

Management of Medical Emergencies in Dental Practice
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Diabetes Mellitus

Hi, hello. Welcome to another episode of the lecture series on Management of Medically Compromised Individuals in Dental Practice. And today we are going to discuss about certain different conditions. Myself, I am Dr. Eapen Thomas. I am the professor and PG guide in Department of Oral and Maxillofacial Surgery, Pushpagiri College of Dental Sciences, Thiruvalla, Kerala.

Today we are going to discuss about diabetes mellitus, a condition which is actually characterized by abnormal levels of blood glucose in the body. So, this abnormal levels of blood glucose and its various implications on the system, all we are going to discuss today. It is probably one of the most common endocrine disorders affecting the human population, with the extent of injuries on different systems in different ranges affecting one's quality of life.

The way what one has to do the, what are the complications associated with this diabetes mellitus, how each organ of the body is going to get affected with his diabetes, it is a big detailed part what we are going to cover today. And this diabetes mellitus is got important relevance in the current scenario.

Because especially in this post COVID situations, most of the patients which has treated with COVID disease, was being treated in the hospitals with COVID disease has been shown to be having an abnormal high levels of blood glucose, even normal individuals were detected with high levels of the blood glucose in the body.

And even diabetic patients. As you all know, they are having a lot of comorbidities and they are very well immunocompromised. So, they do have a tendency to get more prone for these COVID infections. And these type of post COVID treated patients nowadays come to a clinic for dental treatments. So, one should have a proper understanding about all these situations, so that is importance of the diabetes mellitus.

It has got infectious on various other systems along with other disorders also. And I am sure this is one of the most common disease among the human population, one of the most neglected and the overlooked conditions in the human population, where the patients themselves do not have much sort of a seriousness about the incidence of these diabetes mellitus or the rate at which this particular condition can affect your system.

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DIABETES MELLITUS

CLASSIFICATION WHO 2019

1. TYPE - 1 (5-10%)
2. TYPE - 2 (85-90%)
3. HYBRID
4. SPECIFIC TYPES
5. PREGNANCY RELATED
6. UNCLASSIFIED

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Now let us move on to what actually is diabetes mellitus and what are the details as you have told earlier, diabetes mellitus is an abnormal high range, high levels of blood glucose in the level which has not been controlled, and then leading to a lot of infections and associated problems. Now, WHO in 2019, has classified diabetes into different types into six types.

The Type 1 diabetes, which actually is quite less when compared to Type 2 diabetes, it is called insulin dependent diabetes. It occurs about five to 10 percent of those patients who is having diabetes mellitus. It is actually an autoimmune disorder where the body's own cells, identifies our own pancreatic cells, the islets of Langerhans are being identified as an attacking organ or attacking antigen, and the body's own cells destroys these islets of Langerhans.

It is called an auto immune reaction, an auto immune response by the cytotoxic cells of our own system, kills these or destroys these pancreas and islet cells of pancreas. And there is absolutely

no production of insulin, when there is no production of the insulin, the levels of blood glucose remain high.

So, this is actually called as juvenile diabetes or insulin dependent diabetes, and its occurrence is quite less. It is about five to 10 percent of the total cases of diabetes mellitus. Let us see what is Type 2 diabetes? This is the most common form of diabetes, what we all see around. It occurs for about 85 to 90 percent of the patients who is having diabetes mellitus.

It is also called as known insulin dependent diabetes. The reason being; now this particular condition, the Type 2 diabetes, there is no autoimmune reaction, there is formation of insulin, there is secretion of insulin by the islets of Langerhans. But the blood glucose is resistant to the actions of insulin.

So, if the insulin does not matter, insulin is the hormone secreted by the pancreas, which actually lowers the blood sugar level and always maintain it. And the other hormone is actually glucagon which actually elevates the blood glucose level whenever there is a drop. So, this balance is always maintained in the system, balance between insulin and glucagon actually maintains the blood sugar levels.

So, whenever there is a high blood glucose level; this in Type 2 patients, Type 2 diabetes patient even though there is insulin production, the insulin is resistant to this blood glucose. So, you cannot control the blood glucose levels, so the hyperglycemia situation remains as such it is. And that is the reason for this Type 2 diabetes, which is actually seen in 85 to 90 percent of those patients with diabetes mellitus.

It is also called as adult diabetes, or it is also called as known insulin dependent diabetes. As I have told you, Type 1 is insulin dependent diabetes or juvenile diabetes, because it is usually seen in the, the teenagers or ages, the juvenile group. Now, there is a third variety where we call it as hybrid type of diabetes. Now, the immune related or the Type 1 diabetes I have told you, it is usually seen in young individuals who are in the juvenile group.

So, that type of diabetes where its immune mediated destruction of the pancreas and diabetes seen in adult onset is actually put as under hybrid variety. And in Type 2 diabetes, where there is a prone or there is a ketone prone Type 2 diabetes, also put under, your hybrid diabetes. So, the

adult onset immune mediated diabetes, and the ketone prone Type 2 type of diabetes is classified under hybrid diabetes.

Now let us see what is a specific type of diabetes? Now this actually, actually is, actually occurring or happening because of a genetic mutation. Now, if there is a genetic mutation, either in the islets of Langerhans, whether it is the cells cannot produce insulin, or where this known immune mediated response, so the genetic mutation creates a nonfunctioning pancreatic islet cells, that can be one cause.

This particular genetic mutation can actually cause a defect in the function of the circulating insulin. So, insulin even though it is there, it is not functional, that all comes down to a specific type of diabetes. And this infection related diabetes sometimes just seen chronic infection can give us abnormal blood glucose level, because of the alteration in the carbohydrate metabolism and endocrine imbalances.

So, those type of, infection related diabetes mellitus, drug related diabetes mellitus, patients who are on long term steroids, because of this abnormal hyperglycaemic effect of the corticosteroids, they create a diabetes situation. So, there is diabetes arising from the use of long term steroids and the specific infections and other chemicals mediated, other disorders of other exocrine glands, and all these comes under the specific type of diabetes mellitus.

The next type is pregnancy related as we have seen as part of the gestation, you have gestational diabetes, the levels of blood glucose go high, because of the hormonal imbalances during that phases of pregnancy. So, that is pregnancy related diabetes. Then the last one is unclassified type of diabetes. Now in this unclassified type of diabetes, actually any diabetes mellitus or any abnormal blood glucose level arising for which we cannot find any reasons, for which we cannot put them in Type 1 to six, any of five any of those categories.

So, any diabetes with no known reasons is actually put under and classified diabetes. I hope now you have an idea, of this complex disease and the complex nature of classification given by WHO in 2019. Now, why I am telling you all this is basically because we actually have a feeling, we are a dental surgeon, we do not have to know that much about these medical conditions, we

do not have to know about all this because the laboratory will give us report and we just have to follow it.

No, that is not right. Because in the current scenario, when we are all working with these people, and we are all healthcare providers, so, one must have a proper understanding of all these diseases, which actually patient reports to on clinic with, because I personally strongly believe that almost all the complications which is arising in dental practice at least 80 to 90 percent of the complications, which arises in dental practice are because of a non-proper management of the patients, the what we call the medically compromised situations.

In other words, patients with medically compromised situations are the most common candidates, which is giving us trouble or which can prevent which can cause complications in dental practice. So, proper understanding of all these medically compromised situations, the pathophysiology, how this disease happened? How it works? What are its effects on the system? Why is it causing trouble for us in dental treatment?

What are the things that I should keep in mind? What are the things of the investigation part I should take care of this patient? How do we, should I actually manage this particular patient? So, you should have an overall overview and in detail knowledge about these common conditions which actually report your dental clinic for treatment. So, that is the importance of, knowing all these basic things, and of course, the pathophysiology and all those I have already explained.

So, all these are very much significantly required for anyone whether we are a dental practitioner, or we are just supervising the clinic, but whatever it is, if you are providing health care, if you are providing dental treatment to a patient, you must have a detailed knowledge about this because lack of awareness of the problem problems associated with diabetes will never give us immunity in case if any litigation arises.

And we are actually called or to appear in the court of law. So, let us actually be a little more cautious about it, let us be more practical, let us prepare ourselves so that, any patient who goes against us in the court of law, if they take us to the court of law, we should be actually planned very well in such a way that all our treatment plan should be based on the proper planning and assessment. So, this is the basic reason I am explaining these details to you also.

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DIABETES MELLITUS

Problems Associated...!!

1. **Compromised Immune system**
 - *More prone for infection.*
 - *Delayed wound healing.*
2. **Micro-angiopathy.**
3. **Associated systemic disorders.**
4. **Drug Interactions. (NSAID)**
5. **Hypoglycemic syncope**
6. **LA With Adrenaline*****

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Now that we know the classification of diabetes, let us move on to the what are the problems associated with diabetes mellitus. Now, any systemic disorder what the patient reports you one should have understanding about you should see in two or three different headings, what are the problems associated with this particular condition? Why this particular condition patient requires a special care in providing dental treatment?

Why I should be more cautious about dealing with these patients? Now, those are the reasons what I would put it under problems associated with that particular condition. Then in the second part of you should be knowing about is about the investigation, what are the investigation that I should be doing in such medically compromised patients, to make myself and to make the patient comfortable and to make sure the patient is safe and can be taken up for treatment?

That is the investigation part and after knowing the investigation and the values and the safe limits, then the management part. How should I, modify my treatment plan? How should I manage this place to avoid complications in dental practice? So, three heads problems associated with all these diseases, the signs and symptoms and the investigation part and management of this disease? So, I will be describing under these headings like I have told you earlier.

Well, let us see what are the problems associated? Number one, the patients with diabetes mellitus have got a compromised immune system. As you all know, the immunity or the immune

system of one's individual is purely a measure of the leukocytes or the neutrophils and the lymphocytes. The WBC cells are actually contributing the most important part of the immune system.

I have told you now these diabetic patients over a period of time and their chronic diabetes, their immune system become weak because these leukocytes are the functions of the leukocytes come down, they become more and more defective. Now, any infection many, any antigen attacks our body. Now, these WBCs the primary cells or the neutrophils and then chronic inflammatory cells are your lymphocytes.

So, the first line of defense is your neutrophils. So, once the neutrophil goes there with a strong armamentarium and all sort of (())(12:36) meets the antigen, fights against it and win the battle, the disease gets controlled and your body's immunity takes care of you and protects you from this particular infection. But imagine a situation where your frontline defense barriers that is this WBCs and the neutrophils are weak.

So, when they are weak what happens? Any antigen which is affecting us or attacking us has got a dominant. So, they are likely to win the battle against our own defective WBCs. So, what happens, the infection predominates, the infection or the antigen has got a more domination. So, that is the shift of balance. So, that is what is happening in diabetes mellitus when they have a defective WBCs and this neutrophils, the frontline barriers are very defective.

So, any attacking antigen has got a chance to win the battle and then that is the reason they are more prone for infection in these individuals. I hope that it is clear for you. Now, as part of healing, the normal process as you remember, the process of inflammation, your healing repair all goes hand in hand. And in the normal situation when we have studied that in the blood, in the blood volume, the blood fluid, all these formed elements and the plasma are going in a smooth laminar motion.

Whereas WBCs, RBCs, platelets, all these in this particular blood as our plasma is going in a laminar flow. Whenever there is an attack by an antigen whenever there is in the face of repair or inflammation, there is a first step what happens or the WBCs from the center laminar flow, they

move towards the basement membrane, it is called as margination. When it comes to margination of the, when it comes to margins of the lumen of the vessel wall that is called margination.

It just pave, gets pavement at there, like in a line. So, margination pavementing, then it crosses across this blood vessel walls and comes outside what we call it as dye pertussis and then this has to move to the particular side where the demand is required where the action is happening.

When their attacks the cells, kills the cell phagocytosis, macrophage formation, all those things that is a sequence. So, imagine if the WBCs are weak, all these phases gets delayed. So, what happens? The process of healing gets delayed, and that is the reason why they have this delayed wound healing. On top of this, the end phase of healing is a mature, collagen formation. This collagen formation is essential for any good wound to heal in its proper strength and quality.

So, this collagen is formed by the fibroblasts, these fibroblasts are quite defective in the or immature in diabetic patients which is why they never they are formed. And there is more amount of fibroblast disruption or disruption or destruction what we call it as apoptosis. These are situations which actually kills this, reduces the efficiency of the fibroblasts, and they result in collagen form is immature.

And there is disarray, there is a delayed wound healing and the defective wound healing. So, that is the reason why you have a infection, they are more prone why they have a delayed wound healing. Now let is see what is the other big problem with diabetic patients. Micro-angiopathy, you might have heard this terminology. In this individual's, in diabetic patient they always have this high blood glucose level.

The circulating blood has caused always a high blood glucose level. And this glucose what happens they get in here to the lining of the vessel wall or the basement membrane of the vessel walls, the glucose get adhere to that they get, connected to this basement membrane at the endothelial cells, they slowly proliferate them and slowly destroy these endothelial cells and there is proliferation secretion of this contents there.

And just under the surface of the endothelial lining, slowly they form plaques, this small plaque formation gradually gradually build up and that is the reason these patients with diabetes mellitus have got more tendency for atherosclerosis, and this plaque related coronary artery disorders.

Now micro angiopathy is nothing but when this plaque gets formed on the inner lining, so, vessel wall, the vessel wall diameter becomes less and less, the lumen size become less and less.

So, amount of blood going through that becomes less and less. The quality, nutrients and other all other white log, vital structures or vital substances passing through the blood vessels become less and less. So, that situation where in which the vessel volume becomes less and less, because of this gradual secretion, gradual collection of the glucose in the basement cells and the proliferation leading to that is called as micro angiopathy.

This micro angiopathy can affect any organ of the body and bring about lot of destructive changes. Micro angiopathy when it involves the your eyeball, when it involves central artery of the retina which supplies eyeball we call it as your diabetic, what you call it retina nephropathy. Then when it affects the all these peripheral nerves, it is called peripheral neuropathy. When it affects the kidney, we call it as diabetic nephropathy.

Similarly, it can affect the heart and bring about increased insulin of atherosclerosis and coronary artery diseases is the end result. So, this micron angiopathy has got a lot of effects on all the organs like I have told you. Same reason, there is a vascular infection. So, all these nutrients are also less that again, adding to our existing problems. So, they do have a tendency to have a reduced functioning kidney, which is very well.

It should be kept in mind when we prescribe drugs, they do have a tendency for, atherosclerotic plaque and associated cardiac problems and coronary artery disorders. Again, we have to take care of that patients and deal with matters how to deal with patients with coronary artery disorder. That is another one topic.

And because of the micro angiopathy and the reduced lumen, the and the vessel wall thickening, the pressure exerted by the blood volume on the vessel board is more that means hypertension. So, these are the common associated problems in patients with chronic diabetes because of the micron angiopathy. They do have a tendency for heart disorders, they do have a tendency for your kidney disorder there when you write prescriptions, you have to be careful.

You should avoid using nephrotoxic drugs, same way they do have a tendency for hypertension. So, all the associated diseases and disorders also should keep in mind when you think about

patients with diabetes mellitus. Associated systemic disorders I have told you just now all these patients with chronic diabetic mellitus, or most of these patients, they have this tendency for having cardiac disorders and diabetes mellitus and other renal disorders.

So, we also have to think about these patients with such disorders and take the necessary steps to prevent problems associated with that other disorders. Drug Interactions is yet again another one problem associated with diabetes in certain type of or hypoglycemic agents. Patients who are on oral hyperglycemia, especially with your sulfonylureas, they have a strong drug interaction with this when patients are given benzodiazepines or anti-anxiety drugs.

They actually prolong the duration or, intensify the action of these oral hypoglycemic, patient can go into hyperglycemia. They also do have a association and interaction with NSAID. So, prescribing these drugs has to be used with caution. Hypoglycemic syncope is another one problem associated with diabetes mellitus patient that one has to be prepared in a dental clinic. Now the reason being, now patients who are on chronic oral hypoglycemic agents.

They regularly taking the medicines to control their blood glucose. So, morning, they have taken the medicine, so they have a strong action of the drug which lowers the blood glucose. They might have taken the food also that will be there for one or two hours in the stomach, or I am not talking about overall gastric emptying time, which is four and a half to five hours, but from the stomach, basically it gets cleared in one or two hours.

So, after one or two hours, what happens there is no content in the stomach, but the drug the hyperglycemia effect of the drug will still continue. So, that will lead to the hyperglycemia. When hyperglycemia comes like oxygen, glucose is equally important for all the vital structures for the survival which includes the brain. So, a hyperglycemia can cause a syncope like your vasovagal syncope.

Then another one reason for hyperglycemia is now these patients sometimes considering the they might have heard in dental treatment stress, they might be little apprehensive, they might feel a little worried, they might take this medication more than what is required normally, to meet the stress of the dental treatment without our prescription. They are, all these patients they do have this system but this has a habit of self-medication.

So, they might be taking extra drug, extra hypoglycemic drugs, so that again leads to a severe drastic drop in the blood glucose and resulting syncope. And that is about the our hypoglycemic drugs and hyperglycemia related syncope. So, one has to be prepared, one has to have identify this particular condition whenever it happens and do the necessary measures. I will come to that later, and to be in a situation. So, you have to keep all these things in mind.

Whenever you are using lignocaine with adrenaline, remember all of us are using lignocaine with that adrenaline. Now the problem with adrenaline is, adrenaline has got an effect to bring or elevate the blood glucose level. Adrenaline is a strong hyperglycaemic agent, what I mean by hyperglycemic is adrenaline by virtue of its effect on the cardi sorry, your carbohydrate metabolism increases the blood glucose level.

Now, it actually increases the blood glucose level by three main mechanisms. It reduces the peripheral utilization of glucose whatever glucose is coming in the cells and all use it. And so, again the values of the glucose is coming down. So, it this adrenal reduces the peripheral utilization of glucose what happens? The nitrocellulose increase in the blood glucose level in the blood circulation.

It actually promotes gluconeogenesis from non-carbohydrate sources, it actually induces formation of more glucose. So, again giving rise to hyperglycemic situation. And it also promotes, it also promotes glycogenolysis. So, why glycogenolysis? The glycogen is broken down in the liver, and again, by the end product is glucose there by blood glucose level increases. So, that is the effect of adrenaline.

So, these things has to be kept in mind and these are the problems associated with diabetic patients. You might have thought what was there? Nothing was there is not it, but now, just after listening to my this much part, you might have understood at least, you might have had an idea about how complicated this particular disease is, and what are problems that one has to be worried about. And you have to keep in mind whenever you take a patient with diabetes mellitus, remember that.

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The slide features a blue header with the word "INVESTIGATIONS" in yellow. Below the header, on a dark background, are five bullet points in white and yellow text. The first four points are: "Random Blood Sugar* < 200 mg%", "Fasting Blood Sugar* < 140 mg%", "Post prandial Blood Sugar* < 200 mg%", and "HbA₁C* < 7%". The fifth point is "* (In diabetics)". In the bottom right corner, there is a small video inset of a man with glasses and a mustache, wearing a blue and white checkered shirt. At the bottom center, a white box contains the text "PROF. DR. EAPEN THOMAS_NPTEL".

- Random Blood Sugar* < 200 mg%
- Fasting Blood Sugar* < 140 mg%
- Post prandial Blood Sugar* < 200 mg%
- HbA₁C* < 7%
- * (In diabetics)

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Now having known these problems associated let us see what are the investigations what is required to ensure that values are within normal limits or to ensure that the patient is fit for the procedure. The first and foremost thing what we will see is the random blood sugar level. Now, when I talk about random blood sugar level, the value should be always less than 200 milligrams percent.

As per the W.H.O classification of diabetes or random blood sugar level, more than 200 milligrams on one or two multiple occasions is considered to be a diabetic patient. So, make sure the value is a diabetic patient, the random blood sugar level could be less than 200 milligrams. That again, but then when you think about random blood sugar alone, remember just to take history of the diet what the patient has taken just before testing the blood sugar.

Because at the high caloric or high sweet diet can actually raise the blood glucose level also. So, do not actually completely rely on random blood sugar alone. So, that is where your fasting blood sugar level should be actually clubbed with your random blood sugar level. The fasting blood sugar value as per the WHO 126 milligrams per cent, 126 milligrams per second is the cutoff value for being classified as diabetic patients.

Any value less than 126 milligram they call it as the pre diabetic stage up to a value of 110. So, any value more than 126 milligrams percent is considered as a diabetic patient. So, in a diabetic

patient if the patient is on oral hypoglycemics and then values up to within 140 milligrams, you can take the patient for a dental procedure, no problem with taking such patients. Second, the other warning what you have look for is a post prandial blood sugar value.

But again the value should not exceed 200 milligrams percent as per the W.H.O recommendation. Post prandial blood sugar means a patient after taking a nice meal or having taken some sugar diet whatever it is two hours after that when you check the blood value, the value should not exceed 200 milligrams percent.

HbA1C value is again, a reliable value in terms of knowing the patient's value or whether the glycemic status that actually gives you an idea about the immune condition of the patient more than the other above reported three values, why? Because the other three values the random blood sugar level or the fasting blood sugar level or the postprandial blood sugar level gives a value of the blood sugar in the system at that point of time.

Whereas the HbA1C value is a measure of the the glucose content in the RBCs. Now the glucose is existing in the RBCs in the glycated form. This glycated glucose is actually the RBCs are the one which carries along with the oxygen or the this blood glucose is also being carried with RBCs to different parts of the body, including all the vital sectors and the blood actually takes up the organs takes up this blood glucose from the RBCs.

Now, an RBC lifespan in 60 to 90 days is an average lifespan of RBC. So, a measure of the RBC for the glycated hemoglobin that is, the HbA1C level actually gives you an idea whether patients diabetic condition stable or not, whether the patient's diabetic condition is uncontrolled or not, whether the patient is safe to be taken up or not for a dental procedure. So, an HbA1C value less than, less than 7 percent is considered to be safe for dental procedures.

So, that is something what we have to keep in mind. So, all these patients, all these values has to be within normal limits. Now, that does not mean that any value beyond this cannot be taken up, what I am talking about is the most safe values that one can be taken or dealt with in the dental clinic. Now, if there is an abnormal increase in the levels of the blood glucose, even within normal limits, normal range of abnormality the patient can be taken up in the hospital set up.

Where the doctor, the physician or the dermatologist or the endocrinologist sees the patient and maintains the blood glucose level to a normal condition and then also you can do the procedure. So, these values are ideal as far as clinical setup is concerned, any value above this or higher values to be taken up in the hospital and should be treated if it is emergency under the or under the observation and the recommendation and consent of the treating doctor. So, I hope all the values and measurements are understood?

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The slide is titled "Signs & Symptoms Of Hypoglycemia" in yellow text on a blue background. It features a list of symptoms on the left and a list of later severe stages on the right. The symptoms are marked with a blue diamond icon, and the later severe stages are marked with a white circle icon. A small video inset of a man is visible in the bottom right corner of the slide.

Signs & Symptoms	Later severe stage
❖ Sweating	○ Later severe stage
❖ Tachycardia	✓ Unconsciousness
❖ Increased anxiety	✓ Seizure activity
❖ Bizarre behavioral pattern	✓ Hypotension
❖ Poor judgement	✓ Hypothermia
❖ Uncooperativeness	

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Now let us see a patient coming to you in a clinic. And you have actually taken the history and you have an idea about this patient is taking medication and so, I should be looking out for the possibility of hyperglycemia. And I should be well prepared in case the hypoglycemia rises and I should prevent further worsening. So, what are the things that if you know, what are the things you should look for in a patient whose a diabetic patient.

What are the things for hyperglycemia because this is a complication which can arise, a hyperglycemia syncope. So, this also can be, seen and diagnosed very early stage itself so that he can prevent the syncope associated with this hyperglycemia. So, what are the signs let us see, sweating. Patient start minimal amount of sweating in the your forehead area, your malar area or the cheek area, the tip of the nose, the chin area, all these slide droplets.

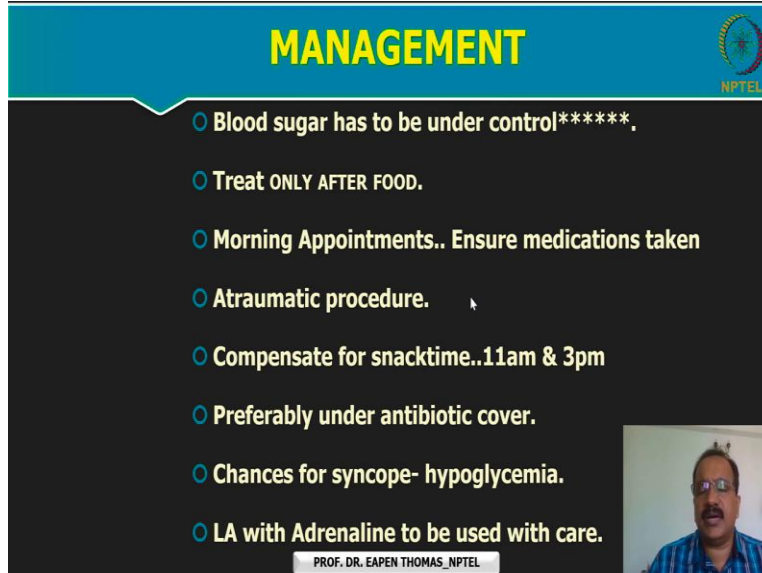
Even if the you have put a AC, patient might start slight sweating because these are all the signs of the protective or the compensatory sympathetic mechanism which is coming into picture. Then tachycardia, again, as part of the symptoms of hypoglycemia heart rate goes high, in an attempt to increase the blood supply to meet the hypoglycemic situation. Increase anxiety, then we have more hyper, or they will be actually having a bizarre behavior pattern.

They do not know, they are not responding very well, their judgment is not correct. They are not answering to you properly, they are just giving all very answers, which is quite bizarre and the pattern is quite different. And they actually, patient was actually in the cooperative, the first part then gradually becoming uncooperative. These are the early signs and symptoms of hypoglycemia.

Now and that particular point of time, if you ask the patient the details for the patient is taking medication, if he has taken his food, then if a patient has not taken food, then definitely you can understand the patient's going for a hyperglycemia syncope. And if you are not identified that at that particular point of time what happened then the later stage what happens? Patient goes into syncope or unconsciousness.

Then seizure activity because of this lack of vascularity and the oxygenation hypoxia and hyperglycemia, hypertension because of a reduction of the blood volume and reduced (30:12) and hypothermia because of a lack of reduction reduce circulation. So, all these are connected features and these are the signs and symptoms of hypoglycemia in the earlier times as well as the later time. So, that one should be keeping in mind and always look out you should be watchful in your patient and look out for these.

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MANAGEMENT

- Blood sugar has to be under control*****.
- Treat ONLY AFTER FOOD.
- Morning Appointments.. Ensure medications taken
- Atraumatic procedure.
- Compensate for snacktime..11am & 3pm
- Preferably under antibiotic cover.
- Chances for syncope- hypoglycemia.
- LA with Adrenaline to be used with care.

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NPTEL

Then let us move on to the management part. Now know now that you know the problems associated with this. Now you know the investigation, what are the things that you should do, you also know do identify a patient in case the patient is having or developing science of this hyperglycemia syncope. With that let us move on to how to manage patients under diabetes or diabetic patients in a dental clinic.

Number one golden rules, blood sugar has to be under control. When you, when I am talking about control you see patients, most of the patients they do have this awareness that, if I tell the doctor that my sugar's not control is high and you will not get the treatment, they know these problems. So, they will not actually reveal the real facts. They keep hiding that, they do not care, do not worry I have checked last time, last week, while he was normal doctor.

You can proceed to the procedure, do not fall into that. You always must be convinced with an evidence based blood sugar control. You have to have a glucometer in your clinic or get a patient's laboratory report at that particular day of time or the day before. So, that is what I am talking about. And according to that if the values are under control, based on the values what I have given below, well you can take it for the patient for a dental procedure.

Now when I take, when I take when I tell about taking a patient's for dental procedure, what I am talking about is surgical procedures. So, patient can be taken for any non-surgical procedures

however high the patient's diabetic status is. This control of diabetes is actually required for any procedure in the dental treatment which inflicts or which creates wound something like extraction or surgical procedures or has to have a diabetic control.

Flap surgery and other invasive procedures definitely have to have diabetic control. So, all other procedures other than these, can be taken up irrespective of the values of the blood sugar. So, blood sugar need not be controlled in all other dental treatment other than all the non-surgical procedures and the surgical video procedures. The second thing golden rule treat only after food, make sure the patient has taken the food.

If you have a history of this patient and patient is diabetic make sure you ask the patient when the patient has taken food or not, you should ensure that and there should be adequate spacing. Now, morning appointments is very important because preferably because once the patient sleeps get a good sleep your system is better refresh, the next day patient is waking up with a lot of fresh and the system is not subjected to the daily routine stress.

So, that is the best time to do any extraction because it is all connected, most of these patients might be having associated symptoms or disorders like hypertension or so. So, body is quite well equipped and more prepared and more tolerant in the morning appointment. So, give a morning appointment preferably, ensure the patient has taken medication. Because patients diabetic blood sugar otherwise might go a very high, you do not, you do not know actually.

So, make sure the patient takes the diabetic medication and taken the right dosage should not have taken double the dose or anything of that sort. Whatever procedure you are doing surgical procedure you do tonight traumatic man because that more injury what you give what you give the patient's more amount of stress, the more amount of time as you are know they are prone for infection they are actually having a delayed wound healing.

So, let us actually do a very gentle management of the tissues and give a less traumatic or (())(33:46) atraumatic procedure wherever possible, you can use a fostered extraction or you can use your periostomes to make the extraction much more simpler wherever possible. So, atraumatic procedure is actually a requirement for dealing with these patients.

Compensate for snack time, a patient who has taken morning breakfast, say 7:30 and taken the diabetic medication and coming to a clinic and by 11, 11:30 patients actually default, devoid of food to the stomach but the effect of the drug is there is still in the body. So, patients prone form hyperglycemia. So, in such patient asked him to go have some food and come, so that is what I meant about snack time.

Some snacks has to be given make sure patients have something in the food, so have some food and the stomach is quite equipped to prevent the hypoglycemic effect of the your drug. Preferably under antibiotic cover, when I talk about antibiotic cover, all diabetic patients do not actually require a preferably antibiotic treatment. Remember, if the diabetic values are on the after range of the normal value or what I have suggested here, the HbA1C value is, seven or even more than seven.

There are situations where the patient can come to you with a normal RBC or your random blood sugar and normal fasting blood sugar or within normal fasting blood sugar and within normal, postprandial sugar. But then that those are all how that patient has taken the day before and day before his diet and the proper fasting can actually give you this a normal values. But remember, the probability or the chances of this patient undergoing infection is based on the patient's immune status.

Immune status is very well assessed by your, your HbA1C value. HbA1C value more than seven means patients diabetic status is uncontrolled. Excuse me, so, in diabetic patients with uncontrolled diabetes, patient has a tendency to become more immunocompromised. So, even if you have a normal or relatively normal blood pictures value what I have told about RBS, FBS and PPBS.

But if the HbA1C is more than seven, definitely do take the procedure only with an antibiotic cover. And as much as possible, try to get a little bit more steady management of the diabetic condition then only take up. If at all you have to take up it should be under antibiotic cover. So, I have told you if the values are like what I have told you the previous picture, but if the HbA1C value is seven or more than seven, you know that the patient's immune is weak.

So, supportive antibiotic preferably is required before the procedure, the day before at least two days before you start off with antibiotic and then do the procedure and continue for another three or four days, excuse me. So, that is about your antibiotic cover. On other situations, otherwise is if the values are abnormally high again and extraction or the procedure is very much warranting or indicated and must insert additional antibiotic cover is required.

Chances for syncope has to be kept in mind, hyperglycemia later syncope and that has to be how it has to be managed again I will tell you because it is something like regular vasovagal syncope only. All these patients they have the signs and symptoms of irregular syncope that sweating then sudden tremors or little bit of hypotension and tachycardia initially, then later on for bradycardia and then lack of pulse, lack of volume of the pulse.

And all the cold and clammy extremities, the lips getting pale, all these signs are classical of a vasovagal syncope. In hyperglycemia, also, the similar type of signs and symptoms are the same. But the only difference is the history will actually reveal that the patient has not taken a morning food, but have taken a drug hypoglycemic drug, or any other situation or too much time has past after taking the food. So, there is no stomach food in the stomach.

So, that is again cause for hyperglycemia, so that has to be kept in mind when you when you think about it. La with adrenaline has to be used with care, make sure you do not keep any intravascular administration. Because intravascular administration pushes the adrenaline into the bloodstream and can create a hypoglycemic situation and worsen the condition that I have told you earlier.

So, these are the things that you should keep in mind in terms of managing that patients with diabetic or uncontrolled diabetes or diabetes under control. When a patient comes to your dental clinic, any oral surgical procedures or surgical procedures are undergoing (38:06) or whatever it is, has to be taken in this consideration all this has to be kept in place. Now with that the management power, let us see a patient.

Now I have told you about fasting blood sugar earlier, when I forgot to mention about that when you talk about fasting blood sugar, it should be a minimum of eight hours fasting and then the blood. So, 9, 8 hours of fasting morning blood sugar, that is a fasting blood sugar value.

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Hypoglycaemic syncope

Awake/alert patient

- Administer 15 g oral carbohydrate (i.e., glucose tablet, 180 mL orange juice, 15–25 mL sugar)
- Monitor blood glucose and repeat carbohydrate dosing as necessary

Uncooperative patient

- Seek emergency medical assistance
- Administer glucagon 1 mg via subcutaneous or intramuscular injection followed by oral glucose supplement or • Administer 20–50 mL of 50% dextrose solution intravenously

Unconscious patient

- Seek emergency medical assistance
- Administer 20–50 mL of 50% dextrose solution

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Well, let us see what are the problems associated with, hypoglycemic syncope we have diagnose a patient with signs and symptoms, and the patient is there on the chair with hypoglycemia syncope, you have maintained the basic protocols of syncope like put the patient a little bit flat, you have raised the lower extremities and then slowly slowly the better pulse is improving. So, if the cause you have asked as the patient.

You have found out that the patient has not taken food, but have taken medication of sugar. So, hypoglycemia, so you know the reason is hypoglycemia. Then you are going to deal with the patient. What are the things? I will be describing under three headings one, if the situation is happening in an awake or alert patient. If the patient is awake and if the patient is alert and listening to your commands, then you can give 15 grams of glucose.

You can either give a 180 to 200 ml of any orange juice or a fruit tea or anything sweet juice, then you can give glucose tablets or glucose powder, anything can be given. And then you have to monitor the blood glucose. That is why I said it is always better to have a glucometer in your clinic, where in which you can map your, check cross or monitor the blood glucose. And after 10 minutes, every five or 50 grams of blood glucose will, raise the blood sugar level slowly slowly.

So, that normal, rate of blood sugar can be monitored with a glucometer if you have. So, monitor blood glucose, and if there is not much of a sign improvement, repeat this particular glucose

supplementation and two or three or four times and let the till the patient recovers till the patient normal sense are there but not feeling fully good. So, until such situation actually, you have to keep on giving this glucose powder or liquid sweet liquid, as in every other patient.

If the patient is uncooperative sometimes I have told you in little bit of this little if you have failed to identify the hyperglycaemic syncope coming in the earliest stages then patient might be gradually moving on to this uncooperative nature. So, in such patients you will remember that, you may not be able to fulfill the requirements automatically, you might require a medical assistance or medical help.

So, always call for your medical assistant you must have a contact with the neighboring hospital and emergency department where in case you happen to get some sort of an emergency, they will come to your assistance or their ambulance will come to your assistance. And you can also administer glucagon one milligram, one milligram glucagon I have told you can actually give a, can actually give a subcutaneously or intramuscular injection.

And then you can also give this 50 percent of dextrose solution about 20 to 50 ml of 50 percent dextrose. So, this can give an intravenous injection of glucagon is intramuscular injection, or a subcutaneous injection. And this 50 percent dextrose solution can be given as an intravenous small infusion. This is a very much easy for you all if you have to get, if you get a little bit training in that it is not at all difficult.

I am not talking about the IV cannulation but at least finding a way in one of these median to better ways out here and just putting us more needle with the butterfly shape scalp instead. And given this will actually definitely help you in saving a lot of emergency situations. Or if you have a trained nurse definitely she will do the purpose for you, she or he the train nurse will do this. So, in uncooperative patients always seek for medical assistance.

And administer glucagon 1 milligrams subcutaneously or intramuscularly. And also you can give 20 to 50 ml of 50 percent dextrose intravenously. In unconscious patient well, I have told you, you have already must be ready with the medical assistance people, the ambulance might be ready. And meanwhile, you can administer this 20 to 50 ml of 50 percent dextrose solution, because that actually suddenly boost the blood glucose level in the body.

I am talking about a situation where there is a hypoglycemic area, hyperglycemia situation. So, this situation in an unconscious patient if the syncope has arisen, and because of hyperglycemia then you should actually immediately summon medical assistants, and administer 20 to 50 ml of dextrose solution. It is always best to have a well-trained nurse or nursing assistants in your clinic because we are all prepared or you should be equipped and trained and not using procedures to meet emergencies.

Because emergencies are inevitable in our practice, and one should be very well equipped have a proper understanding to diagnose the situation as well as manage this condition also. So, with that, details, we have covered all the parts pertaining to diabetes mellitus. We have also discussed about the various types of diabetes, the implications of diabetes, the problems associated with diabetes and the what are problems you can have, you should face, how you should be prepared, what you should be anticipating, the signs and symptoms of diabetes mellitus.

And we have also seen the investigations on the normal values. And we have also dealt in detail about the management of diabetic patients how to deal, when to deal, what sort of medications are required, when to give antibiotic when not to give antibiotic prophylaxis and where it is, is needed or not. And we have also ended up with the detailed management part about this patient who is having a hypoglycemic syncope. I hope everything is clear for you. Thank you for your patient listening.