

Management of Acute Onset Chest Pain in the Dental Practice

*Siva Prasad Reddy.E

*Profesor and Head, Department of Oral Medicine, Teerthankar Mahavir dental college and research institute, Delhi Road , Moradabad. U.P, India

ABSTRACT

In modern times a lot of advances have been made in the treatment of Cardiac diseases and it is not uncommon to come across patients who are leading almost a normal life even after having a "Triple / Quadruple" by pass. On the other side modern dietary practices and sedentary lifestyles are responsible for the increased incidence of coronary heart diseases¹. Recently many states have introduced emergency response services like '108' services in Andhra Pradesh. This has made some improvements to the emergency care and it is now possible to successfully manage even more number of these cardiac emergencies. In this article every attempt has been made by keeping in mind the limited knowledge of a practicing Dental Surgeon regarding the definitive management of coronary events and the presentation has been designed in such a way that it can be easily adopted and followed by a general dental practitioner

KEY WORDS: Dental emergency, acute chest pain.

Introduction

Acute onset chest pain can be a frightening experience for the patient if it is his first experience of chest pain. It can also be of equally terrifying experience for the dentist as the chest pain may represent impending "Heart Attack"^{2,3}

Although several conditions may cause chest pain, acute onset chest pain is mainly because of three main reasons. They are:

1. Hyper Ventilation
2. Angina pectoris
3. Myocardial Infarction

1. Hyper Ventilation⁴

Chest pain due to Hyper ventilation is usually very easy to diagnose as the chest pain usually follows a brief period of Hyperventilation. Usually the patient is relatively young and in these younger patients cardiac related chest pain is rather rare. One would also see other signs of Hyper ventilation.

Hyper Ventilation, as a result of anxiety causes the subject to "blow off" the CO₂ from the body resulting in a fall of partial pressure of

CO₂ (PaCO₂). This causes the pH of the blood to raise from 7.4 to 7.55 resulting in respiratory alkalosis. This increased pH causes a fall in the ionized calcium in the blood and this fall in calcium levels is mainly responsible for the symptoms of tingling and spasm of extremities. Convulsions can also be seen.

Signs of Hyper Ventilation:

- Anxious patient
- Increased rate & depth of breathing
- Muscle cramps
- Light headedness
- Paraesthesia of the extremities
- Tachycardia
- Stiffness
- Tetany

Management:

1. Stop all the dental procedures
2. Remove all the objects from the mouth
3. Calm the patient
4. Allow the patient to sit upright
5. Rebreathing of exhaled air with help of a paper bag will help to correct Pa CO₂

Angina Pectoris (AP)^{5,6,7}

This is one of the most common causes of acute onset chest pain in the Dental office. Careful history, would help in arriving at a quick diagnosis in patients who are already known to be suffering with A P. These patients usually carry their own supply of Nitroglycerine spray (NTG) and allow these patients to use their own NTG spray.

It is quite possible that the patient with no previous history of chest pain, may have his first attack of Angina in the Dental office. This can be an alarming experience for both the patient and the dentist and situations like this warrant the emergency referral by calling '108' for ambulance.

Pathophysiology of Angina Pectoris

Angina occurs when there is a mismatch between the Oxygen supply and Oxygen demand by the Myocardium. Anxiety increases the Oxygen requirements of the Myocardium. Coronary vessel wall Stenosis due to atheromas significantly reduces the coronary blood flow. Coronary vessel disease is increasing in its incidence and the predisposing factors are:

1. Smoking
2. Dyslipidemia (High Cholesterol)
3. Hypertension
4. Diabetes
5. Obesity
6. Sedentary life style

Signs and Symptoms of Angina Pectoris:

Heavy crushing, Squeezing feeling of the central chest with the pain usually radiating to the left shoulder, and down the medial aspect of the left arm.

Management:

The management of chest pain due to the Angina Pectoris will depend on whether there is a positive history or not.

Management In patients with positive history of angina pectoris:-

1. Stop Dental procedures.
2. Allow the patient attain a comfortable position.

3. Encourage the patient to have his own NTG spray 1 or 2 metered sprays depending on patients usual requirement. (up to 3 –doses of NTG spray can be given in 15 minutes)
4. Administer Oxygen 4- 6 lit /min.
5. Expect quick pain relief.
6. Dental procedure may be restarted if it's the usual type of experience for the patient
7. If no Improvement within 3 mins – suspect MI
8. If pain increases - suspect MI
9. If the patient says the pain is different this time – suspect MI
10. Call for ambulance once the MI is suspected

Management in patients with no previous history of Angina Pectoris:-

- Treat as above
- Emergency referral should be made, even if the pain is relieved with rest or with NTG spray.

2. Acute Myocardial Infarction^{3,7}

Myocardial Infarction (MI) results from acute deficiency of blood supply to Cardiac muscle that results in death of cardiac muscle and necrosis. Ischemia leading to Infarction of Cardiac muscle results when there is a sudden occlusion of coronary artery by a thrombus. It can also result when there is significant mismatch between the Myocardial Oxygen requirements and supply. This later scenario is more common in highly stressful situations that can be associated with traumatic Dental procedures.

Signs and Symptoms:

1. Pain and discomfort similar to that of Angina Pectoris but, the pain is more severe in intensity and persists for longer duration.
2. Can be associated with nausea and vomiting
3. Light headedness and sweating.
4. Patient becomes restless and struggles to find a comfortable position.
5. Skin becomes pale, cool, sweaty.

Prevention:

In patients with known history of Coronary heart disease, the following measures will help to reduce the incidence of MI.

- Anxiety reduction.
- Supplemental Oxygen via a nasal cannula will help meeting the extra oxygen requirements of the Myocardium : 4 lit/min
- Sedation: Best sedation technique would be to give N₂O - O₂ inhalation sedation. Anxiolytics will be of help but physician's advice should be thought
- Pain free dentistry: To reduce the stress and there by minimizing the release of endogenous Catecholamines It is even more important in patients with Coronary Artery Disease to make procedures pain free.
- Minimizing the use of catecholamines: Certainly Catecholamines like Adrenaline in Local Anesthesia will help in achieving a very high levels of Anesthesia. Caution should be taken when more then 3 mls of 2% Lignocaine Hydrochloride with 1: 80,000 adrenaline solution is required. 1 ml of this 1: 80,000 solution contains 0.0125 mg of Adrenaline in 1 ml. As per the American Heart Association, It is advisable to limit the dose of Adrenaline to 0.4 mg. Fortunately, now a days other Local Anesthetic agents are increasingly available in the market with alternative Vasoconstrictors like Felypressin. Use of these Local anesthetic solutions should be preferred if more than 3ml of solution is required. Avoid Intra vascular administration of L.A and inject the solution very slowly.
- Keep the appointments small Duration of dental treatment should be kept small so that patients tolerance levels are not tested.

- Dental treatment in a patient, with a recent history of MI: Elective dental treatments however small should be avoided up until 6 months following MI. Within 6 months if any urgent invasive treatment is required such as Extractions / RCT, the treatment should be delivered in a hospital setting where facilities exist should there be another attack of MI.

Management of Myocardial Infarction

1. Terminate the dental treatment.
2. Call for Ambulance as soon as MI is suspected.
3. Let the patient achieve a comfortable position.
4. If N₂O – O₂ is available, administer.
5. If N₂O – O₂ mixture is not available, give Oxygen.
6. NTG can be administered if the patient is not Hypotensive.
7. Administer Aspirin 300 mg as soon as MI is suspected. (Advise the patient to chew and swallow for quick action).
8. Monitor vital signs.
9. Prepare to initiate BLS/CPR should cardiac arrest supervenes.

Conclusion:-

With modern diet and life style, Dentists will see and have to offer dental treatment to patients, who are suffering with significant Coronary Artery Disease. Careful history and a good understanding of the Risk factors will identify these patients who are at risk, so that proper preventive measures can be taken.

Simple measures like Anxiety reduction, Supplemental oxygen, Slow administration of L.A, Avoiding intra venous administration and Minimizing the use of adrenaline will significantly reduce the untoward occurrences even in "at risk" patients.

When a patient develops Chest pain, a quick, systematic management has to be initiated as up to 60% of deaths following MI occur within the first few hours. Simple measures, which can be easily implemented by dentists like early administration of Aspirin in all suspected cases of MI was shown to be quite effective in reducing mortality. It has been reported that early administration of Aspirin in suspected cases of MI reduces the mortality by 42%. By adopting the above Protocols, Dental Health Care Professionals can fulfill their inherent duty of care to these group of patients.

References:

1. Charles H Hennekens, Chest, 1990, 97; 151-155
2. Stanley F Malamed, Medical Emergencies in Dental Office, 6th revised Edition.
3. Little: Dental Management of the Medically Compromised Patient, 7th ed. Copyright © 2007 Mosby, An Imprint of Elsevier
3. Ganda, Kanchan M. Dentist's guide to medical conditions and complications, 1st ed 2008. Wiley-Blackwell. Iowa, USA; pp 91-93.
4. Malamed, GF. Managing Medical Emergencies. Journal of American Dental Association 1993. 124: 40-53.
5. Zacharias, M., Hunter, K.MacD. Cardiopulmonary Resuscitation in Dental Practice – an update. NZDJ 90: 60-65; 1994.
6. Boorin, M.R. "Anxiety – Its manifestation and role in the dental patient", *Dent ClinNorth Am* 1995; 39 (3): 523-539.

Corresponding Author

Dr. E.Siva Prasad Reddy

**Profesor and Head,
Department of Oral Medicine,
Teerthankar Mahavir dental college and research institute,
Delhi Road , Moradabad.
U.P, India*