Management of Medical Emergencies in Dental Practice
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Lecture 11
Chest Pain of Cardiac Origin-Myocardial Infarction and Anigina Pectoris-Part 2

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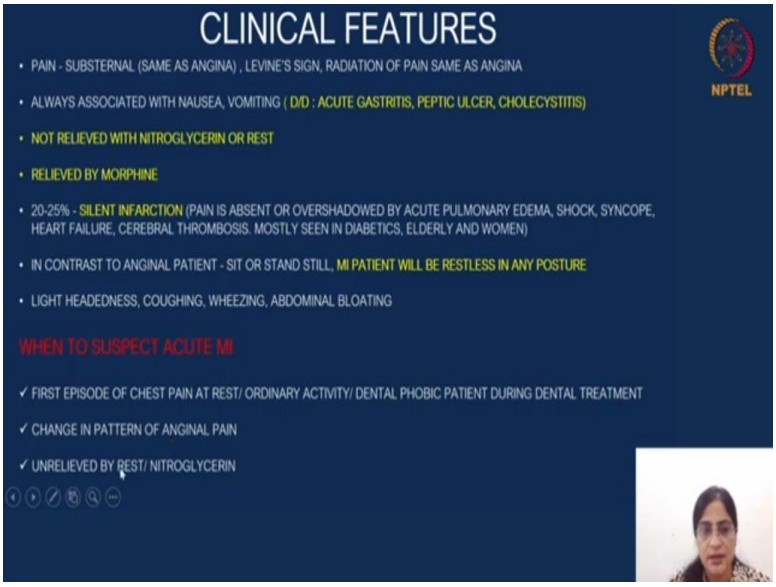

So, what will be the clinical features of myocardial infarction? You will be seeing the patient in the dental chair substernal pain same as angina, Levine sign, radiation of pain same as angina. It will be associated most of the time with nausea and vomiting; but you need to differentiate diagnose it from acute gastritis, peptic ulcer and cholecystitis. It will not be relieved by nitroglycerin or rest; the only relieving drug is the morphine.

Silent infarction is another kind of infection which happens constitute 20 to 25 percent cases of myocardial infarction. In this the pain is absent, or it is overshadowed by acute pulmonary edema, shock, syncope, heart failure, cerebral thrombosis, and it is mostly seen in diabetics elderly patients and women.

So, this is what is the silent infarction. And the patient's in contrast to the angina, anginal patients will be restless; like in anginal patient, the patient with either sit upright or standstill, but an MI patient will be restless in any posture. There can be light headedness, there can be continuous coughing, wheezing, and also abdominal bloating. So, these are the features which you can appreciate in a patient undergoing an MI attack.

So, when all you should suspect an acute MI? If there is a first episode of chest pain at rest, or doing an ordinary activity, or in case of extremely anxious patient having a phobia to the

dentistry, towards dentistry during dental treatment; you can suspect an acute MI. As I told earlier, any first episode of chest pain where the patient does not give you the history of angina pectoris or myocardial infarction, there has to be call for emergency medical services to try to treat it. So, any change in the pattern of anginal pain, and the pain which is unrelieved by rest or nitroglycerin acute MI is suspected.

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So, in this second part of the lecture, what all have we learned? We have learned how to take a thorough case history in terms of medical history. You need to find out the systemic diseases, what a patient is suffering from; whether the patient had hospitalizations or any previous surgeries done cardiac, non-cardiac.

Must go through the hospital record of the patient must, must ask for the file of the patient, even if the patient has not got the file. Just do not rely on what the patient is saying verbally; ask for the file, go through the file, and look at what drugs the patient is on. There can be n number of drugs, which the patient range of drugs which these patients are on.

Then, the description of the pain from the patient if the patient is having the history. So, what is important in the description of the pain, the duration, aggravating and relieving factors, any associated symptoms; and the duration since last episode of MI. Then we talked about the general physical examinations; how vitals are important for us. And what are the clinical features of angina pectoris and myocardial infarction in case it happens in chair. And when all you should use suspect MI?

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So after this, we go to the management part of these patients in case the anginal attack happens in chair; or in case the myocardial infarction attack happens in chair. First of all, for all these patients, for all these patients who give you the history of angina pectoris and myocardial infarction; or patients who are at high risk category, please adhere to the stress reduction protocols.

What is stress reduction protocol, what is the goal of it? The goal is to minimize the stress during the dental treatment, so that myocardial oxygen demand is met; because we do not want to increase the myocardial oxygen demand. And emotional stress is one factor at this it is all soul responsible for increasing the myocardial oxygen demand. Why? Because it increases the release of adrenaline to multiple folds, which is a huge risk, which is a huge risk to the cardiovascular system.

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So, what comes in stress reduction protocol? So, you need to, other than what you treat an anxious patient or a healthy patient of ASA 1 category? What all comes under stress reduction protocol? Recognize the patient level of anxiety, premedicate if required, scheduled the appointments in the morning.

Minimize the patient's waiting time, consider psychosedation during therapy, adequate pain control is required, length of appointment has to be considered. Follow up is required with post operative pain and anxiety control. You need to be in touch with the highly anxious or fearful patient later in the day, and monitor preoperative and post operative items.

Other than what you follow in the stress reduction protocol for ASA 1? That means healthy patient for ASA 2, 3 and 4. That means the patients we are talking about with a history of angina pectoris myocardial infarction; you must arrange the appointment for such patients during the first few days of the week, so that you are available.

You should not be operating; you should not be doing the dental procedure for the patient on a Saturday; when Sunday the clinic is shut or a Friday. So, try doing those patients though keeping those appointments in the beginning of the week; so that you are available for any emergency care at the in the rest of the week.

Along with this the add on things which I would recommend is keeping the communication on with the patient; keeping in verbal touch with the patient throughout the dental procedure, reassuring the patient. Giving them intermittent rest is very important for us, for such for managing such kind of patients for preventing any kind of attack in the dental chair.

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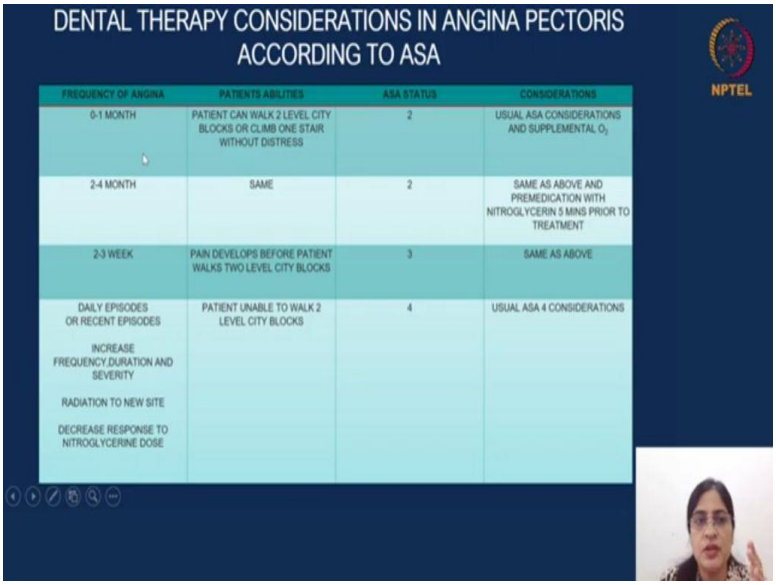

Also, keeping the dental clinic environment more friendly and positive is a good idea to keep the patient calm. Now, let us understand the ASA status of angina pectoris patients according to the frequency of angina that the patient has suffered. So, the patient who is having the frequency either no angina, but a high risk patient or history of angina one per month falls into the category of ASA status 2. So, in that the consideration is you only oxygen supply is good enough for such patients.

But, the patients who are having anginal attacks 2 to 4 per month, also come under the category of ASA status 2. But, pre-medicating them with nitroglycerin 5 minutes prior to the treatment and with supplemental oxygen is a good idea. In, now the patient having more number of attacks in a week like two to three in a week. Here we were talking about one per month, 2 to 4 in a month; now we are coming to 2 to 3 in a week.

So, such patients fall into the category of ASA status 3. Again, you need to premedicate them with nitroglycerin 5 minutes prior to the treatment and give supplemental oxygen. Now, ASA 4 patients are the patients who have daily episodes, or recent episodes of anginal attacks; there is increase in frequency duration and severity like how we talked about the change in pattern of the angina; there is a radiation to the new site.

There is a decrease in response to the nitroglycerin dose; that means these are the patients who are moving towards unstable angina or myocardial infarction. Such patients have ASA 4 considerations, where the elective dental procedures are not done in the dental chair. And only emergency procedures are done and that also not in the dental chair, but in a hospital setup.

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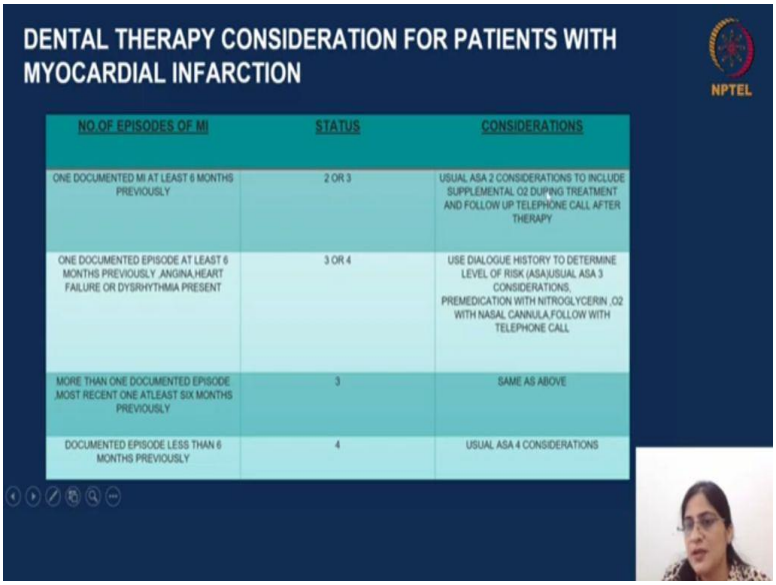

Now, the ASA considerations for patients who give you the history of myocardial infarction. So, one case that is documented in the file, at least six months previously come in the status 2 ASA status 2 or 3; so usual considerations of supplemental oxygen and follow up telephone call after the therapy is considered.

Now, one documented episode at least six months previously and along with angina, heart failure, and dysrhythmia present comes into the ASA status 3 and 4. So, in such patients you need to premedicate with nitroglycerin, oxygen supplementation is required and follow up telephone call.

If more than one documented episodes like that means the patient has suffered more than once the myocardial infarction and the; and the last one was at least six months previous. Again falls into the category of ASA status 3, same treatments as ASA status 3 that is premedication with nitroglycerin and supplemental oxygen.

And if the documented episode is less than six months previously, that becomes the ASA 4 category and the ASA 4 considerations are the same. No electric procedures to be done within six months, only emergency procedures can be done; and those emergency procedures also have to be done in a hospital setup.

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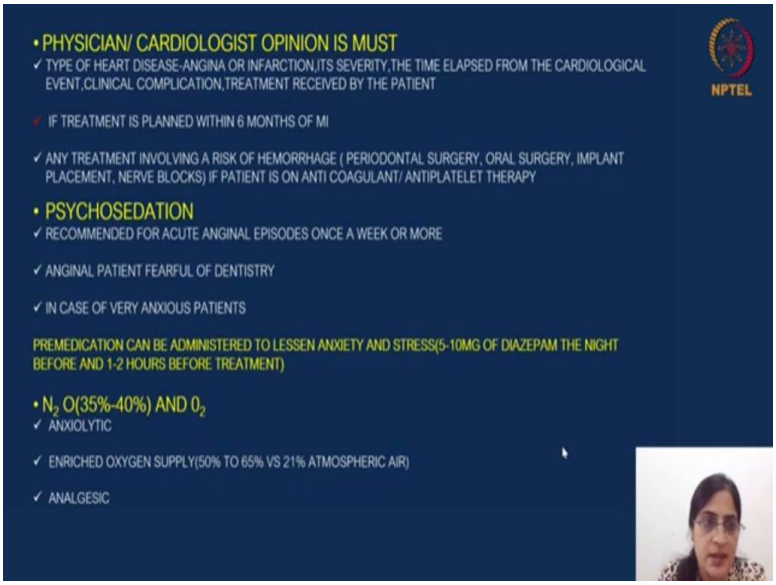

So, for such patients, the patients with history of angina pectoris or myocardial infarction, cardiologist opinion is must. So, when all do we require a cardiologist opinion? It depends on the type of heart disease, angina or infarction, its severity; how much time has elapsed from the cardiological event, what are the clinical complications which you are expecting? What is the treatment received by the patient, you must have one one to one conversation with the cardiologist.

If the treatment is planned within six months, then also cardiologist opinion is must. And any treatment involving the risk of hemorrhage, like periodontal surgery, oral surgery, implant placement, nerve blocks; and if the patient is already on anticoagulant or antiplatelet therapy, then also cardiologist opinion is must.

Consider psychosedation. Now, when I am talking about psychosedation, I am trying to tell you to give orally some sedatives, either before the surgery or a night before the surgery; or the dental procedure to calm the patient to reduce the anxiety; especially the patients who have dental phobia, extremely anxious, fearful patients.

So, when all do you recommend psychosedation for acute anginal episodes once a week or more, it is recommended. For anginal patients who are fearful of dentistry or in case of very anxious patients. So, how do you premedicate? Your premedication is administered to lessen the anxiety and stress; and you premedicate with 5 to 10 mg of diazepam. You can also give lorazepam the night before and one to two hours before the treatment.

Another mode to help us with psychosedation is the nitrous oxygen and nitrous oxide and oxygen. So, nitrous oxide is 35 to 40 percent concentration, so it has three purposes. Once it is one, it is anxiolytic; so helps with sedation of the patient. Second, it provides enriched oxygen supply almost 50 percent of 65 percent oxygen concentration versus the 21 percent oxygen concentration in atmospheric air; and it is mild analgesic also.

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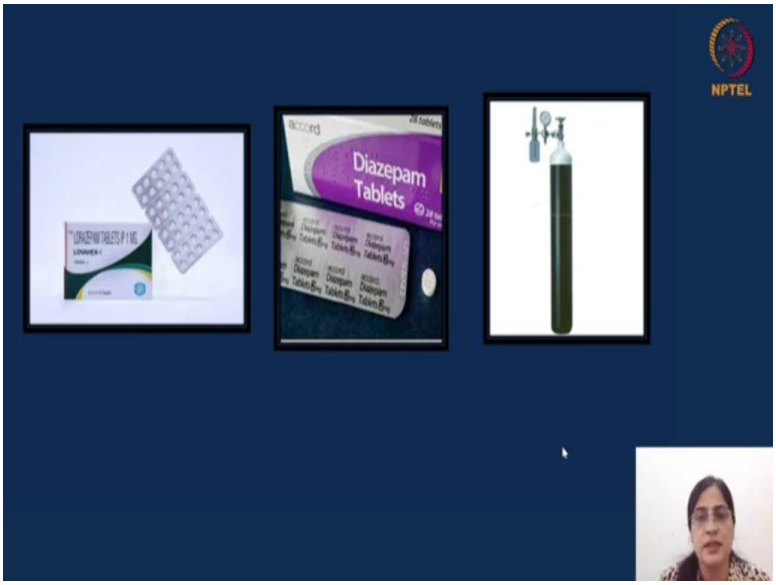

So, this is what Lorazepam, Diazepam and the nitrous oxide oxygen you can have in the dental clinic for psychosedation purpose.

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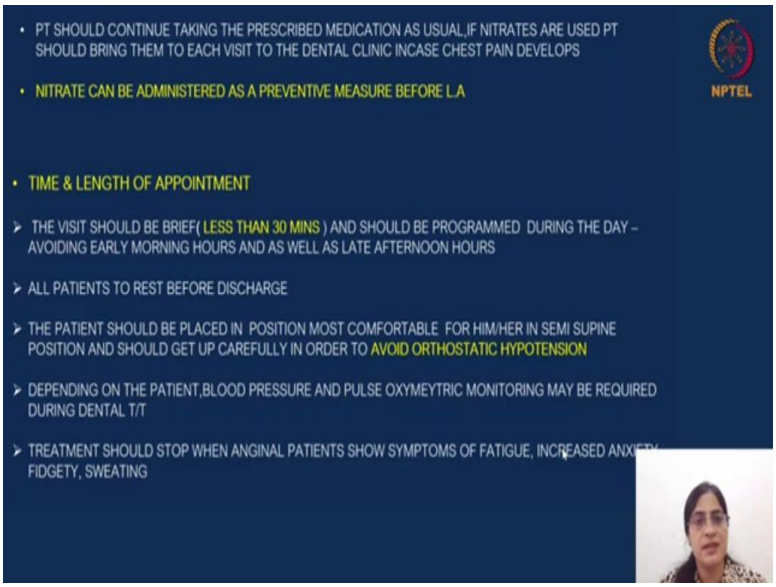

Also if the patient is already prescribed with the medication, the patient has to continue the prescribed medication as usual. And it is a good idea that whatever form of nitroglycerin the

patient is taking, the patient can get his her own nitro nitroglycerin rather than using from the clinic. So, that is a good idea in case the chest pain develops there.

And you can also give nitroglycerin as a preventive measure before local anesthesia; because local anesthesia is something the needle prick or something, which can trigger an emotional stress or an anxious anxiety. So, it is important that it has to be given before you inject local anesthesia to the patient.

Now, another important factor which you must keep it in mind is the duration of the appointment and the time of appointment. The time of appointment we have already discussed is usually in the morning times; not early morning times because at that time the catecholamines are quite a bit in the blood.

Early appointments, early morning appointments, and late evening appointments are to be avoided for such patients; so daytime appointments is good idea and also in the beginning of the week. Regarding the length of the appointment, if you keep it less than 30 minutes is a good idea. It should be brief, and it should be like or you can depend it on the comfort of the patient.

If the patient is comfortable, you can extend the duration of the appointment; all the patients are supposed to rest before they are discharged from the clinic. The patient should be placed in a position which is most comfortable for him or her; and semi supine is the most recommended one and patient should get up carefully. There is no hurry to tell the patient to walk off the chair. The patient can get up slowly from the chair in order to avoid orthostatic hypotension.

Any kind of trigger, we do not want to trigger an attack of angina or myocardial infarction chair. Depending on the patient, the patient's blood pressure and the oxygen saturation monitoring can be done during the dental treatment. And anytime the patient anginal patients or infarction patient show symptom of fatigue, or increased anxiety, or they are being fidgeting; or there is a sweating happening, the treatment should stop there itself.

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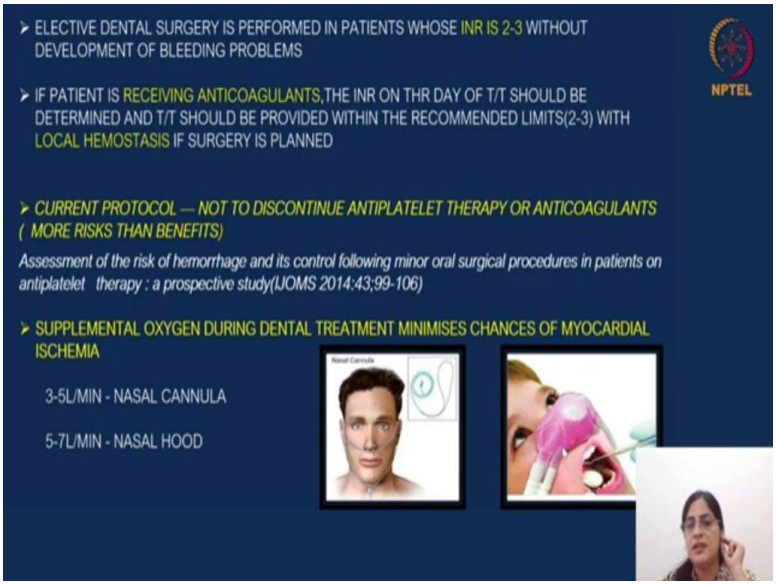

So, for myocardial infarction patients, we need to have the blood parameter INR which is the International Normalized Ratio. It has to be in the region range of 2 to 3 before you take the patient for any elective dental surgery. So you do not, you are trying to prevent any bleeding issues which happens in dental chair. Also if the patient is receiving anticoagulants, it is important to do the INR on the day of the treatment; and it should be within the recommended limits and if required, you can do local hemostasis.

Now, this local hemostasis or local hemostatic measures which can be used, I would like to advise that the current protocol says not to discontinue the antiplatelet therapy or anticoagulant therapy. We will come across or you will you must be coming across in clinics such kind of patients, who have themselves stopped aspirin or the antiplatelet therapy three to four days before by themselves; or the cardiologist has told them to stop.

So, it is basically a miscommunication. Try talking to the cardiologist, try talking to the physician that you are going to give you know, you are going to do an extraction; you are going to achieve hemostasis in the dental chair. You are going to give sutures, so the stoppage of antiplatelet therapy or the anticoagulant therapy is not a good idea; because it has more risks than benefits.

And there is another article which is which you can Google and read it. It shows you the levels of hemostatic measures, which can be used to control the bleeding; that is the assessment of risk of hemorrhage, and it is controlled following minor oral surgical procedures in patients on antiplatelet therapy.

So in that article mentions that the basic local hemostatic measure which you should do in such patients who are on antiplatelet or anticoagulant therapy, is at least suturing is required for all these extractions. And in case the patient is still having bleeding, then local hemostatic agent and over that suturing would be a good idea; rather than leaving the extraction socket open in such patients. So, make use of the local hemostatic agents send suturing; or you can even pack the extraction socket if it is bleeding, and suture over it and remove the pack after 24 to 48 hours.

So, this is an important issue which you must be aware of rather than stopping the antiplatelet agents. So now, only in case of high risk patients where the cardiologist would want the anticoagulant therapy to be stopped; that is the only scenario where it is okay. But, in case the patient is stopping the drugs on his own, it is better to have a word with the cardiologist or a physician before going with the procedure.

So, next is the supplemental oxygen, which can be given during dental treatment; it will minimize the chance of myocardial ischemia. So, that is through the mode of nasal cannula; it is 3 to 5 liters per minute. And if you are giving a nasal good kind of a thing, then 5 to 7 liters per minute.

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Now, very important factor for us not to trigger an emotional stress or a pain in a patient to achieve a good pain control during the treatment. So, it starts right at the time of local anesthesia, so that prick of the needle is also painful to the patient. So, our aim is to achieve painless anesthesia. How can we achieve that?

We can use topical gels or sprays before putting the needle inside; we can use a thinner gauge needle 30 gauge needle is least painful as compared to the 26 gauge needle. Also the speed of injection of 1 ml per minute; it has to be such a slow deposition of local anesthetic solution that the patient does not even realize it.

So, these all are the factors which are responsible for painless anesthesia and once you achieve a good anesthesia profound local anesthesia; that means the depth of the anesthesia is good, the rest of the entire procedure the patient will cooperate; and you can prevent any kind of anginal or myocardial infarction attack during the dental procedure.

So, there is another controversy which is always going on and people have confusion whether to give plain local anesthesia, or whether to give local anesthesia with adrenaline. What happens is if you do not give local anesthesia with adrenaline, if you are giving a plain local anesthesia, then the profoundness of local anesthesia is not achieved.

So, there is due to that feeling of pain due to that stress, there is an epinephrine release from the adrenal medulla in the body of the patient, which is almost 20-40 folds more due to the pain. And this increases the myocardial oxygen demand; and it can trigger a cardiovascular event in the dental chair.

So, adding adrenaline is very important to the local anesthetic solution for the profound local anesthesia. And benefits we all are aware of it, gives us the longer duration of action, more profound, reduces systemic toxicity; and lastly it gives you the bloodless field in that particular way.

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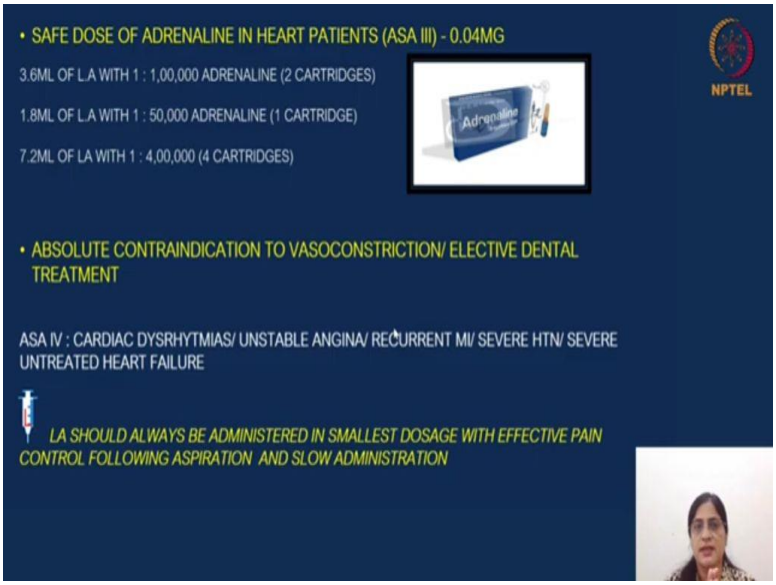

So, why I am insisting of not to use plain lignocaine hydrochloride, plain local anesthesia at least till ASA 3; because the safe dose of adrenaline in heart patients we all are aware of is 0.04 milligrams. Now, imagine if we are using a local anesthetic solution 2 percent lignocaine hydrochloride with adrenaline concentration 1 is to 1 lakh.

So in that case, if the maximum dose is 0.04 mg, you can easily inject 4 ml of local anesthetic solution, if you are taking taking it from a vial. If you are using a cartridge, the cartridge has 1.8 ml of local anesthetic solution. So, you can easily give 3.6 ml of local anesthetic solution with 1 is to 1 lakh adrenaline concentration; that means 2 cartridges.

So, why the patients should experience pain and trigger adrenaline release in the body for it. So, it is very important for us to have a good pain control, profoundness of local anesthesia. So in case, you are using 1 is to 50,000, then one cartridge is good enough. If you are using 1 is to 4 lakh, then 4 cartridge easily you can inject local anesthetic solution. And as per the literature, there is a good amount of literature which supports that there is no difference in efficacy of concentration of 1 is to 1 lakh, or 1 is to 2 lakh of adrenaline.

The concentration does not interfere in the efficacy of adrenaline; so easily you can opt for a more dilute adrenaline like 1 is to 2 lakh. And at the same time, inject more amount of local anesthetic solution; and get maximum cooperation from the patient and the let, let the patient be relaxed in the dental chair. Only case where adrenaline is absolutely contraindicated, where no way you can give a vasoconstrictor is ASA 4 patients.

Now, who are who all are those ASA 4 patients? The patient's having cardiac dysrhythmias; the patient having unstable angina, recurring myocardial infarction patients. Severe hypertensive patients, severe untreated heart failures, thyrotoxicosis; these all are the only categories of ASA 4, where adrenaline is absolutely contraindicated, or any kind of elective dental procedure is contraindicated.

Whenever you are injecting local anesthesia, it should be administered in the smallest dose, where you can achieve profound local anesthesia, effective pain control and you must aspirate and must administer the local anesthetic slowly at the speed of 1 ml per minute. It is a good idea even when you are injecting into the tissues, or you are giving a block; you keep withdrawing the needle while you are injecting, so, so that you are not at any time into the blood vessel. So, it is good idea to keep withdrawing keep depositing, keep withdrawing keep depositing the local anesthetic solution.

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We have alternatives also to lignocaine hydrochloride, like maybe mepivacaine hydrochloride with levonordefrin; that is another form of adrenaline. Another form of vasoconstrictor, even mepivacaine can be used in as a vasoconstrictor in heart patients; or you can use 3 percent mepivacaine or 4 percent prilocaine also.

Now, for prosthodontic concerns, there is an epinephrine cord which is used for gingival retraction for greater impressions of the ground progressions, so that has high concentration of epinephrine. Almost 8 percent epinephrine is there, which is a combination of dextro and levorotatory forms. And 1 ml what we were talking about in regular local anesthetic has 0.001 milligrams, it has 40 milligrams.

So, in case the mucous membrane is not injured or not abraded, then it is of least concern. But, in case the gingival mucosa or the membrane is abraded and there is an active bleeding, then this adrenaline can be absorbed into the blood. And the patient can have cardiovascular manifestations like palpitations, sweating, tremors or headache; so there you have to be careful.

In this we have already discussed if the patient is on antibiotic medication, so you need to control the local bleeding. For that local hemostatic agents other than suturing, you have bone wax, gel foam, surgical, collagen thrombin tissucol; you have antifibrinolytic agents as transexamic acid also. For all these patients of angina and myocardial infarction or close follow up is required.

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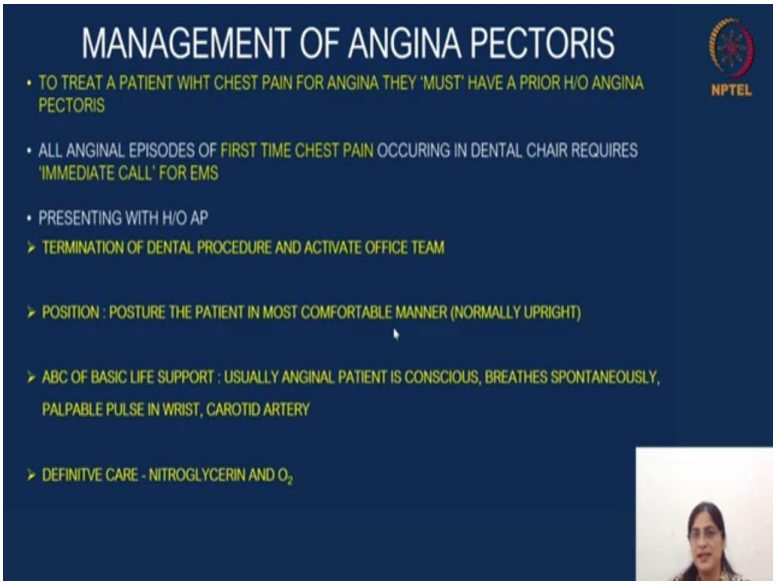

So, this is now we are coming to if the patient is having the anginal attack in the chair, so what is the ABC of managing it? So, to treat a patient with chest pain for angina, they must have a prior history of angina pectoris. So, all anginal episodes of first time chest pain occurring in dental chair requires immediate call for emergency medical services. You are not going to manage the first time chest pain if you feel, it could be angina on myocardial infarction, emergency medical services have to be summoned.

Now, till the emergency medical services reach you, what all you can do? Terminate the dental procedure, activate the office team. Position the patient in the most comfortable manner; mostly the patient will be comfortable in upright position. ABC of basic life support is taken care of airway, breathing and circulation, usually the angina patient will be conscious.

He will or she will breath spontaneously; you will be able to palpate the pulse in the wrist, or the carotid artery. And what is the care you can take in the dental chair? You can give nitroglycerin sublingual nitroglycerin to the patient along with supplemental oxygen.

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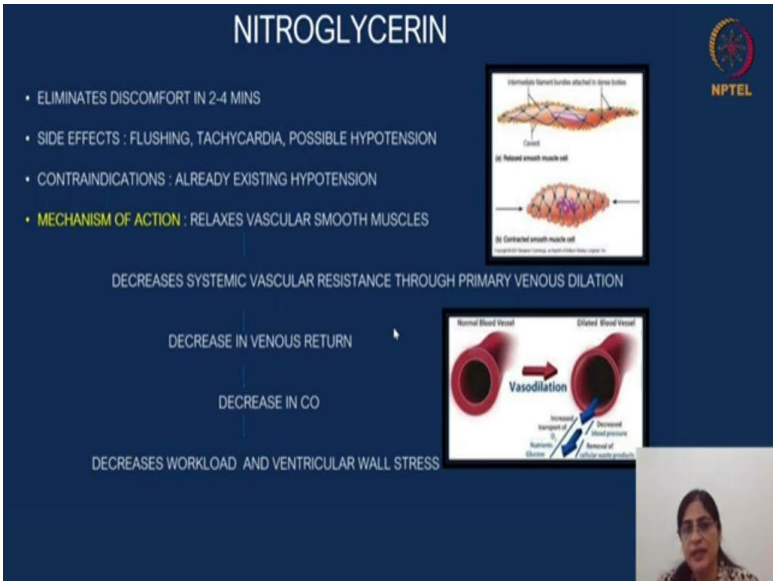

So how does nitroglycerin work? It eliminates the discomfort within few minutes like two to four minutes; and definitely it is contraindicated if there is an already existing hypotension in the patient. You can have side effects like flushing, tachycardia, tachycardia, possible hypotension. What is the mechanism of action? It relaxes the vascular smooth muscles. So, this is the contracted smooth muscle, this is the relaxed, so that is how it is.

This is the see this was the lumen of the vessel and the venous dilation which is happening. So, it decreases the systemic vascular resistance through primary venous dilation. This decreases the venous return to the heart; there is a decrease in cardiac output and this decreases the workload and ventricular wall stress.

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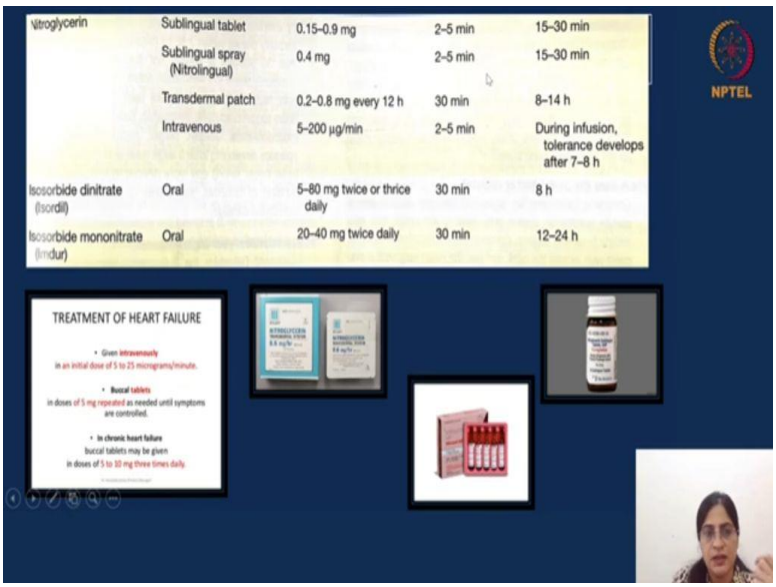

So, it is usually given sublingual, you have tablets available or sprays available. And it is 0.2 to 0.6 milligram dose which is given; the relieving period is 2 to 5 minutes. So, these are the various formulations or availability forms of nitroglycerin as tablets or sprays.

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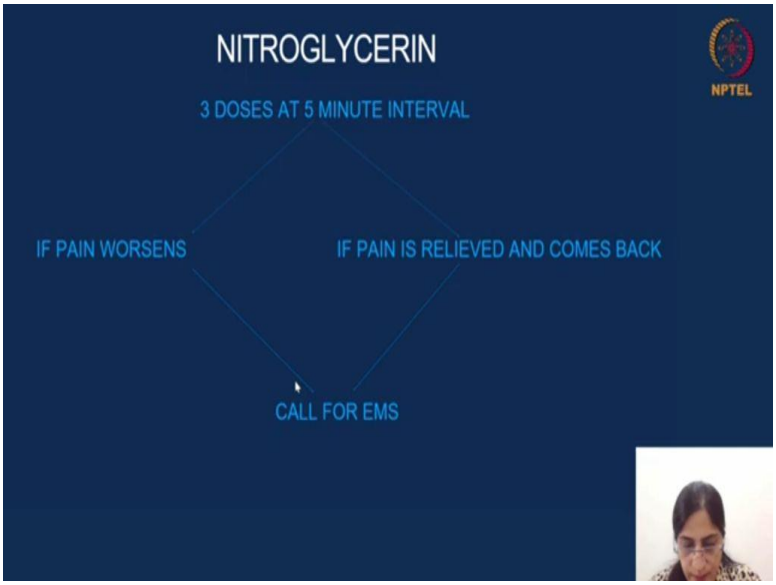

So, in a patient who is having an angina attack, how much nitroglycerin you can give? You can give three doses at 5 minute interval, so one second. So, so three doses at 5 minute interval; now there can be two scenarios after that. If the pain is relieved completely, it is fine; if the pain is relieved and it is coming back. That means the patient is going into either unstable angina or myocardial infarction.

And if the pain is worsening again if the patient is going into unstable angina or myocardial infarction, and you have to call for EMS. So, not more than three doses at 5 minute interval, you can try nitroglycerin. This is all you are doing till you your image emergency medical services are arranged; and you have arranged the transportation of the patient to the hospital.

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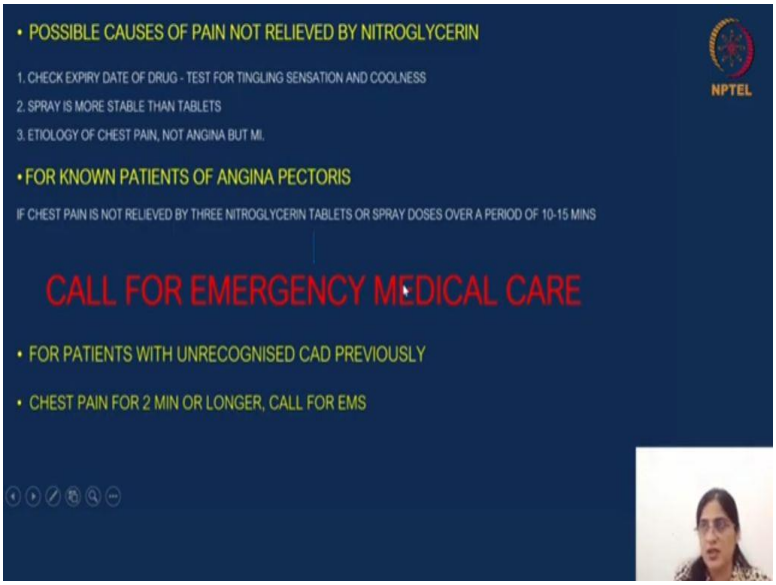

What can be the reason of the pain not relieved by nitroglycerin? Check the expiry date of the drug. If you are using it from the clinic if it is not the patient, what the patient is carrying, please check the expiry date of the drug. You can test the drug whether it is causing any tingling sensation and coolness. If it is this testing positive for tingling sensation and coolness that means the drug is working.

Spray is supposedly more stable than tablets. If the etiology of the chest pain is not angina but myocardial infarction; then in that case, nitroglycerin will not work. So, for the patients who have the history of angina pectoris, if the chest pain is not relieved by three nitroglycerin tablets or spray doses over a period of over a period of 10 to 15 minutes, then call for emergency medical care.

When all possible scenarios you can you have to call other than this for the patients with an unrecognized coronary artery disease previously; that means the patient is not was not aware of, and did not give any history of previous myocardial infarction of angina pectoris. Or if there is a chest pain which is happening for 2 minutes or longer, you have to call for EMS. So, these are the three situations where you have to call for the emergency medical care.

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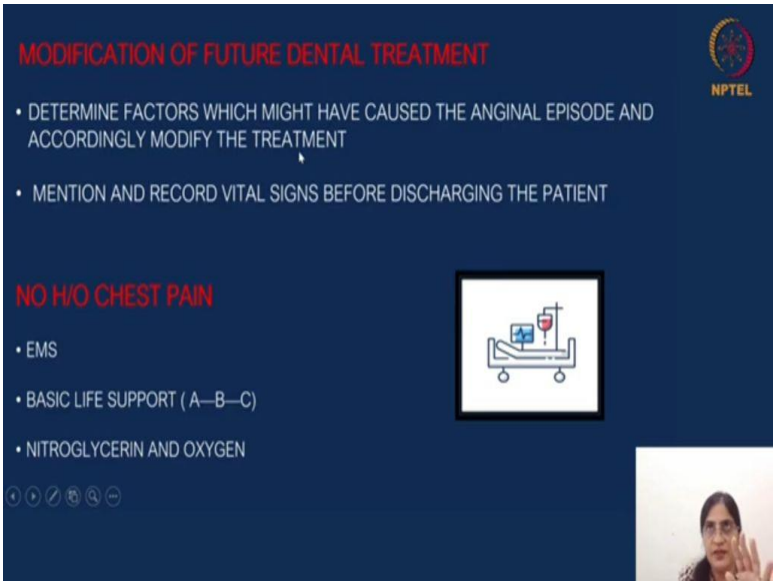

So, how do you modify afterwards your future dental treatment? You please determine and consider the factors, which might have caused the anginal episode and accordingly modify your treatment; and always mention and record the vital signs before discharging the patients. Now, in case these were this was the management if the patient develops these angina attack during the dental procedure, and the patient had the history of chest pain associated with angina.

Now, there can be a scenario where there is no history of chest pain associated with angina. In that case, you have to call for EMS, Basic Life Support A-B-C has to be followed and nitroglycerin and oxygen have to be given till the emergency medical services are arranged.

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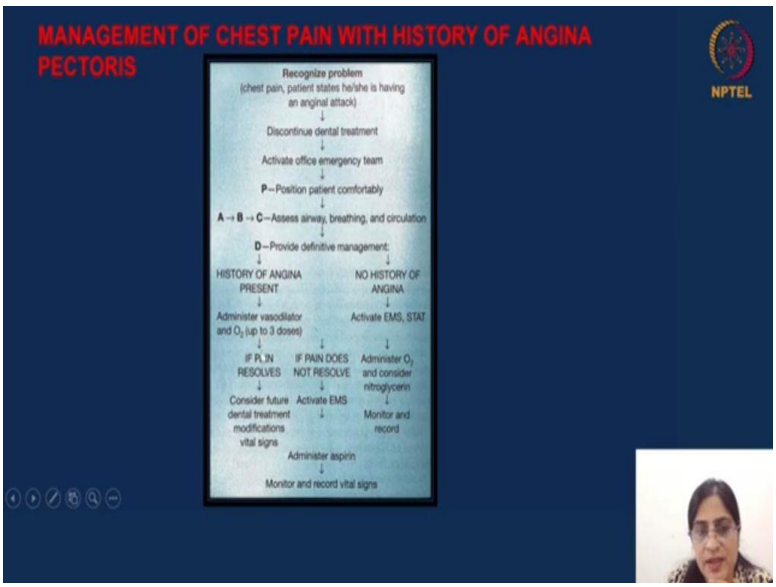

So, let us summarize the management of chest pain with history of angina pectoris. Recognize the signs and symptoms, discontinue the dental treatment, activate the office emergency team. Position the patient comfortably, do the ABC, assess the airway, breathing and circulation, and provide the definitive management.

Now, in the definitive management if there is a history of angina, then administer the vasodilator; that is your nitroglycerin up to three doses and supplemental oxygen. If the pain resolves with this, then you can consider the future dental treatment modifications and vital signs.

If the patient, if the patient's pain is not resolving with this, activate EMS. You can give loading dose of aspirin which is 150 to 300 milligrams and keep monitoring and recording the vital signs. The other scenario can be if the patient does not have any history of angina, immediately you have to activate EMS. And administer oxygen consider giving nitroglycerin and monitor and keep recording the vital signs.

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Now, this this was what we talked about the patients with angina pectoris. Now, coming to managing the patients who get a myocardial infarction attack in the dental chair. Other than what you do for angina, what else has to be done for myocardial infarction patients? First of all, find out what ASA is standing; whether it is ASA 3, ASA 2 or ASA 4; that will depend on the basis of time elapsed since last infarction.

Or, the ASA status will be decided according to the number of prior infarct and the presence of continuous signs and symptoms of cardiovascular disease. So, as for angina, follow the

stress reduction and adequate pain control supplemental oxygen, you can consider psychosedation in such patients. Pain control, pain control in case of myocardial infarction also is very important. Same as for angina we have talked about duration of treatment should not exceed the patient's level of tolerance.

Only ASA 4 category patients who have within, who had myocardial infarction within six months of last episode. So, they are contraindicated for any kind of elective dental procedures; only emergency dental procedures can be done. And that emergency dental procedures can be just an incision and drainage if there is an abscess formation. Or you have to continue with the antibiotics and analgesics and try achieving those six months; and do a plain treatment.

But, all emergency dental procedures within the six months have to be done in a hospital setup. Elective treatment has to be postponed; elective treatment can only be done after six months have elapsed since last myocardial infarction. And elective treatment which can be a potential risk of bleeding or hemorrhage has to be done in a hospital setup after six months also.

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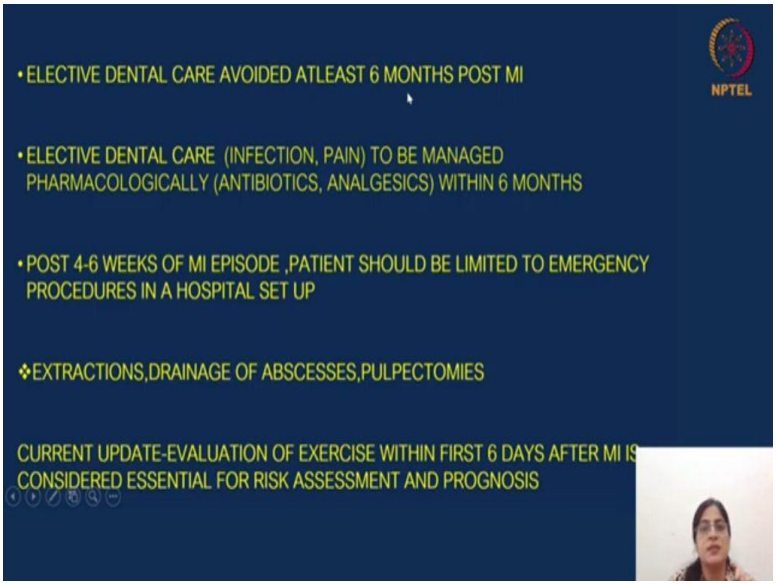

So, this we have discussed, avoided at least six months post MI. So, elective dental care can be managed if there is an infection or pain with antibiotics, and analgesics within those six months. There is a current protocol of limiting the emergency procedures in a hospital setup within the 4 to 6 weeks of MI episode.

What those emergency procedures include are the extractions, drainage of abscesses and pulpectomies. Current update is that evaluation of exercise within the first six days after MI is done is considered essential for risk assessment and prognosis.

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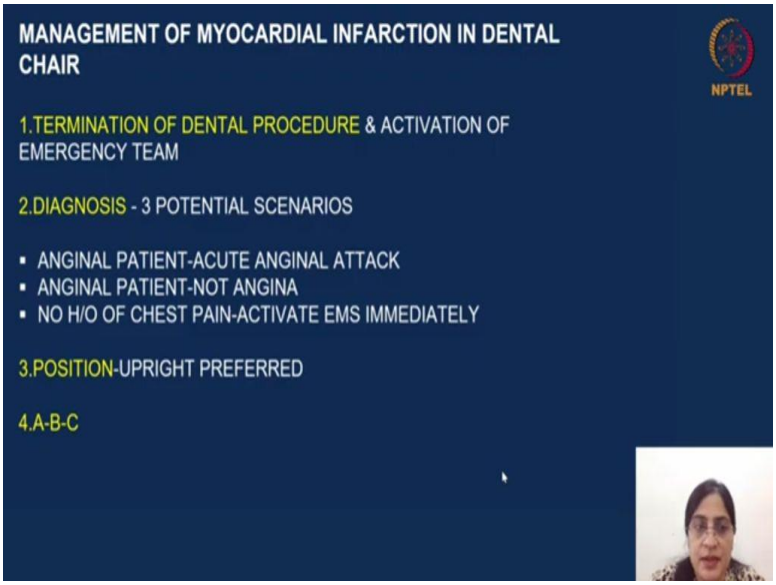

So, first of all dominate the dental procedure, if the attack is happening in the dental chair, activate the emergency team. There can be 3 potential scenarios happening in the dental chair when you diagnose MI. It could be an anginal patient having an acute anginal attack. It could be an anginal patient, but this time the patient says it is something different; it is something more severe, it is something worsening.

So, the patient is not current possibly having not angina and patient is going into unstable angina. Or there is no history of chest pain, then of course, you have to activate EMS immediately. So, you need to identify this these scenarios. Thirdly, position of upright position is mostly preferred. Carry on the airway breathing, circulation assessment.

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What comes in the definitive care, which is the prehospital management is important is morphine, oxygen, nitroglycerin and aspirin. So, what is oxygen doing? With the help of supplemental oxygen, you are increasing the myocardial oxygen supply. And with the help of thrombolytic therapy, also you are increasing the myocardial oxygen supply. Then, Beta Blockers can be given to reduce the force of myocardial contraction and thereby the oxygen demand. You can increase the metabolic substrate availability through nitroglycerin and thrombolytic agents.

Morphine would be a good drug in the pain management of myocardial infarction as an anti-inflammatory drug, to decrease inflammation or toxic injury to injured myocardial cell function. And antiplatelet therapy, that means the loading dose of aspirin of almost 150 to 300 milligrams to prevent reocclusion of coronary artery disease. This all you can provide to the patient before the patient is taken to the hospital.

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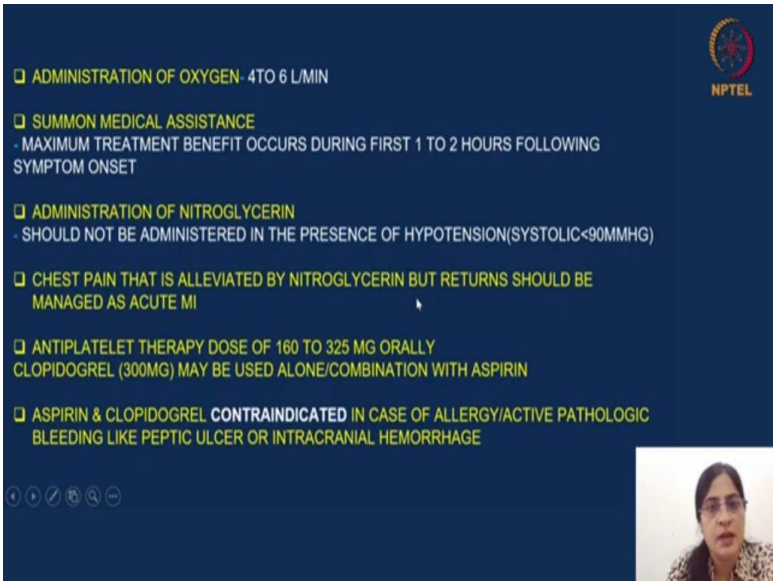

So, how much oxygen administration of oxygen is 4 to 6 liters per minute. Maximum treatment benefit occurs during the first 1 to 2 hours; so summoning the medical system Emergency Medical Services has to be very quick. Nitroglycerin should not be administered in the presence of hypotension; that means the systolic blood pressure is less than 90 millimeters of mercury.

And chest pain that is alleviated by nitroglycerin, but return should be managed as acute MI; this we have already discussed. Antiplatelet therapy as a loading dose of 160 to 325 milligrams can be given alone or in combination with clopidogrel. Aspirin and clopidogrel both are contraindicated in case of any allergy or any active pathological bleeding like peptic ulcer or intracranial hemorrhage. So, basically before providing the drugs to the patient, you must know the contraindications also before it is administered to the patient.

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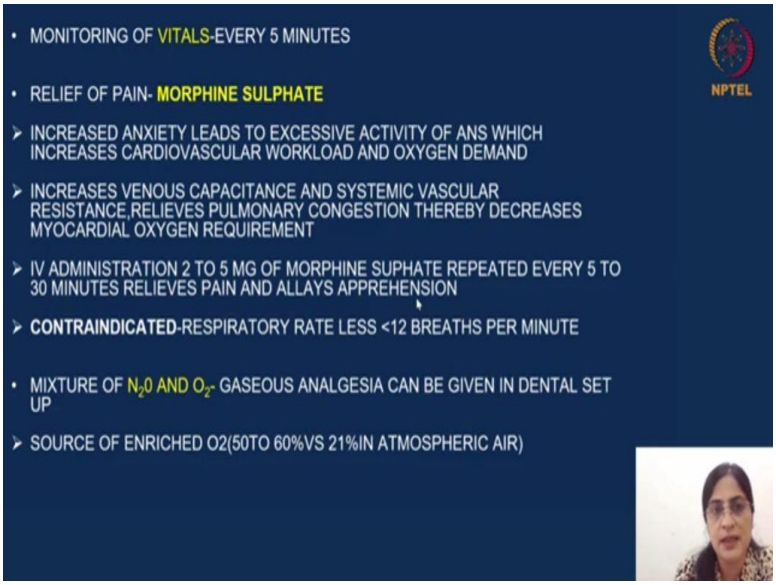

Monitor the vitals every five minutes. Morphine sulfate is used to relieve the pain; because what is happening because of the increased anxiety, it is leading to excessive activity of the autonomic nervous system, which increases the cardiovascular workload and oxygen demand. Now, what if morphine doing? Morphine is increasing the venous capacitance and systemic vascular resistance. It relieves the pulmonary congestion, thereby decreasing myocardial oxygen requirement.

It can be administered intravenously 2 to 5 milligrams of morphine sulfate, and it can be repeated every 5 to 30 minutes. And it relieves the pain and allays the apprehension. It is definitely contraindicated in case the respiratory rate falls down to less than 12 breaths per minute.

You can also provide mixture of nitrous oxide and oxygen as gaseous analgesia in dental setup. And it acts as a source of enriched oxygen that we have already discussed because it is providing 50 to 60 percent of oxygen saturation, rather than 21 percent in atmospheric air.

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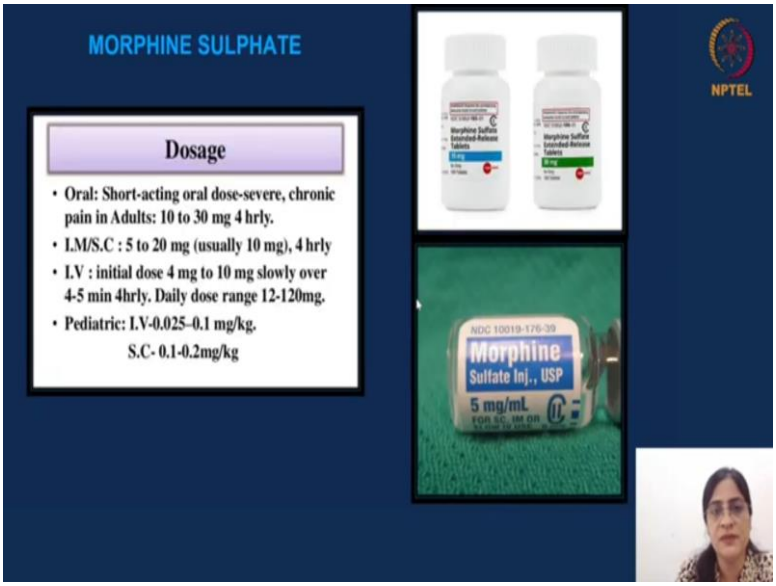

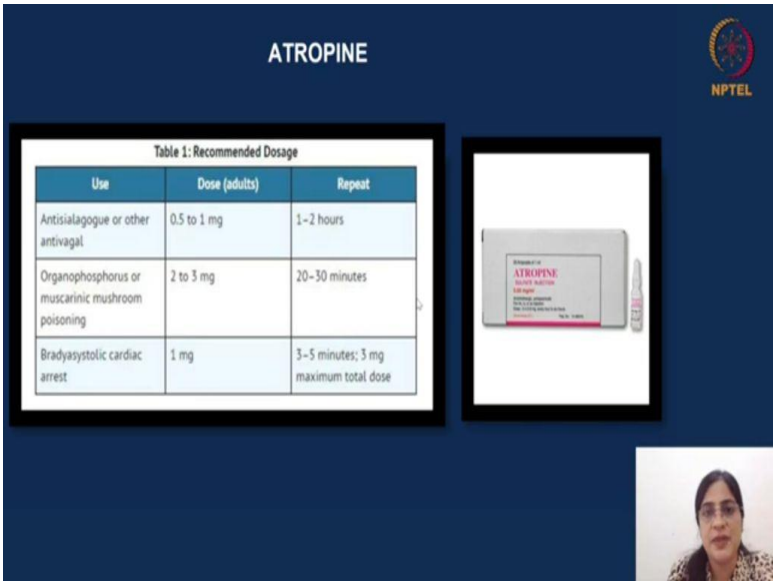

So, that is the morphine sulfate, Atropine in case the patient develops bradycardia.

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Now, what can be the complications of myocardial infarction? Acute dysrhythmias, left ventricular failure and cardiac arrest. Now, these all complications cannot be handled in the dental chairs; for that you need require a specific training to, first of all, interpret the ECGs, to do the ECGs; and accordingly manage the dysrhythmias. You should know how to do CPR CPR training is definitely a very important part of dentistry.

Now, as a dentist surgeon, we must know how to do CPR, which then you have to be trained in operating a defibrillator device also. Or, to inject intravenously, or to give such kind of aids that training is required to manage the complications.

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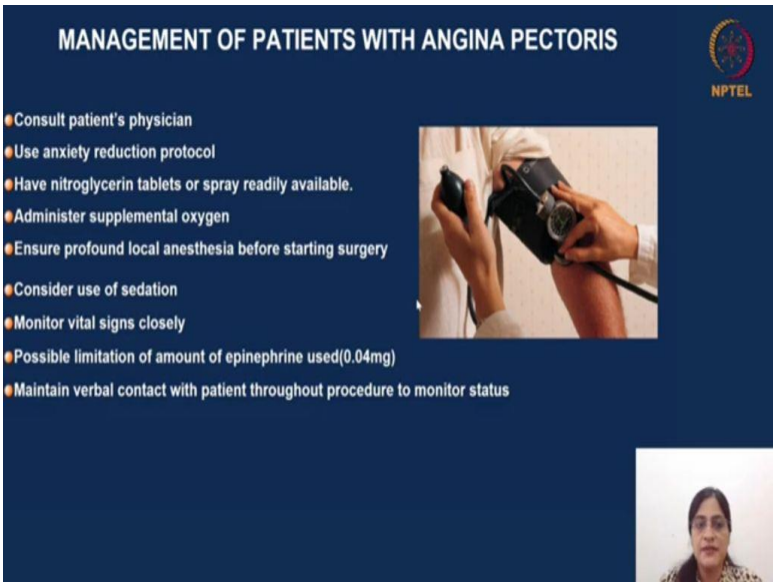

So to summarize, I would like to tell you the management of patients with angina pectoris; the consult, consulting the cardiologist is very important. Use the stress reduction protocol, have nitroglycerin tablets or spray readily available with you. Administering supplemental oxygen is a good idea in such patients to increase the oxygen supply to the myocardium.

Ensure profound local anesthesia before starting the surgery, consider the use of psychosedation, monitor vital signs closely. And limit the amount of epinephrine 0.04 milligram is the maximum what you can use in a heart patient. And maintaining verbal contact with the patient throughout the procedure is very important to monitor the cardiovascular status.

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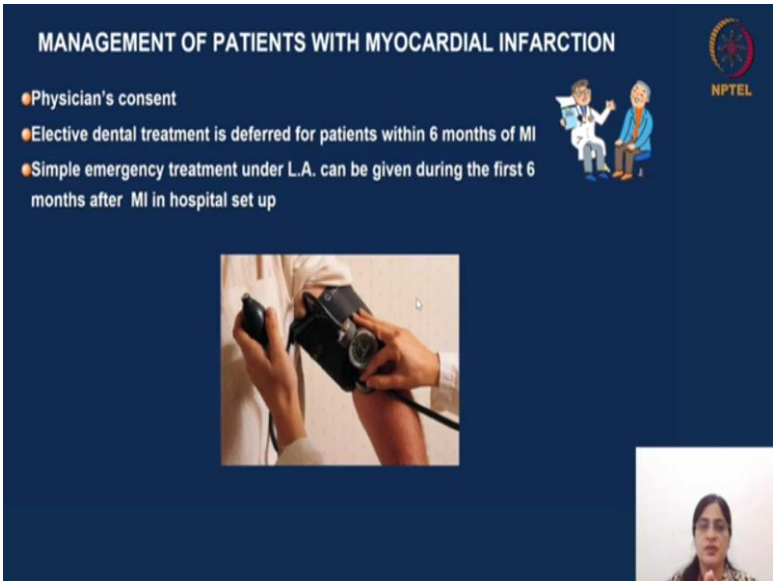

Similarly, management of patients with myocardial infarction, physician consent is must. Elective dental treatment is to be deferred for patients within the six months of myocardial infarction. Simple emergency procedures can be given during the first six months after myocardial infarction but in a hospital setup.

And till the emergency medical services reach you or you are able to transport the patient to the hospital nitroglycerin. Giving oxygen, giving a loading dose of aspirin is a good idea to save the patient, and make the patient reach with within the first hour of myocardial infarction.

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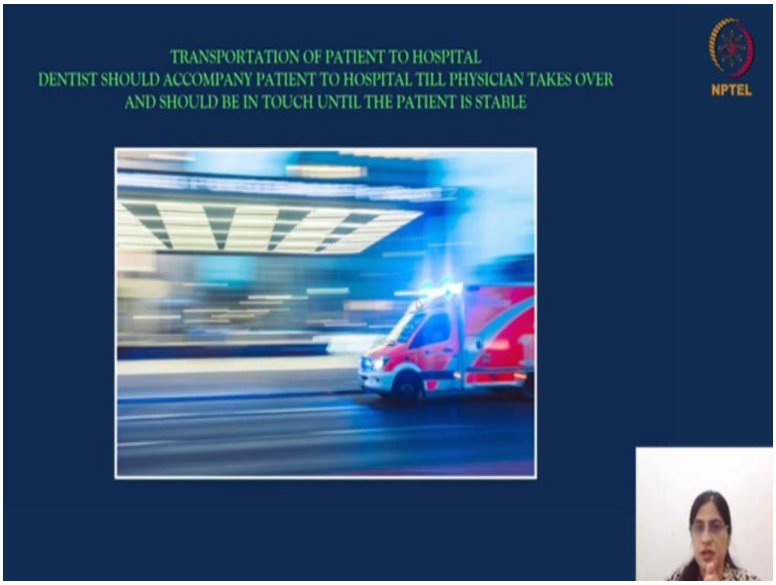

So, transporting the patient to the hospital, the moral ethic says that the dentist must accompany the patient to the hospital. Then the physician takes over and should be in touch with the family until the patient is stable.

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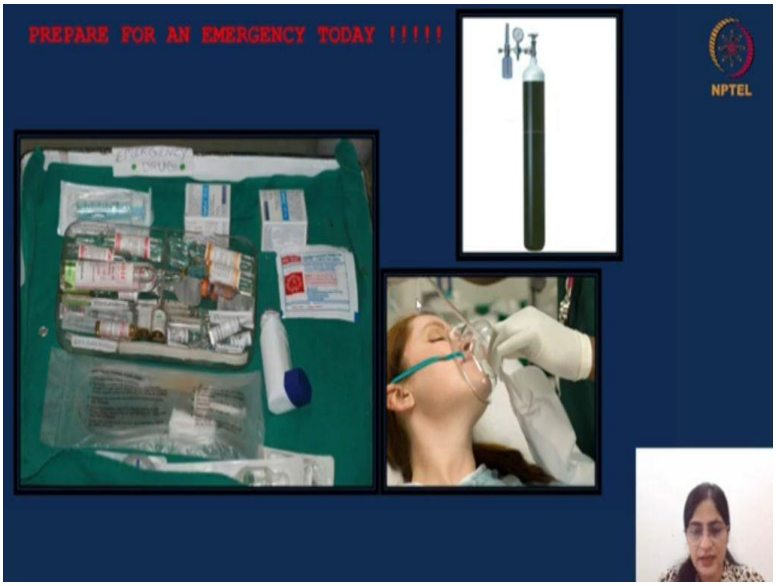

So, prepare for an emergency, have the emergency drug tray ready, have nitrous oxide oxygen cylinder with you, some oxygen masks. Please check the expiry date of the drugs and keep checking them regularly. So, that when it is there is a medical emergency in dental chair, you should be falling, you should not be falling short of the drugs at that time.

Like to say as a dentist, we should be able to identify the medical emergencies, must adopt proper measures to prevent and manage them quickly and effectively. So, I hope you all have

a great learning experience from this course, and become confident to handle any kind of medical emergency in your dental practice. Stay safe. Thank you.