patients with serious extended phlegmons of head and neck increases. Inflammatory processes affected some cellular spaces, 32 patients had complications of odontogenous mediastinitis. In 30 cases it was anterior cephalic neck mediastinitis. Inflammatory process spreading on the neck that in anterior mediastinum we observed during extended phlegmons of mouth floor and root of tongue sequent the break of internal layer of neck fascia overcoming barrier of hyoid bone and inflammatory exudation penetrating in near trachea cellular tissue of neck between parietal and visceral layers of 4<sup>th</sup> fascia. Pyoinflammatory process was spreading in anterior mediastinum by fissure between trachea and fascia sheath of neurovascular fascicle of neck for some patients. Pyoinflammatory process spreading from anterior near pharynx space into its posterior part along artery and nerves through diaphragm Geonesko was also observed. When patients had posterior mediastinitis, inflammatory process was spreading into posterior mediastinum from neck trachea cellular tissue what was accompanied with extended tissue necrosis as well as fascia. That is why purulent exudation having broken integrity of visceral layer of 4<sup>th</sup> fascia of neck, was spread on periesophageal fiber and posterior mediastinum fiber was also involved into pyoinflammatory process. We had one case when pyoinflammatory process spread from peritanzilar space into near pharynx space, pterygomandibular space and into posterior mediastinum finally by prevertebral cellular spaces.

Odontogenous contact mediastinitis characterize not only by hard development, but different symptoms with distinctive anatomic and physiological features of mediastinum. At the beginning of disease patients felt ill and were seating in forced position with head turned down. Some patients were in euphoria at the beginning because of intoxication. Common state was not appreciated adequately neither by patient nor by doctor. Patients with contact mediastinitis had temperature 39 - 40°C, pulsation was 140 – 150 beating per minute and was arrhythmic. Breathlessness was typical syndrome. Quantity of respiratory movements consisted 45 – 50 per minute. Respiration was superficial, breath too much short, outward breath longer in 2-3 times. Typical mediastinal symptom as retrosternal pain becoming stronger when patient turned down head and they tapot chest (Gerke's symptom). Pain appears when neurovascular fascicle shifts to the top of the neck (Ivanov's symptom). Jugular cavity becomes drawn when breathing (Ravitch-Tzerbo's symptom). Permanent tussiculation because of pharynx, larynx, mouth floor edema and hypersecretion of slime due to vagus nerve irritation and violation of catchment of bronchial tree (Popov's symptom). Increase of retrosternal pain, breath-

lessness and dysphagy at the time of passive trahea removal (Rutenburg-Revutsky's symptom). Pulsing pain in thorax, irradiating into interscapular region and increasing when to press on the spinous process of thoracic vertebra is characteristic for posterior mediastinitis (Tcherbo-Shteinberg's symptom). Rigidity of long muscle of back with reflex trait (Ravitch-Tcherbo-Shteinberg's symptom). Very often inflammatory process passes from soft tissues of maxillofacial region and neck to the mediastinum without symptoms. It is necessary to pay attention that 2-3 or 6-7 days at maximum pass from the beginning of the disease (tooth treatment or its extraction). At that patients had no dense infiltration and symptoms of fluctuation in soft tissue of mouth floor and neck. Inflammatory edemas were spreading from cell space of maxillofacial area on the neck and mediastinum then. If first surgical d-bridement of suppurative focus was unequal, we saw supposed amelioration of patient when he felt better. Diagnosing odontogenic mediastinitis it is necessary to take into consideration indices by O.P. Chudakov (1979), indicating that 2 days after phlegmon of oral cavity development there is change of cellular tissue mediastinum typical for serous mediastinitis. So, all patients with spread phlegmon of the mouth floor and neck had radiation examination of neck and mediastinum in three projections in order to diagnose disease in earlier terms. Having a little of symptoms of mediastinitis, patients underwent computer tomography (KT) of neck and mediastinum. Examination was done twice and third time when it was necessary. KT semiotics of acute mediastinitis depended on process localization, its spread level and degree of development. Inflammatory infiltration of near gullet cellular tissue had round form and unequal contour of fluid density. Abscess of mediastinum had round or oval form with unequal or careless contours of fluid density and gas inclusions (FIG.1).

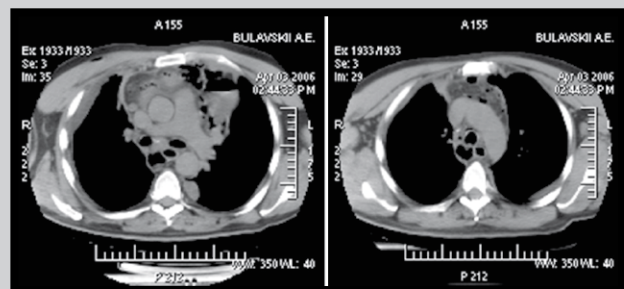


FIG.1. KT of patient with total inflammatory mediastinitis.

It gave to diagnose acute odontogeniz mediastinitis in earlier terms for all patients, do first adequate surgical treatment of suppurative focus with front top-neck mediastinotomy by V.I.Razumovskiy and catchment of mediastinum with system of active tube drainage (FIG.2). When patients had posterior mediastinitis, we reached posterior mediastinum through the neck doing mediastinotomy operation by Nassilov [4]. At the same time, maxillofacial specialists meet the problem when trachea intubations are hampered. Patients individual characteristics and pyoinflammatory processes with apparent intoxication could cause it. There is a risk of general anesthesia for those patients [2,3]. The main problem for anaesthetist is to provide patency of airways because every anesthetic provokes relaxation of cross-striated muscle. It is not possible to make lower jaw to take necessary position because of its inflammatory contracture. Not always the airway helps to cope with patency of airways violation. Situation could be complicated by real tissue edema intensity that it was determined when examination of patient's fauces, superficies of submandibu-



**FIG.2. Patient after first surgical treatment of suppurative focus of neck and front mediastinotomy by V.I.Razumovskiy.**

lar region and neck. When patient is in consciousness and has spontaneous breathing, relatively successful breathing and respiratory metabolism can become worse suddenly at the beginning of general anesthesia course and stopping of independent breathing. Compensated patency of airways violation turns into critical breathing disorder. Patient's status becomes worse rapidly. Trachea intubations can be ineffective in result of pharynx edema and entering into larynx. Direct laryngoscopy or fiber-optic bronchoscope application is impossible [1]. In those cases critical hypoxia expects tracheotomy application immediately what is also difficult due to increase of neck tissues edema. It is necessary to take into consideration that augmentation of laryngopharyngeal reflexes is independent from process localization in an anatomy region and can provoke laryngospasm. Reflexes of vagus nerve, larynx and trachea irritation combined with hypoxemia can lead to heart rate violation: extrasystole, ventricle fibrillation, asystole. In this connection, first we performed tracheostomy and intubations through it. Intubations were done under loco-regional anesthesia with fiber-optical control for 12 patients. Standard therapy course was performed postoperatively combined with rheology of blood. 29 patients left clinic 30-40 days after operation for out-patient treatment.

## Conclusion

It is evident clinical outcome of mediastinitis depends on its diagnostic in earlier terms, adequate first surgical treatment, optimal anesthesia, complex treatment combined with modern methods.

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# THE ANALYSIS OF THE INFLUENCE OF UHMWPE MODIFICATION ON THE WEAR RESISTANCE

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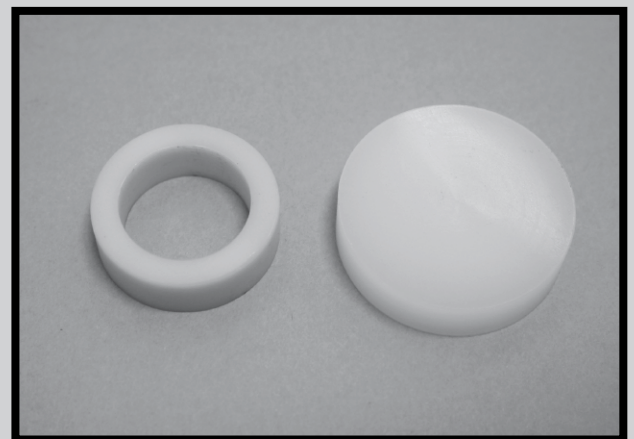
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## Introduction

No known surgical implant material has ever been shown to be completely free of adverse reactions in the human body. However, long-time clinical experience of use of the biomaterials has shown that an acceptable level of biological response can be expected, when the material is used in appropriate applications. This article deals with very specific wear resistance testing of the bio-compatible and bio-stable materials used for surgical implants. This type of testing is very important for appreciation of new directions at the joint replacement design (for example in total knee replacement). The aim of this work is to evaluate the influence of modification of UHMWPE (Ultra High Molecular Weight Polyethylene) on the wear resistance. The special experiments were carried out in collaboration with company MEDIN ORTHOPAEDICS Inc. - developing and producing bone-substitute biomaterials and implants.

## Materials and methods

The special wear resistance tests, called "Ring On Disc", were completely carried out with a lot of pairs (FIG.1) of different biomaterials. The experiments were executed according to ISO 6474:1994(E). This International Standard deals with evaluation of properties of biomaterials used for production of bone replacement. The standard requires a long-time mechanical testing at which a complete volume of worn material is evaluated. The test conditions, requirements on the testing system and specimens' preparation are closely determined. For the specimens treatment and their evaluation, a procedure is assessed which ensures the testing objectivity.



**FIG.1. One pair of tested specimens.**