**Management of Medical Emergencies in Dental Practice**
**Professor Doctor P. Suresh Kumar**
**POSTURAL HYPOTENSION**

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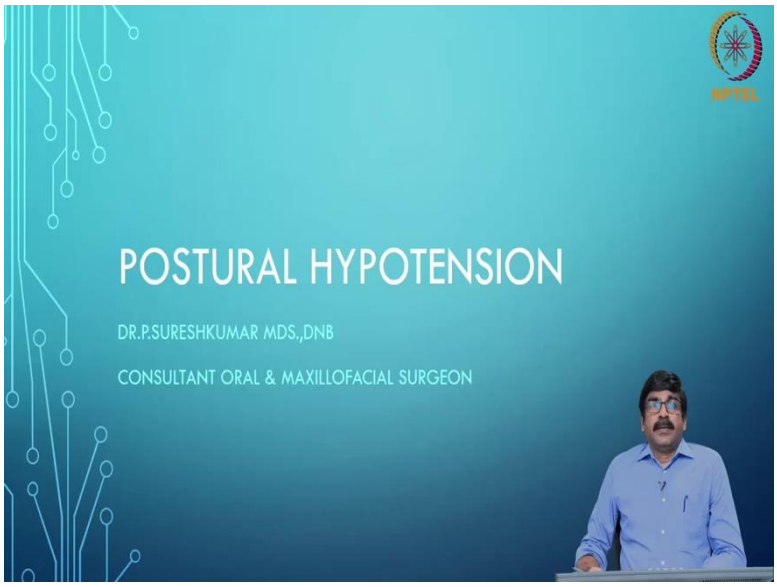


Hello friends, we are here again to discuss one of the complications in dental science, which is known as Postural Hypotension. Which is relatively rare, but an important complication to be aware of.

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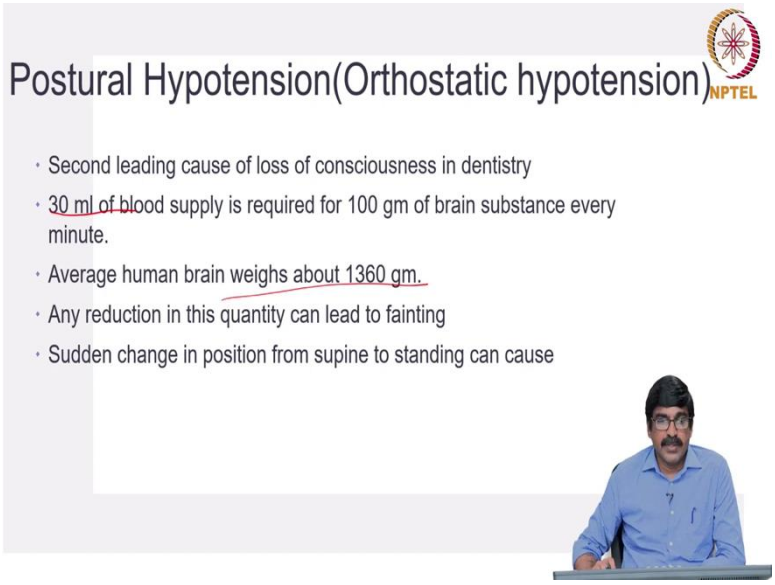


Postural Hypotension is also called Orthostatic Hypotension that is change in position leading to hypertension that is the literal meaning of postural hypotension. It is a second leading cause of loss of consciousness in dentistry. If you look at the blood supply to the brain, the brain

needs 30 ml of blood supply for 100 grams of its tissue every minute and the human brain weighs about 1360 grams.

So, ideally every minute 500 ml of blood has to go to the brain for it to survive well or act well, function well. Any reduction in this quantity can lead to fainting. And sudden change in the position from supine to standing can cause a reduction in the blood pressure leading to fainting which is known as postural hypotension.

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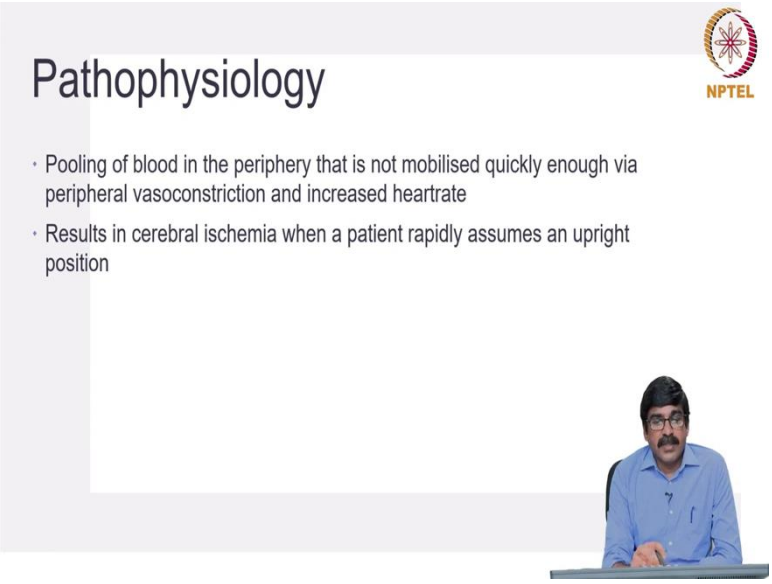


So, in other words, the pathophysiology or the mechanism which causes postural hypotension is pooling of blood in the periphery that is not mobilized quickly enough via the peripheral vasoconstriction and increased heart rate. And this will result in cerebral ischemia, less blood supply to the brain, when a patient rapidly assumes and upright position.

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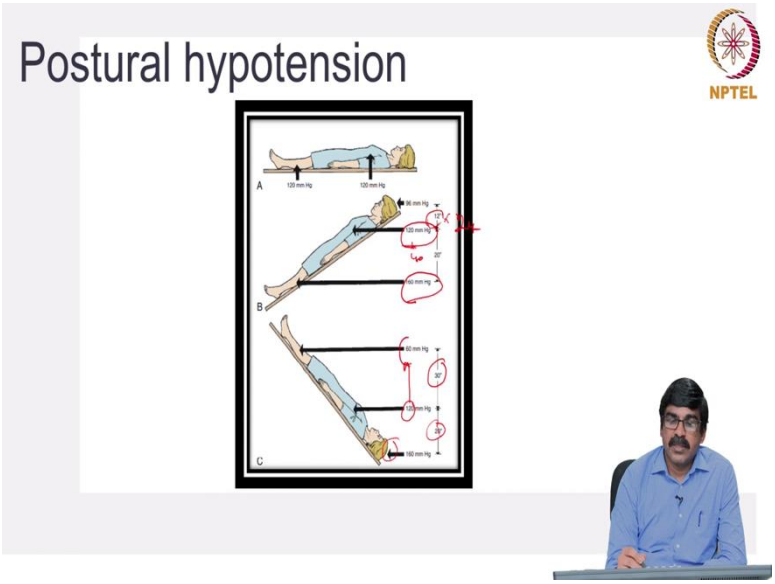


So, these physicians will tell you like when the patient or when an individual lays down flat the blood pressure and the heart level, brain level or the leg level or the foot level everything will be the same. For example, imagine it is 120 millimetres mercury, when you make the patient or individual tilted so that the head is raised up compared to the heart and the feet, every inch, 1 inch increase of the head level from the heart will reduce the blood pressure by about 2 millimetres mercury.

So, if I have raised the patient like this, the head is raised by about 12 inches here, it is written here 12 inches, so 12 into 2 millimetres mercury, it is 24. So, the 24 millimetres is reduced from 120 millimetres mercury. So, the blood pressure at the brain level will be only 96. Whereas the legs are gaining advantage by the gravity because they are at a lower level compared to the heart level.

So, imagine this is about 20 inches low then 22 into 2, 40. The blood pressure will increase by 40 millimetres mercury, that is 160 in the feet. If you do the other way tilting, that is the feet are raised high, the head is lying low, more of a Trendelenburg position. The head comes about 20 inches below the level of the heart.

So, the blood pressure will be more by about 40 millimetres mercury. So, what is 120 at heart level is 160 at the brain level now. But the reverse happens in the leg level because it is higher than the heart level by about 30 inches, there is 60 millimetres mercury reduction. So, 120 becomes 60 in the foot level.

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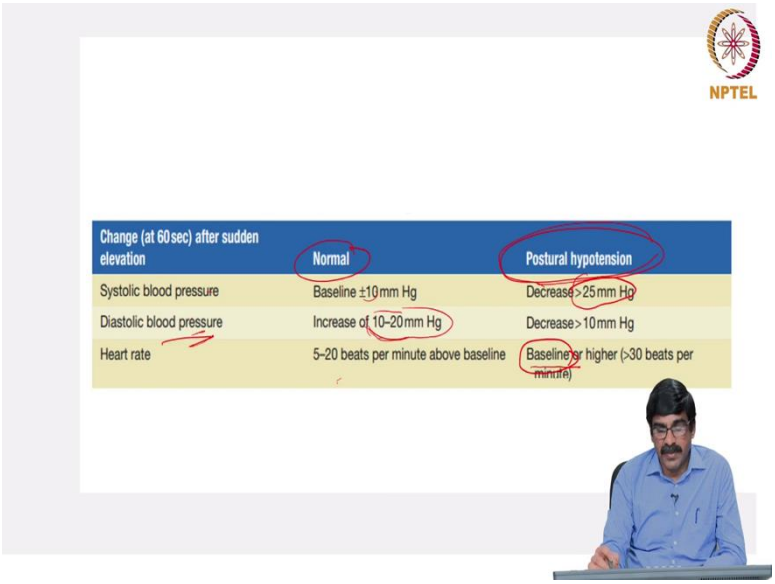


So, normally when you are when you shift from a supine position to a standing position when you suddenly elevate your position, what happens to a normal individual what happens in postural hypotension. The systolic blood pressure will not change much or it might increase only about 10 millimetres mercury. For example, a normal individual like me if I am lying down if I am standing up my systolic BP will be the same or it might increase by about or fall about 10 millimetres mercury.

But in a postural hypotension patient, the systolic BP on standing will decrease by more than 25 millimetres mercury that is a great difference. If it is 120 in the lying down position. When the patient stands up suddenly, it will be only around 95 which is very, very low. And if you look at the diastolic blood pressure. If a normal person from the supine, if he stands up, it will increase about 10 to 20 millimetres mercury.

So, it is not normal, I mean it is increasing it is not lowering. Whereas, in postural hypotension there is a decrease in the blood pressure by about or more than 10 millimetres mercury. So, if the patient is prone for postural hypotension the systolic blood pressure as well as the diastolic blood pressure will fall if the patient stands up suddenly.

Whereas a normal patient there are compensatory mechanisms postural reflexes there, so that the systolic pressure will not change are only will raise up slightly or lower down slightly. And the diastolic pressure might raise from 10 to 20 millimetres mercury. What happens to the heart rate? There is 5 to 20 beats per minute above the baseline, because these are the postural reflex mechanism.

So, when I stand up, the body will try to push more blood to the brain, because I am normal person by increasing the heart rate, my heart rate will be increased so that I get the same amount of blood and pressure to my brain. Whereas in postural hypotension patients, the postural reflex is not okay. So, what happens to the heart rate, it still lies the same, if it is 72 in lying down, when he stands up also, it is only 72 or there is a minimal change or increase in the heartbeat. Most of the times it lies the same that is the typical feature of postural hypotension.

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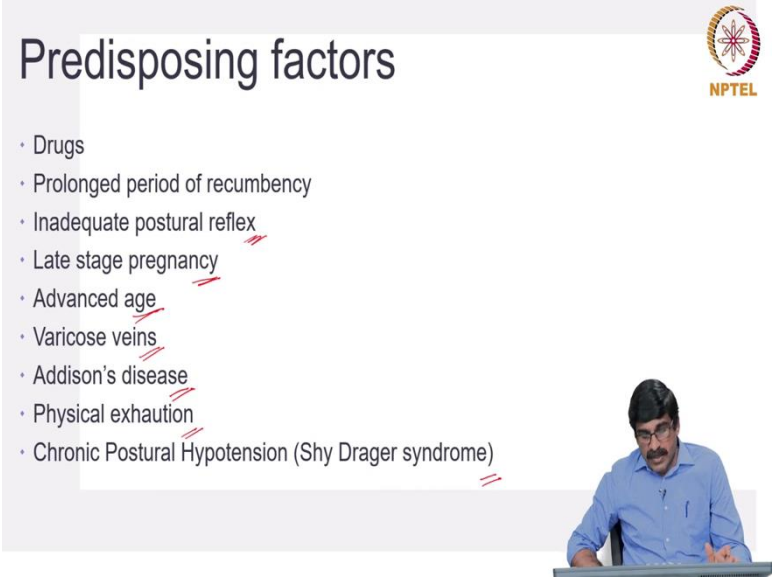


So, does this occur in every patient? That is, if every individual from a lying down position to standing position when it is changed, are they going to faint, no, because just know I told you there is a postural reflex in every normal individual which will compensate fall in BP. So, they do not get the BP reduce or they do not faint. But there are some predisposing factors like drugs.

If the patients are taking a cardiac drugs, especially like diuretics, beta blockers, or some drugs like anxiolytic agents, sedatives, these things can cause postural hypotension. I may be a normal patient, but if I am taking a lot of beta blocker for my hypertension, probably I will develop hypertension, postural hypotension, if I stand up suddenly. Drugs are a very important predisposing factor for postural hypotension.

Prolonged period of recommends, even if the patient or the individual is a normal individual, if we make him lie down for longer time and asked him to get up suddenly to a upright position or standing position, then there is a chance for developing postural hypotension.

Inadequate posture reflex, I said all the normal individuals will have a postural reflex to compensate for this postural hypotension developing.

But there may be an inbuilt error in this postural reflex due to unknown or known reasons which can lead to postural hypotension. Late stage of pregnancy, that is third trimester pregnancy is very much known to cause the postural hypotension. So, whenever you treat a patient when they are in the third trimester, you make sure that you are changing the position very, very gradually or you ask the patient to stand up and leave slowly very, very slowly and gently to avoid postural hypotension.

Advancing age, advanced the age is one of the well-known factors which can lead to predisposing factor, the mechanisms are not known, but elderly people are very, very prone for developing a postural hypotension. Structural defects like varicose veins, these are not normal veins, they are torturous widened veins, so they do not allow the blood to return back to the heart immediately when the patient is standing straight.

So, this itself can cause postural hypotension. Certain diseases like Addison's disease, where there is an adrenaline crisis or deficiency, the patient is not able to compete or counteract the standing posture suddenly. So, this can lead to postural hypotension. Physical exhaustion, you are after a very strenuous work and you want to change your position suddenly, you are prone to develop postural hypotension.

That is way strenuous exercise, you are asked to sit down for some time or lie down for some time before start walking. And there is something called a chronic postural hypotension by a syndrome called the Shy Drager Syndrome. Most of the times it is a genetic problem, where the patients are prone to develop postural hypotension even if there is no other problem, even if he is not on any drugs, all these factors are not there, the patients can develop postural hypotension. These are the predisposing factors.

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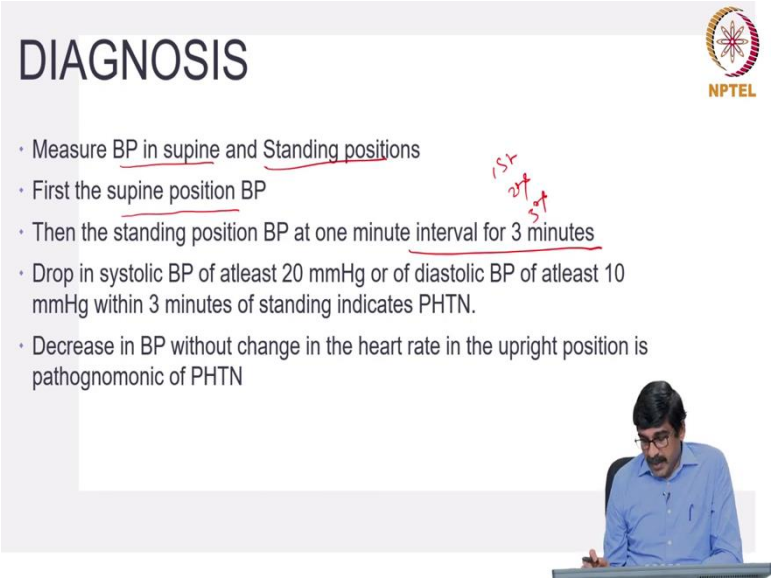


So, how do you diagnose a postural hypotension patient? It is important to diagnose because it is not like normal syncope. Even in syncope, there is loss of consciousness. Even in postural hypotension, there is loss of consciousness. But there is a major difference in between these loss of consciousness attacks. Because in syncope, the patients tend to recover by themselves very faster. It is a very transient complications we mentioned.

But postural hypotension there is a severe drop in the BP and the patient can lead to more serious complications like coma, sometimes even death. So, diagnosing postural hypotension is very, very important, because of this difference between the syncope and the postural hypotension. How to diagnose a patient? Whenever a patient says I had a syncopal attack last time when I was treated. So, you do not know whether it is a common syncope that had happened or it is a postural hypotension.

But I want you to rule out postural hypotension because postural hypertension is a more serious complication. If it is a syncope, even if the patient is recurring with the syncope complication, it is easy to manage our prevent, but if it is a postural hypotension, it is slightly difficult to manage. So, if the patient has a history of syncopal attack in the last treatment or previous treatment, diagnose or rule out postural hypotension.

So, you have to measure the BP is a very simple test, make the patient lie down and measure the BP. So, the BP has to be measured in supine position and in the standing position, two stages. First thing to be measured is the supine position BP, this is the baseline BP for the patient, just imagine it is 120 and 80. Then ask the patient to stand and then measure the BP once again at 1 minute interval for 3 minutes.

So, at the end of first minute, end of second minute, end of third minute, so we have three values in the patient, while standing, we have a baseline value, supine value, three values when the patient is standing, there are four values. Now, look at the difference between the baseline BP and the standing BP. If there is a drop in systolic BP of at least 20 millimetres mercury, or a diastolic BP of at least 10 millimetres mercury within 3 minutes of standing. This indicates the postural hypotension.

So, if the standing BP shows lower values within 3 minutes, you might get lower values in 4th or 5th minute, that is a little different, that is an adaptive mechanism. Naturally the body has, so that is not a problem. If the BP drops on standing within 3 minutes, then you have to think the patient has a postural hypotension. This is the only diagnostic factor we have, there is no lab test, there is no x-ray, there is no CT scan or MRI.

It is only a clinical testing and very simple testing measuring BP in the baseline as well as in the standing position. And this decrease in the BP on standing position without changing the heart rate in the upright position is pathognomonic of postural hypotension that is there will be BP loss.

But if it is a normal individual, the BP loss, the body tends to increase the heart rate so that more blood can flow to the brain. But in postural hypotension, the postural reflex mechanisms are absent. So, the BP drops as well as the heart rate does not increase it will be in the baseline value only. So, this is the diagnostic things which are useful for establishing a postural hypotension.

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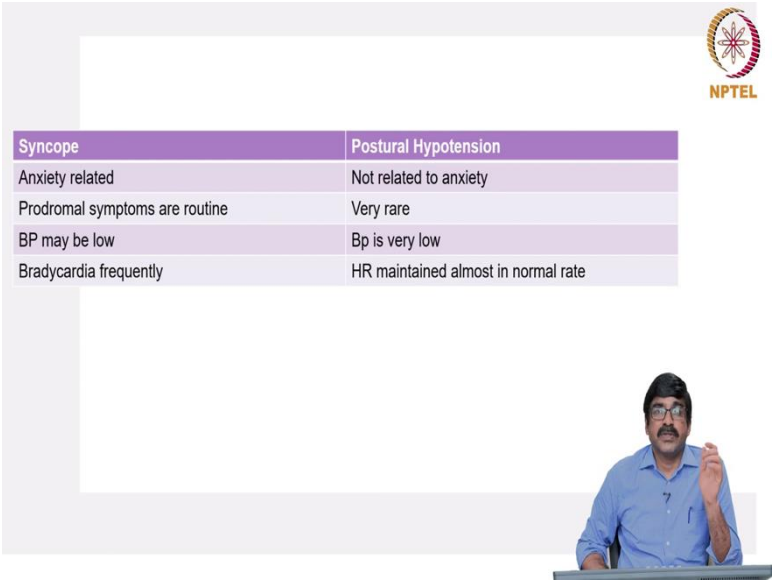

As I told you, clinically, the syncope and the postural hypotension will look similar. How will you differentiate if the patient has fainted in your dental chair? I am telling you the syncope but you want to prove that it is possible hypertension. So, what are the difference between the syncope and hypertension?

Patient will be looking similar, they are unconscious, they are lying down on the dental chair happily, it is your duty you will be more tense to know whether it is syncope or postural hypotension because treating syncope is easier, treating postural hypotension is not very simple. So, syncope the basic difference is etiology, it is anxiety related. Whereas in postural hypotension, it is not anxiety related.

Even if the patient is well built, confident there is no anxiety, if he has other problems to develop hospital hypertension he will faint, he will lose consciousness. This is the etiology related main difference between the syncope on the postural hypotension. And the prodromal symptoms, if you read about syncope, the patients will have a prodromal stage that is they will start feeling the warmth in the body there will be tremors, sweating, increased heart rate, and they do not feel comfortable they will let you know they are not feeling comfortable.

The response level also will keep going down. So, this is called the prodromal stage in syncope. This is always present in syncope, but in postural hypotension, the prodromal stage is absent it is not there or very, very rarely it can be present. So, is it significant? Yes, it is significant because God is giving you a chance to recognize syncope through a prodromal stage or the body is giving you a chance, so that you can act quickly reverse the problem.

In postural hypotension, you are not given any chance to diagnose the postural hypotension from happening, the patient will be okay the moment you start some procedure or you raise the chair up or make the patient stand up, then he will collapse and fall down immediately. There is no prodromal stage. So, this is the significant difference between the syncope and the postural hypotension.

And if you measure the BP, in syncope, it may be low or it may be maintaining well, but in postural hypotension, it is always slow because the BP drops immediately when the patient stands up, and that is the reason for the syncopal attack in postural hypotension. And look at the heart rate, there may be bradycardia frequently in syncope, but the heart rate is maintained in the postural hypotension.

So, in syncope, there may be bradycardia or even tachycardia in the initial stages in case of syncope. But in postural hypotension, there is no change in the heart rate. That is why I told you fallen BP without changing the heart rate is pathognomonic of postural hypotension. So, this is very important differences between a syncope and postural hypotension, which we have to understand so that we can tackle them efficiently.

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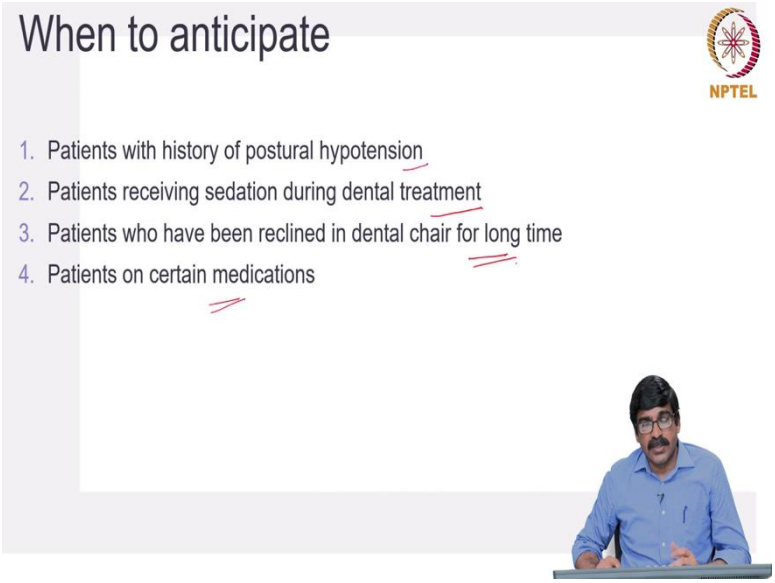


So, when will you anticipate a postural hypotension? So, if the patient is already given history of postural hypotension, yes, we have to expect this can happen. So, all the procedures should go smoothly, all change in the position of the patient should be done very, very smoothly. Patients receiving sedation during dental treatments.

Nowadays, it is becoming very, very common to give IV sedation or inhalation sedation for patients for longer procedures or multiple procedures. For example, multiple root canal treatments, multiple dental implants placement, or multiple wisdom teeth removal, impacted teeth removal, all these combined. So, and very, very anxious patients.

Nowadays it is becoming more and more common to use sedatives in dentistry. So, whenever you give sedatives in dentistry, these agents are prone to cause postural hypotension. So, in these patients, you should be very careful in changing the position of the patient. So, once your procedure is over, lift up the chair slowly and ask the patient or make the patient stand up first and then start walking.

Otherwise, there is a chance for developing postural hypotension, the patients might fall down injure themselves. And patients who have undergone multiple treatments as we just

saw in the dental chair, even without sedation, they are prone to develop a postural hypotension. And patients on certain medications, I told you diuretics, beta blockers, hypnotic, sedatives, all these drugs can cause postural hypotension.

So, when the medical history form of the patient shows they are on this kind of beta blocker drugs or other drugs, be careful in treating them. So, ask them not to get up suddenly or change the chair position suddenly, so you should take that care.

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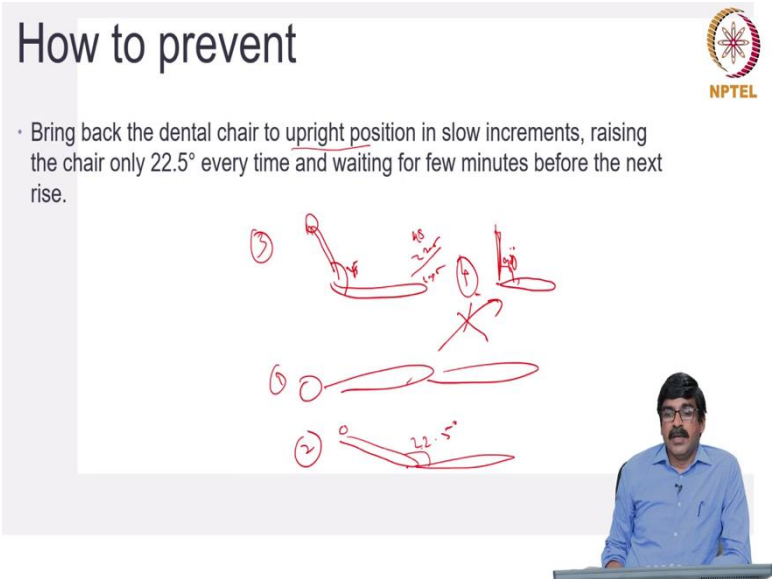


So, how to prevent postural hypotension? Prevention is the best way. So, if you have recognized a patient who is prone for developing postural hypotension, all the time whenever you are treating the patient, you have to change the position of the chair from the laying down or the supine position to the upright position in very, very slow increments and raise the chair every time only by 22.5 degrees and then wait for few minutes before you raise another increment.

For example, if this is the dental chair, patient is like this, your treatment is over. In second stage, what you will have to do is raise by 22.5 degree then in the third stage one, two, in third stage raise it by another 22.5 degrees that is 45 degrees. So, the chair becomes like this 45 degree then finally, you can increase to another 25. Finally, it will come to 90 degree, 90 degree this is one increment, second increment, third and there is one in between because 45 plus 22.5 be 67.5 and the fourth increment will be your 90 degree.

So, do not do from this position to this position directly. This is wrong in suspected postural hypotension patients. You have to increase or upright the chair in slow increments every time

only 22.5 degrees and then waiting for few minutes for the patient to recover. So, that is the way you can prevent a postural hypotension.

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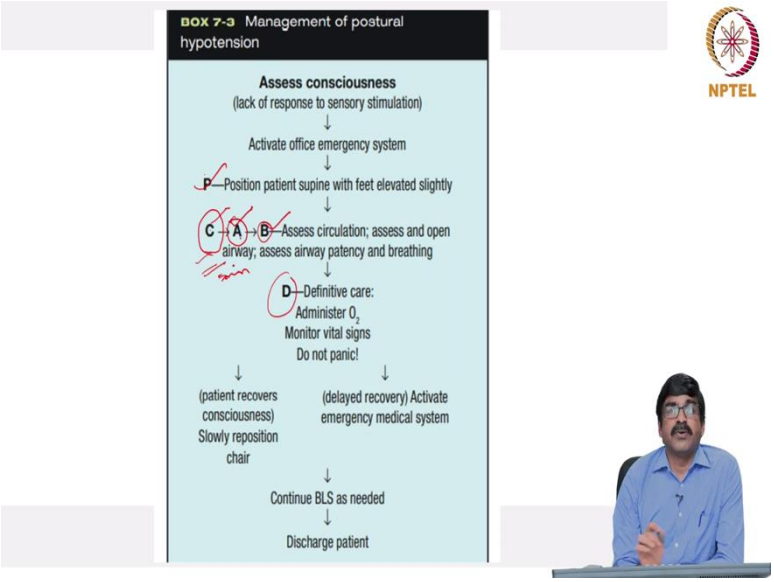


We have not prevented the patient has developed hypotension, postural hypotension, so how do you treat it? First you assess the consciousness level of the patient. If the patient has lack of response to your sensory stimulation, he is not responding to you at all, not conscious then you do PCAB and then activate the emergency system. PCAB is position the patient in supine, again you can put them back to the supine position with the feet elevated.

So, position is important both in syncope and postural hypotension, the position is the first one to be done, P. Then we do CAB, because there is hypotension analytically become normal. But if it is exerted some time, more than 5 minutes, probably then we have to make the airway patent and then make the breathing possible by the patient. There is also something called a definitive care PCABD, definitive care is nothing but administering oxygen because hypovolemia less blood to the brain carrying less oxygen.

So, we have restored circulation. But still, I do not know, we do not know how much blood is entering the brain. So, if you administer oxygen, even that very little blood that is entering the brain will carry more oxygen. So, this is definitive care and keep monitoring your vital signs. Most of the times the patients will recover consciousness and the patient is alright they can be discharged, they can go home.

Sometimes there is problem, the patients may not recover consciousness, the BP is still low, the loss of consciousness is not reversed fully. Then probably we should summon medical

assistance, we should call them and after they attend they become alright then we can discharge the patient home.