PROSTHETIC REHABILITATION FOR PATIENTS WITH SEVERE CARDIOVASCULAR DISEASE. CASE REPORTS.

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ABSTRACT. Several aspects should be considered when elaborating the dental treatment plan for patients with severe cardiovascular disease. Minimally invasive treatment options, shorter appointments, stress-reduction protocol and constant collaboration with the cardiologist are all suggested for patients with significant cardiovascular disease. Here we describe three clinical cases of severely compromised cardiovascular function in patients requiring prosthodontic treatment. For the first patient with ischemic heart disease, hypertension and cardiomegaly, a complete denture decollated in the anterior region, around the two central incisors was fabricated. After 5 years the patient suffered a heart attack and after 6 months the prosthetic rehabilitation was completed with an immediate complete denture. The second patient presented at the Department of Prosthodontics with unstable angina and confirmed coronary artery disease. The prosthetic therapeutic decision was a fixed partial denture with distal extension at the superior arch and an overlay denture at the inferior arch. The third patient presented had a history of valvular heart disease requiring anticoagulant therapy. A conservative prosthetic treatment alternative comprised of an over denture with precision attachments (Bredent) was elected. Patients presented in this clinical study were candidates for minimally invasive prosthodontic treatment. The severity of the underlined disease, time from the causative event and sequelae arising from it, are all important in dental treatment planning. The purpose was to ensure that any hemodynamic change produced by dental treatment does not exceed the cardiovascular reserve of the patient. Reducing the psychological and physiological stress during dental treatment was determinant and was conducted following the instructions from the cardiologist. We have avoided bleeding maneuvers and the appointments were short in duration and in the morning. The patient with severe cardiovascular disease may present a challenge to the dental health care provider. The therapeutic decision should follow a conservative approach associated with maximal risks reduction during the entire dental treatment.

Keywords: cardiovascular disease, therapeutic decision, stress-reduction protocol, prosthetic rehabilitation

TRATAMENT RESTAURATOR PROTETIC ÎN CAZUL PACIENȚILOR CU AFECȚIUNI SEVERE CARDIOVASCULARE. PREZENTARE DE CAZ.

Rezumat. Tratamentul protetic al pacienților cu afecțiuni cardiovasculare severe trebuie să țină cont de o serie de particularități. Dintre acestea cele mai importante sunt: elaborarea unui plan de tratament cât mai conservator, ședințe de tratament scurte, reducerea stresului emoțional și colaborarea permanentă cu medicul cardiolog. În lucrarea de față sunt prezentate 3 cazuri clinice ale unor pacienți cu afecțiuni severe cardiovasculare care au necesitat tratament restaurator protetic. În cazul primului pacient, cu insuficiența cardiacă și cardiomegalie s-a confectionat prima proteză totală maxilară râscroîtă la nivelul celor 2 incisivi centrași. După 5 ani, pacienta a suferit un infarct miocardic, iar la 6 luni postinfarct a necesitat refacerea tratamentului protetic printr-o protezare totală imediată. Cel de-al doilea pacient s-a prezentat la Clinica de Proteză dentară cu boală coronariană și angina instabilă, necesitând restaurarea protetică maxilară și mandibulară. Pentru a evita manevre stressante și săngerânde, am decis o soluție terapeutică minim invazivă: proteză fixă la maxilar și overlay la mandibulă. Al treilea caz prezentat a fost al unui pacient cu proteză valvară și tratament anticoagulant. Tratamentul protetic minim invaziv a constat într-o supraprotezare mandibulară pe capă cu capse Bredent.

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INTRODUCTION

Cardiovascular diseases make up the most prevalent category of systemic disease in almost all countries, and increase in prevalence with age. Atherosclerosis is a progressive disease process that involves the large- to medium-sized arteries. It can lead to ischemic lesions of the brain, heart or extremities, and can result in thrombosis and infarction of affected vessels, leading to death. Relevant for dentistry is the accumulation of plaque at the carotid bifurcation, that can be early detected at a panoramic X rays. For those patients prone to angina or a myocardial infarction, dental care providers must be prepared to recognize and manage the risks so untoward events are prevented.

The primary management goal for the patient with cardiovascular disease during dental therapy is to ensure that hemodynamic changes produced during dental treatments does not exceed the cardiovascular reserve of the patient. This is best achieved by maintaining the patient’s optimum blood pressure, heart rate, heart rhythm, cardiac output and myocardial oxygen demand.

This article presents information useful for assessing risks and planning the delivery of safe dental care to those patients with severe cardiovascular disease. Over thirty patients with severe cardiovascular disease presented in the Department of Prosthodontics, Faculty of Dentistry Timisoara during September 2002-June 2007 requiring prosthodontic treatment. We have selected 3 cases to be presented in the following.

CASE ONE

A 57 years old female patient presented at the Faculty of Dentistry Timisoara, Department of Prosthodontics with ischemic heart disease, cardiomegaly, and arterial hypertension.

Clinical oral examination revealed a maxillary ridge with average size and retentivity and the presence of the two central incisors. Because the clinical status of the two central incisors was good, we decide to preserve the two teeth without any alteration of the crown and to make a complete denture cut out in the anterior region (Fig.1), (Fig.2).

After six years, the two central incisors presented an advanced stage of periodontal disease (Fig.3). The general status of the patient was compromised because of a myocardial infarction six month ago.

We decide to make an immediate complete denture, so we schedule the extraction of the two central incisors in the appointment of setting the denture. The stress reduction protocol consist in 2 mg diazepam 1 hour before extraction, premedication with nitroglycerin and...
for pain control local anesthesia with vasoconstrictor (1:200,000).

Because of the stress reduced protocol, the extraction was safely conducted, without any incident, and the immediate complete denture was seated (Fig.4).

**Case 2**

A 68 years old male patient presented at the Faculty of Dentistry Timisoara, Department of Prosthodontics with unstable angina (Prinzmetal’s angina) and coronary artery disease. Those patients generally are not candidates for elective dental therapy, and consultation with the patient’s physician is highly recommended. If emergency dental care is needed, preoperative anxiolytic agents may be indicated for stress reduction and to minimize endogenous epinephrine release. The dentist should closely monitor the patient’s hemodynamic status and oxygen saturation before and during treatment.

The patient presented a class I Kennedy maxillary and mandibulary edentation with severe attrition. The therapeutic decision was for a fixed partial denture with distal extension at the superior arch and an overlay at the inferior arch. Those treatment options impose an ultraconservative preparation of the teeth, without the need of devitalisation and bleeding maneuvers (Fig.5).

Shorter appointments and use of only small amounts of vasoconstrictor in local anesthetics were indicated. Supplemental oxygen delivered via a nasal canal may help prevent intraoperative anginas attacks. The drugs of choice for treating an acute anginas attack are 100 percent oxygen and sublingual nitroglycerin.

The dental treatment was completed without inconveniences and the patient was contented with the prosthodontic restoration.
After three years of service, the mandibulary overlay was relined, so the ability to chew, eat and speak was considerably improved. (Fig. 6)

CASE 3

A 76 years old male patient presented at the Faculty of Dentistry Timisoara, Department of Prosthodontics with valvular heart disease.

The clinical oral examination revealed a six years old removable partial denture with wire clasp on the two mandibular cuspids. Because the two cuspids presented periodontal disease, we decide the reduction of the teeth and to make an overdenture on copings with precision attachments. (Fig. 7, Fig. 8). The root canal therapy was completed five years ago.

Our patient receive anticoagulant therapy consisting of coumarin derivatives. We have consult the patient’s physician before beginning the treatment to determine whether modification of anticoagulant therapy is indicated. The cardiologist decide that anticoagulant therapy may not be discontinued before the dental procedure (scaling and root planning, preparation of the teeth for the copings).

To prevent infective endocarditis we recommend systemic antibiotic prophylaxis with 2,5 g amoxicillin 1 hour before treatment and another 1,5 g 6 hours after the first dose. Also a chlorhexidine mouth rinse has been recommended before dental procedures.

Because of the minim invasive treatment plan it was not necessary to modify the anticoagulant therapy. The patient was pleased with the new overdenture, and the retention was considerably improved (Fig. 9, 10).
DISCUSSIONS

The patient with cardiovascular disease may present a challenge to the dental health care provider, depending on the degree of hemodynamic compromise and the stability of his or her condition.\textsuperscript{10,11} Many of the dental treatment approaches used for these patients are based on consensus opinion.

They where established through years of experience and informed clinical judgment\textsuperscript{12}. Few of the treatment approaches are founded on controlled clinical trials that have assessed the effect of different treatment modalities on well-defined outcome criteria.

Researchers and clinicians commonly recommend that patients not receive routine dental care for at least six months after experiencing a myocardial infarction.\textsuperscript{13}

Short appointments and a stress-reduction protocol where indicated, including:
- short, late morning appointments;
- vital signs monitoring: (heart rate, blood pressure, etc);
- stress reduction protocol;
- 2-5mg diazepam on the night before treatment and 1 hour prior to treatment.
- nitrous oxide + O\textsubscript{2} (3 lit/min) via nasal canula;
- premedication with nitroglycerin if needed;
- pain control – local anesthesia with vasoconstrictor (1:200,000) – maximum 3 cartridges\textsuperscript{5}.

The most important goal of dental therapy in patients with valvular heart disease is the need to prevent infective endocarditis\textsuperscript{12}. Dental procedures often cause a transient bacteremia that rarely lasts longer than 15 minutes, but the bacteria may lodge on abnormal or damaged cardiac tissue, especially valves, which may result in endocarditis. Periodontal disease may predispose patients to an increased incidence of bacteremia. Because dental procedures that involve bleeding may induce a transient bacteremia, is recommended the antibiotic prophylaxis prior to “dental procedures known to induce gingival or mucosal bleeding, including professional cleaning.”\textsuperscript{16}

Patients at risk of developing infective endocarditis may undergo multiple courses of antibiotic therapy, increasing the risk of establishing resistant strains; alternatively, numerous procedures may be accomplished at the same appointment, if possible. It may be prudent to allow at least seven days to elapse between appointments or to select an alternate antibiotic regimen for appointments within this one-week period. As a local adjunct to systemic antibiotic prophylaxis, a chlorhexidine mouth rinse has been recommended before dental procedures.

Patients with prosthetic heart valves, other valvular disorders, or a history of myocardial infarction, CVA or thromboembolism frequently receive anticoagulant therapy consisting of coumarin derivatives, such as dicumarol and warfarin.\textsuperscript{14}

The dental health care provider may consult with the patient’s physician before treatment which can induce bleeding to determine whether modification of anticoagulant therapy is indicated. In addition, drug interactions with warfarin and other similar agents are numerous, and these must be considered. Aspirin and other nonsteroidal anti-inflammatory drugs may dramatically increase the risk of warfarin-associated bleeding.\textsuperscript{15} Tetracyclines may decrease vitamin K production, interfere with formation of prothrombin and increase anticoagulation. Metronidazole may inhibit coumarin’s metabolism, increasing its anticoagulant effect, while penicillin may counteract coumarin’s effect.

Clinicians should alter anticoagulant therapy only in consultation with the patient’s physician, since some people are more at risk of developing thrombus formation or hemorrhage than are others. Aspirin, an inhibitor of platelet aggregation, is often used to prevent thrombosis formation. Because of its irreversible binding to platelets, the effect of aspirin lasts at least four to seven days. It generally is used in small doses of 325 milligrams or less and usually will not alter bleeding time significantly at this dose. However, higher doses may increase bleeding time and predispose the patient to develop postoperative bleeding. For these patients, aspirin therapy may be discontinued for several days before the dental procedure if treatment is expected to induce significant bleeding.\textsuperscript{15} In many instances, such studies are limited by ethical or medico-legal considerations involved with placing patients at risk of developing systemic complications.

CONCLUSION

To provide care to patients with severe cardiovascular disease, oral health care providers must understand the disease, its treatment, and its impact on the patient’s ability to undergo and respond to dental care. It is highly recommended to chose dental treatment alternatives as conservative an minimally invasive as possible and to reduce the risks along the entire dental treatment.
REFERENCES: