Questionnaire study on awareness of the prosthodontic/implant considerations in cardiovascular patients among the students

S. Renuka, Dhanraj Ganapathy*, Visalakshi Ramanathan

ABSTRACT

Background: Cardiovascular disease (CVD) and its drug therapies have direct impact on oral cavity causing severe gum diseases and periodontal problems as a secondary adverse complication. Surgical dental procedure in CVD patients should be managed carefully as the blood clotting mechanism is compromised with anticoagulant therapy. Hence, precautionary measures, special treatment protocol, and physicians consent are required to perform dental treatment in CVD patients. Dental professionals play an important role in the detection of adverse oral reactions and to prevent oral and systemic risk in CVD patients with the help of general physician’s opinion. Aim: This study aims to evaluate the knowledge and awareness about prosthodontic considerations in CVD patients among dental students. Materials and Methods: This study used a questionnaire to check and evaluate the knowledge and awareness level of dental students about prosthodontic considerations and mainly implants in CVD patients. 100 volunteers were selected to participate in the study and the questionnaire was distributed through SurveyPlanet weblink. Data collection and statistical analysis were done. Results: The results of this study show that 96.1% of students felt that CVD patients require special consideration in dental treatment planning. 45.1% of students thought that hypertension is the most common CVD in Indian population. 56.9% of students felt that stress reduction, short appointments, monitor vital signs, premedication, and physician consent are the modifications required in the dental treatment plan for CVD patients. 54.9% of students felt that discontinuation of anticoagulant therapy temporarily before prosthetic surgical procedures is mandatory. Conclusion: This study shows that most of the students are aware of the basic management protocol for CVD patients, in general. Around half of the students were unaware about emergency drugs used in emergency situations. However, awareness on the specific prosthodontic procedures indicated for each specific CVD disease and about management of emergency conditions should be increased.

KEY WORDS: Cardiovascular, Complications, Prosthodontic, Protocol, Treatment

INTRODUCTION

Cardiovascular diseases (CVDs) are group of diseases that affect the heart and vascular system of the body. Conditions such as ischemic heart disease, hypertension, dysrhythmias, infective endocarditis, and myocardial infarction (MI) are the most common life-threatening disease affecting majority of individuals worldwide. [1]

Patients with CVD are most commonly cited, in general, dental practices. Hence, dental practitioners should have a clear knowledge about the prophylactic measures to minimize the risk of cardiac complications during dental treatment among CVD patients. [2] CVD patients and their drug therapies have direct impact on oral cavity causing severe gum diseases and periodontal problems as a secondary complication. Dental professionals play an important role in the detection of adverse oral reactions and to prevent oral and systemic risk in CVD patients with the help of general physician’s opinion. However, at high-risk patients with poor oral hygiene and gingival bleeding even after tooth brushing have shown an increased potential for developing complications of infective endocarditis. [3-5] Hence, it is recommended for CVD patients to maintain their oral hygiene regularly by proper brushing technique to minimize the gum

*Corresponding author: Dhanraj Ganapathy, Department of Prosthodontics, Saveetha Dental College, Saveetha University, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, India

E-mail: dhanrajganapathy@yahoo.co.in

Received on: 14-01-2019; Revised on: 17-02-2019; Accepted on: 06-03-2019
bleeding and plaque accumulation and thereby minimize the bacteremia which may worsen the cardiac problems further.

CVD patients should also be managed carefully during dental treatment as their blood clotting mechanism is compromised with anticoagulant therapy, especially in case of surgical dental therapy. Hence, some precautionary measures, special treatment protocol, detailed medical history, and physicians consent are required to perform dental treatment in CVD patients.

Patients with cardiac problems and periodontitis are at high-risk category due to correlation between periodontal disease and cardiovascular problems. Periodontal disease contains periodontal pathogen which has proteins that cross-react with the heart. The heat shock protein 60, which is produced by Tannereilla forsythia and Porphyromonas gingivalis, has about 60% homology with the mammalian heat shock protein. It is known that antibodies to the heat shock protein are found in periodontitis patients. These antibodies to heat shock proteins of periodontal bacteria are cross-reactive with the heat shock protein that is exposed in an injured endothelium or atheromatous plaque and leads to atheroma formation. Hence, periodontitis in CVD patients should be treated effectively to avoid the life-threatening situations.

The basic precautionary measures in managing patients with CVDs during dental treatment are to deal with the identified risk factors involved, pre-medication should be considered to reduce anxiety and effective analgesia is required to reduce stress, early and short morning appointments are advised, CVD patients are allowed to attain a comfortable position in a dental chair, every effort should be made to keep the procedure time down to a minimum, and treatment should be terminated early if the patient becomes overly anxious, current medications which the patients are taking and allergies to any drugs and also any potential drug interactions and side effects should be noted.

Each cardiac problem has to be managed differently based on its severity and systemic effects. Hypertension is one of the most commonly seen issues in general patients. Patients with hypertension are at increased risk of developing adverse effects in a dental office. Dentist must inform the physician regarding the estimated degree of stress, length of procedures, and complexity of the individualized treatment plan. Detailed family history and medical history should be taken in advance. Routine measurement of BP during dental procedure may reduce the risk of cardiovascular events and acute complications during dental treatment. During hypertension crisis, the dental procedure should be postponed and the patient should be sent to hospital immediately. Patient with angina pectoris is initially felt with dental pain, as angina progresses from the left side of the mandible, neck, and throat. Anxiety, stress during dental procedure will increase the angina attack during dental treatment. During angina in dental office, the patient should attain a comfortable position. Patient is reassured and restrictive garments are loosened. Patient is encouraged to have his own NTG spray 1 or 2 metered sprays depending on his usual requirement (up to three doses of NTG spray can be given in 15 min). If angina signs and symptoms do not resolve with this treatment within 2–3 min, administer another dose of nitroglycerin, monitor the patient’s vital signs, call his or her physician, and be ready to accompany the patient to emergency department. Oxygen is administered 4–6 l/min. Dental procedure may be restarted if it is the usual type of experience for the patient. If no improvement within 3 min – MI is suspected, patient is sent to the hospital.

Cardiac arrest as a result of MI in dental office can occur due to stress and anxiety. A careful medical history with short appointments along with anxiety reduction should be carried out. Supplemental oxygen through a nasal cannula will help meeting the extra oxygen requirements of the myocardium: 4 l/min. Caution should be taken if more than 3 ml of 2% lignocaine hydrochloride with 1:80,000 adrenaline solutions is required. Drug interactions with potential adverse reactions need to be taken into account after treatment because prophylactic antibiotic may need to be considered to prevent infection. In patients with pacemakers, electrocautery and the use of cavitron should be avoided. Within 6 months, if any urgent invasive treatment is required such as extractions/RCT, with 6 months of infarction, the treatment should be delivered in a hospital setting where facilities exist should there be another attack of MI. After 6 months, MI patients can usually be treated using techniques similar to the stable angina patient.

A patient with cardiac arrhythmia during a dental appointment necessitates continuous electrocardiogram monitoring and good knowledge of interpretation of the abnormalities observed. The risk of harmful arrhythmias is also increased in patients with cardiomyopathies, heart failure, and valvular problems. Such patients should be carefully evaluated by their physician and adequate medication and other measures should be implemented before extensive dental procedures. If a patient with heart disease collapses in the chair, cardiac arrest should be suspected and emergency medical services activated immediately and cardiopulmonary resuscitation initiated without delay. These patients are advised to take their medication regularly. Beta-blockers are the preferred drug of choice.
Every dental professional should be aware of emergency medical conditions and proper way to manage the situation during dental practice. Invasive surgical dental procedures required more care and attention during treatment of CVD patients. Proper medical history, family history aids in proper diagnosis and enhances the success of treatment plan. Physician consent and opinion are most important part to minimize the risk of the systemic disease during dental procedure. On treating, CVD patients more knowledge required to manage the emergency situations in dental setup. This study is to create awareness and to increase caution during prostodontic considerations mainly implants in CVD patients to avoid medical emergencies during dental treatment.

MATERIALS AND METHODS

This study used a questionnaire to check and evaluate the knowledge and awareness level of dental students about prosthodontic considerations mainly implants in CVD patients. 100 volunteers interns and postgraduates in the Department of Prosthodontics and Implantology from Saveetha Dental College and Hospitals were selected to participate in the study. The study population is selected based on their clinical exposure and in students trained for implant placements. The questionnaire contains 22 questions to access the dental students regarding special care treatment for CVD patients and the questionnaire was distributed through SurveyPlanet weblink. Data collection and statistical analysis were done.

RESULTS

The results of this study show that 96.1% of students felt that CVD patients require special consideration in dental treatment planning. 45.1% of students thought that hypertension is the most common CVD in Indian population. 35.1% of students felt that MI is the most common CVD in Indian population. 56.9% of students felt that stress reduction, short appointments, monitor vital signs, premedication, and physician consent are the modifications required in the dental treatment plan for CVD patients. 54.9% of students felt that discontinuation of anticoagulant therapy temporarily before prosthetic surgical procedures is mandatory and 21.6% of students felt that discontinuation of anticoagulant therapy is not needed for all prosthetic procedures. 72.5% of students thought that anticoagulant therapy decreases clotting time which enhances the bleeding during implant surgery. 92.2% of students felt that stress reduction protocol is necessary for prosthodontic treatment in CVD patients. 68.6% of students felt that diazepam is most commonly used for stress reduction in CVD patients. 45.1% of students had an opinion that patients with atherosclerotic cerebral disease may present with reduced motor skills and confusion and may face difficulty in coping with removable dentures. 47.1% of students felt that patients taking antidepressant drugs mainly after stroke face problems with retention and stability of removable prosthesis which can be managed alternatively with removable prosthesis with adhesive pastes. 41.2% of students felt that patients with angina pectoris use sublingual nitroglycerine and nitrous oxide with supplemental oxygen. 51% of students state that unstable angina is contraindicated for elective dental surgery. 43.1% of students felt that in patients with a history of MI, the treatment protocol for dental surgery is treatment can be done under hospitalization regardless of time after MI and in patients with MI in the preceding 6 months; treatment should be postponed to at least 12 months. 19.6% of students’ state that in patients with a history of bacterial endocarditis, the treatment protocol is endodontic prophylaxis is not required for removable prosthesis and for making oral impressions [Graphs 1-6].

About 72.5% of students felt that there is interrelationship between CVD disorder and periodontitis. Only 23.5% treated CVD patients for prosthesis/implant placement in their dental practice. 82.4% of students thought that knowing the medical history of CVD patient before prosthesis or implant treatment is necessary. 74.5% of students had an opinion that the chair position plays a major role while treating the CVD patient in dental chair. 84.3% of students felt that starting the treatment after breakfast in CVD patients is mandatory. 80.4% of students were aware about the emergency kit. 84.3% of students

Graph 1: Modifications are required for CVD patients during dental treatment are stress reduction (7.8%), short appointments (3.9%), monitor vital signs (11.8%), premedication (5.9%), physician consent (13.7%), and all the above (56.9%)
thought that emergency medication should be ready during prosthetic or implant treatment in CVD patients. 52.9% of students state that either furosemide or captopril is used to manage hypertensive emergencies. 39.2% of students felt that gingival hyperplasia, xerostomia, burning mouth sensation, and lichenoid reaction are the most common difficulties faced while taking dental impressions for hypertensive patients.

**DISCUSSION**

According to a Brazilian study, 41% of the respondents judged themselves capable of diagnosing the cause of medical emergencies, 79.7% of the respondents did not judge themselves capable of rescuing victims of acute MI, 54.4% judge themselves that they cannot perform CPR, and 61.4% of dentists cannot apply drug intravenously. The dentists’ most frequent justifications with regard to the lack of preparation to deal with medical emergencies were the lack of updating courses after graduation by 51% of respondents, lack of learning during undergraduate course by 19.1%, and disinterest by 4.6%, 37% of the respondents reported having no difficulty in dealing with medical emergencies in dentistry, and 40% of the responding dentist had never undergone training in CPR. In the United States, the incidence of cardiac arrest is 5 times higher. According to a study by Regina et al. also supports the finding that Brazilian dentists usually have a theoretical knowledge of issues related to medical emergency management, but lack practical CPR training. According to a study by Elanchezhiyan et al., all respondents (100%) agreed that medical history plays a key role in emergency management and short duration procedures were preferred by 68%. For anesthesia in hypertensive
patients, nitrous oxide was said to be the preferred inhalation anesthesia by 78%.

Around 85% reported that antibiotic premedication to cardiac patient is must, and 65% reported that it is needed before any selective invasive procedure. Nearly 11% said that they preferred physician instruction to do so in antibiotic premedication. While treating cardiac patients, morning appointments without specific time duration were preferred by 48%, while 32% preferred regular appointments. For management of angina during dental procedures, around 21% advocated stopping the procedure, beginning sublingual nitroglycerine administration, monitoring the conditions, and then continuing the procedure if patient condition is stable; however, 63% advocated nitroglycerin administration and monitoring and then seeking physician help and 15% preferred to stop the procedure and seek physician help. The ultimate aim of anticoagulation therapy is to prevent clot formation and expansion. The anticoagulation therapy lowers the risk of recurrent venous thromboembolism in cardiac patients, but it increases the bleeding during invasive procedures. Warfarin is the most common drug prescribed for anticoagulant therapy. Around 30% said that they preferred stopping antiplatelet therapy before any procedure; 32% preferred stopping before any invasive procedure with the remaining preferring to stop if indicated by a physician. The level of knowledge about medical emergencies found in a study is at the same level of other dental practitioners found in other studies. In India, the dental curriculum includes all basic medical sciences, which would provide better knowledge of handling medical emergencies. The dental interns are treating patients under the supervision of the faculty, and they depend on the faculty if an emergency occurs. Dental students should be trained in identifying the medical

Graph 5: Knowledge of treatment protocol for elective dental surgery in myocardial infarction (MI) patients. (11.8%) Treatment can be done anytime regardless of time after MI and treatment can be done under hospitalization regardless of time after MI, (23.5%) in patients with MI in the preceding 6 months, treatment should be postponed to at least 12 months, (43.1%) both B and C and (9.8%) none of the above.

Graph 6: Knowledge of hypertension emergency drugs. (17.6%) Furosemide, (27.5%) captopril, (2%) domperidone, and (52.9%) either A or B.
emergency conditions. Diagnosing the cause of the emergency and having knowledge to manage it are the most important in dental practice. Unfortunately, many practitioners are not aware of the cause and are unable to manage when an emergency occurs. [24] These interns are future dental practitioners, so it seems that they might not acquire any knowledge of emergency management in practice before graduation. The basic dental and medical training should be given simultaneously to make dental students effective in managing all kinds of patients. Knowledge and training in medical conditions will make the dental practice complete, while insufficient training restrains the dentist from attempting some treatments in clinical practice. [10] Based on a study, the knowledge of medical emergencies among dental interns in Southern India is superficial. This superficial knowledge makes the interns insecure, which acts as hindrance in performing basic life support that will lead to improper management of medical emergencies in the dental office, which could have fatal consequences. Institutions offering undergraduate health courses should find the educational formats needed to build the confidence necessary for dental students and professionals to be active in stressful situations that threaten the patient’s life. [13]

CONCLUSION

This study shows that most of the students are aware of the basic management protocol for CVD patients in general. Around half of the students were unaware about emergency drugs used in emergency situations. However, awareness on the specific prosthodontic procedures indicated for each specific CVD disease and about management of emergency conditions should be increased. Most of the students were not experienced with the management of emergency conditions alone in dental office during invasive procedure in CVD patients before graduation. Hence, more awareness and educational programs regarding emergency conditions and its management protocol should be conducted to increase the knowledge level among students before graduation that will increase the confidence level of students to manage emergency situations which is life-threatening condition for the patients. [11]

REFERENCES


Source of support: Nil; Conflict of interest: None Declared