Management of Medical Emergencies in Dental Practice
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Asthma Status Asthmaticus – Part II

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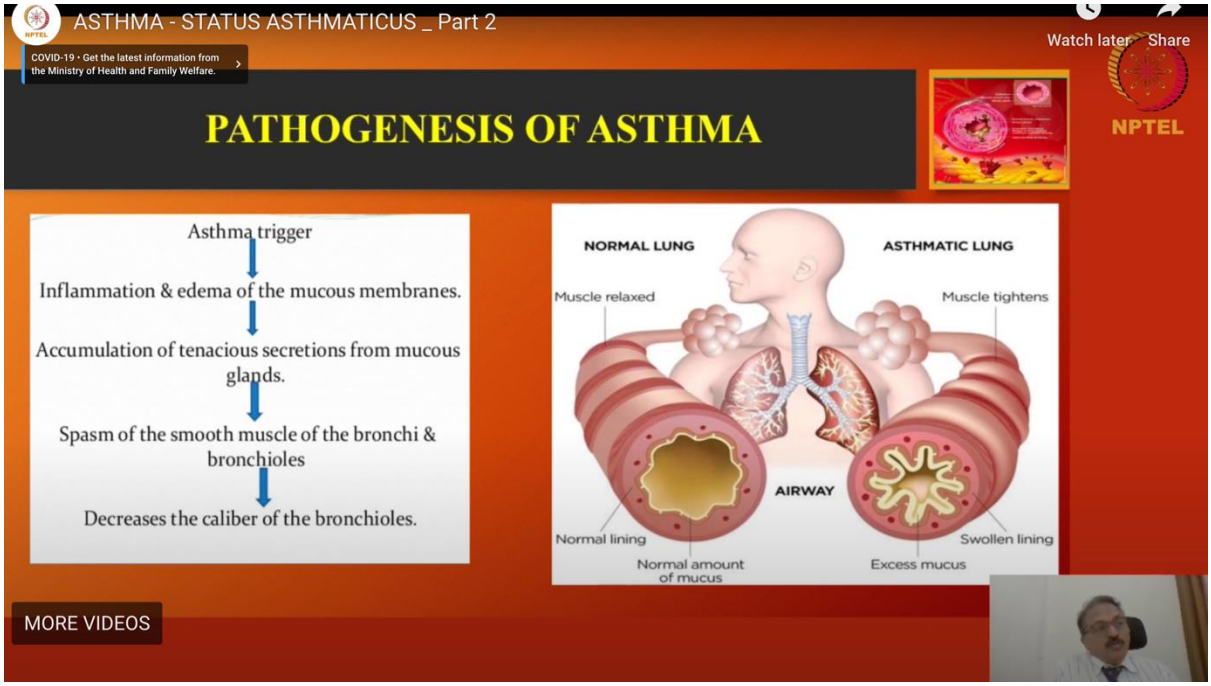

You should know how the pathogenesis is also very important to understand before doing anything. Yes, now we know the causes of asthma, what are the external factors, internal factors, what are the various reasons and who are more prone and things like that. Now, what exactly happens in the bronchi. See you have – from the trachea, you have the bronchi. Two parts which is divided – to the right lung and left lung. From the bronchi it goes to the bronchioles, which are tree like. It's like a tree. Ok. And the end of these bronchioles you have small alveoli. These are the alveoli which exchange gases. Pure to impure; impure to pure. These are the ones which exchange the gases and again go back and come back. When you breathe, whatever you breathe – all the oxygen will be given and whatever carbon dioxide are taken to the alveoli, again given, when you exchange, it comes out. This is a normal phenomenon of physiology of any alveoli to the bronchioles; to the bronchi; to the trachea; to the pharynx and through the nose it comes out. This is how it is. When there is any disturbance, maybe because of chemicals, maybe because of medications, maybe because of the dust, maybe because of infections, maybe because of any- any factor, lot of factor were mentioned. When there is a triggering of these bronchioles or the bronchi or the bronchioles- whenever the get triggered, immediately what will happen is – these bronchioles will respond

when there's a inflammation here. That is the way the body protects from the outside part and even from the inside part. It protects by creating an inflammation. Because of inflammation, there is oedema. Once there is oedema, it is widely- the width will increase of this particular mucous membrane, maybe in bronchi or even in bronchioles. The mucous membrane will increase in size. And, it is not just increasing in the mucous membrane. Whatever secretions there- it increases the secretion. So the secretions will come into the lumen – into the outside or into the tubular pattern. Because it is swollen now the air entry and exit will be very less. And, moreover, all these bronchioles will be having some smooth muscle around them. These smooth muscle – the are going through a little bit of contraction. So the inside lumen has come down, outside there is contraction and there is a secretion. See, if all three things happen, how can you breathe? How can you exhale? Then inhaling- exhaling will be difficult. So this is when the patient feels difficult and having difficulty in breathing. He's panting- he's having breathlessness. So that is what happens, when a pollen goes inside bronchioles, a dust particle goes inside the bronchioles. Now the bronchi will get – the dust particle settles there. Immediately this part of the mucous membrane will react. It'll try to protect this area, it evokes inflammation. Once it evokes inflammation, because of inflammation, there is oedema. Now, because of oedema, the lumen becomes small. And because of contraction of these smooth muscle- still smaller. Upon that you have secretions around this which will block it. So this is what will happens. This decreases the calibre of this particular thing. If you look at the slide here, see the lumen- this is normal, good, this is what is the mucous membrane and these dots are your muscle and this is the lumen- internal lumen and here is your smooth muscle. Now, when there is an inflammation like this, the entire thing becomes very narrow. Can you see this white part? This is the secretion. And because of the inflammation there is lot oedema in the bronchioles and the smooth muscles. See this smooth muscle- how nicely it is contracting. So there is difficult. So there's a smooth muscle contraction, there's oedema inside and there is secretion inside- all three put together states difficult in breathing. This is what is pathogenesis of asthma. What happens in the bronchiole, bronchi- this is part what you should understand.

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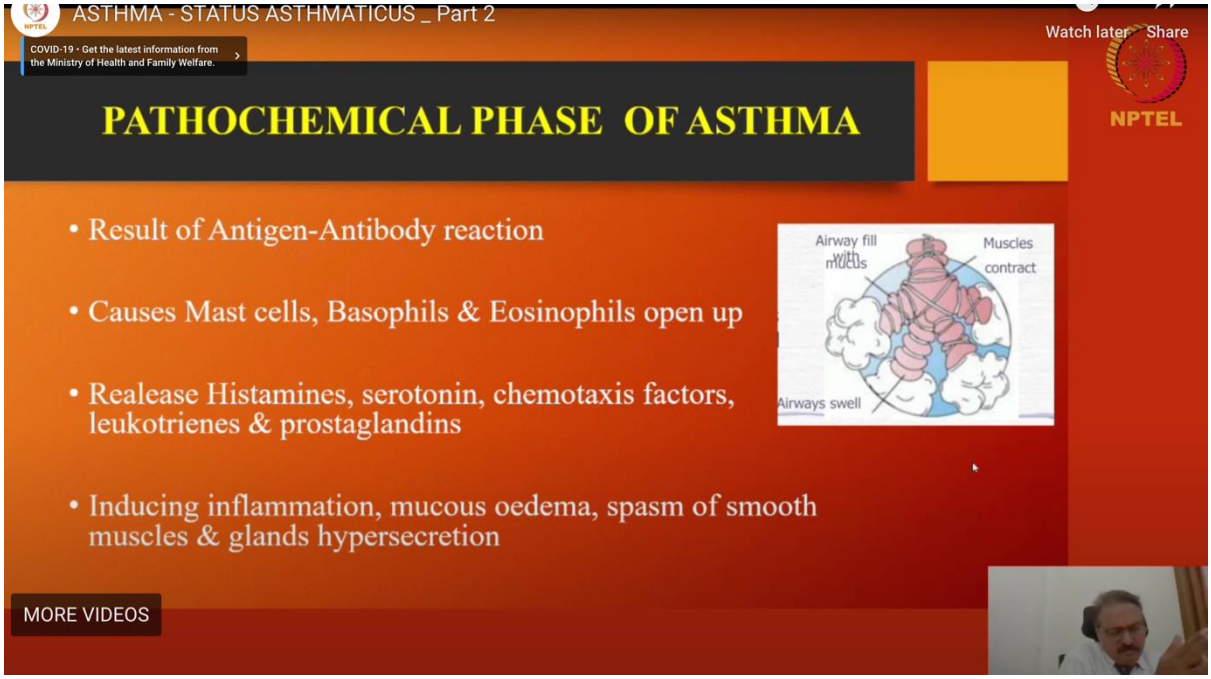

Coming to the – ok – this is by large. What exactly happens at pathochemical phase of asthma – in the sense what exactly. For example, in the lumen, immediately if a dust particle goes in, pollen goes in, smell goes to this and irritates this part. What exactly happens, when dust particle, pollen or anything goes in or hair follicle, if anything goes in here – there is an antigen-antibody reaction. There is a new thing, that has come into the body, the body will react, the antigen-antibody reaction will result. Because of the antigen-antibody reaction what will happen is, there are mast cells in this particular mucous membrane and these mast cells are the trigger. When the trigger these mast cells and there are also basophils running in the blood vessels of this particular area. This mucous membrane is supplied by the blood circulation and blood circulation will have basophils, eosinophils, all these things, they are also triggered. The mast cells which are present in the mucous membrane, the basophils , eosinophils which are present in and around the capillaries or small blood vessels, they are also triggered. Once they are all triggered, they burst and open- they burst open. In the sense, the get triggered, they open up like this and whatever the content within the mast cells and whatever the content within the eosinophils and basophils, they are all released into the blood stream and they are all released into the mucous membrane. Likewise, they release histamines, the release serotonins, chemotactic factors, leukotrienes and prostaglandins. All these are released in the blood vessels, all these things are released into the mucous membrane which leads to – for example, histamines – is the one which cause constriction of the smooth muscles, it causes increased secretion and things like that. All these chemotactic factors and leukotrienes will cause more and more inflammation. When there is more and

more inflammation, there is a lot of oedema and then that's how the lumen reduces. And the histamines will act on the smooth muscles and there is contraction. Histamines also causes excessive secretions, so thereby when all these things have been provoked and evoked, all these things happen. One is, increased oedema, then there's constriction of smooth muscle, then there is increased secretions in this particular area. That is what it means – it induces inflammation, mucous oedema and then smooth muscle contraction and then finally the glands also causes hypersecretion. This gelatinous secretion also makes air intake and exhaling very difficult. So this also happens in this particular- so this is what it is, pathogenesis and pathochemical phases of asthma. If you look at that particular level, this is how you should understand that this is what it is to create or cause an asthma.

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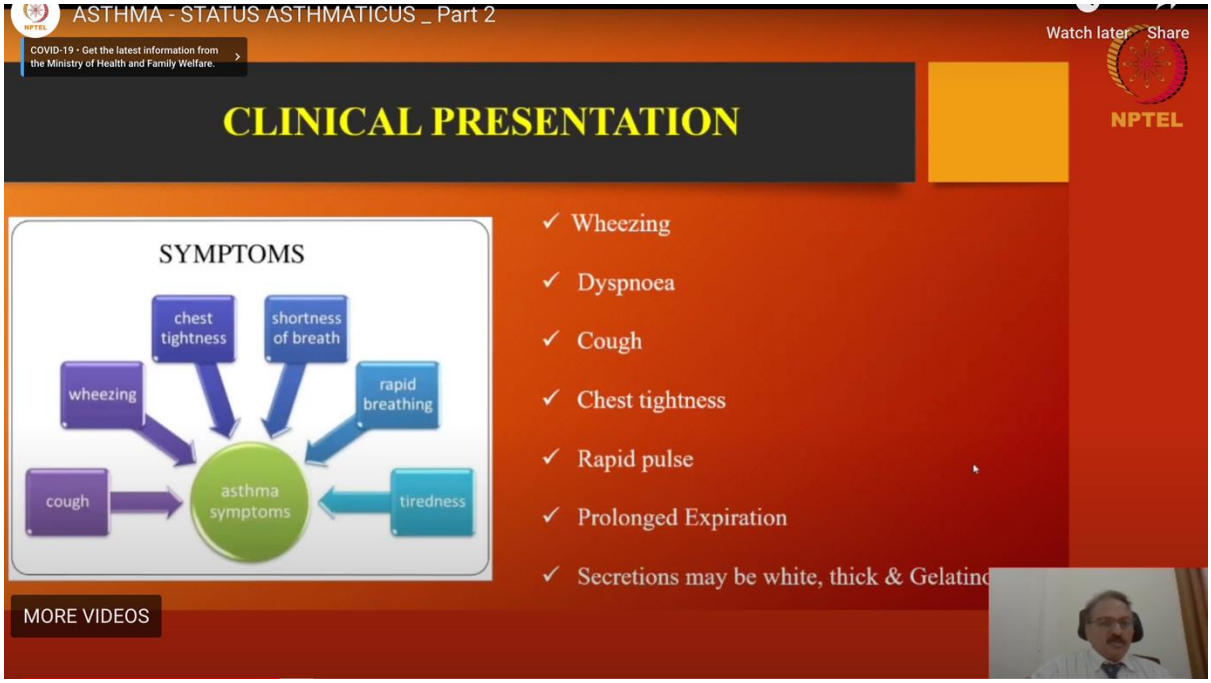

All these things – now what happens to the person who's getting affected by this – all these things like that, the person will suffer and what are the symptoms you see and say that he is having an asthmatic attack. First thing is wheezing, in sense difficult – because once the lumen becomes smaller, air going inside and going outside, going inside and coming outside, there is something like small wheezing. If it is a big one, it goes and comes, there is no problem but as it constricts, there is some amount of difficulty in entering, so there is some amount of wheezing sound that can be heard. Then is dyspnoea – difficulty in breathing.

Then patients begins to get cough due to irritation of soft tissue. There is a tightness of chest because, all these things are filled with oedema, all these things are constricted with smooth muscle, there is mucous secretion. Then there is feeling of tightness in the chest because the air also is unable to enter and because of all this the body is trying to fight – there is excess work that leads to rapid pulse. And there is prolonged expiration- you try to remove maximum so that you can inhale properly so there is prolonged expiration. There are secretions – sometimes there secretions – you take out the secretions which are gelatinous, which are mucous, thick secretions taken – which are seen in these particular conditions.

Because these secretions are given by the hyperactivity of the glands or from the mucous membrane of the bronchi and bronchioles , there's a lot of secretion and these secretions will also come out. So all these things can be seen with patients with asthmaticus , firstly you'll see a wheeze, difficulty in breathing, you'll see a cough, chest tightness, rapid pulse, prolonged expiration and there is gelatinous or thick secretions which are coming out when they cough and things like that. So these things are the clinical presentation of asthma.

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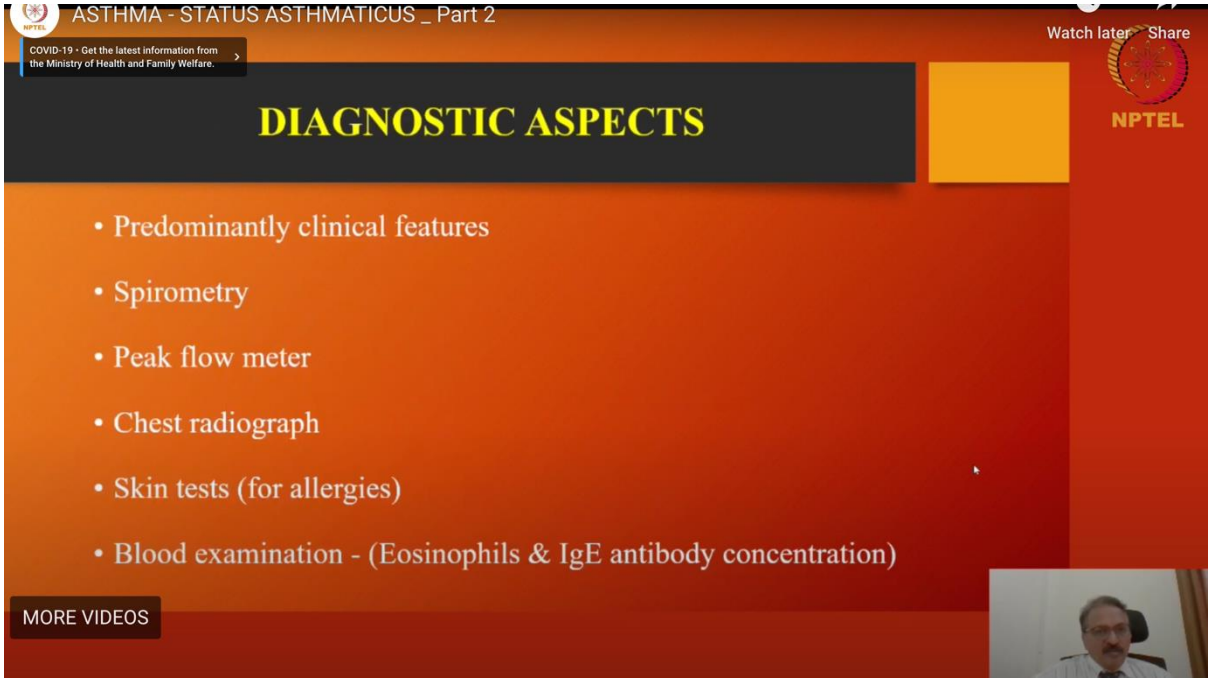

Diagnostic aspects , when you come to diagnostic aspects, one of the most important aspect is that this is a predominantly clinical study – clinical feature, with the clinical features you can diagnose as predominantly asthma but then you can also have some other aids which can

confirm your diagnosis or we can see how severe is this particular condition as well as for example Spirometry – it's an apparatus, which measures both inspiratory and expiratory volume of the air in the lungs. So by this you can compare, the normal and the abnormal and accordingly you can treat. This is how you see it, in the sense, you – ok, during the asthmatic attack you check, now over, you have done the treatment, the asthma has come down-spontaneously or with treatment. Afterwards again use a Spirometry and check. See during the attack and after the attack, what are the value. So this is a very small equipment, at home also it can be done, you can get the reading during the attack and after the medication you can see whether you are getting relief or not, how much volume of air in inhaling and exhaling has increased, that can be seen by yourself. so that is one useful instrument. So by this particular spirometry instrument you can detect two different types of abnormality of ventilation can be detected. Is it because of obstructive or restrictive?. Obstructive or restrictive type can be detected by this spirometry. Then there is one more peak flow meter which is again, very small gadget that can be done at home. This is to measure how well, your lungs exhale the air. It is a small bottle like thing, you exhale the air forcefully. There will be green, yellow and red, when you exhale forcefully, the volume of air will reach up to the green, which means it is normal but when you exhale, it goes only till the yellow, that means there is some problem, you need to go to the doctor. When your exhaling it is in the red, it means you are in the attack - you are in the peak of the attack. So this is a peak flow meter, which will contain green, yellow and red only for exhaling only. Forcefully, inhale, whatever possible, forcefully take it out. If the meter goes up to the green, absolutely no problem, it is yellow, then there is a problem then if it is red, then you're in a difficult situation, you need to see your doctor immediately. So this is a peak flow meter. These are very small, simple things which can be done at home, which is done in outpatient basis by the doctor and they can tell you, what is the problem and things like that. And these peak flow meter, it is better if you keep it at home. During the medication or during the treatment, you can use it and you can see for yourself how well it is whether you can go till green with the medication slowly, coming to yellow and things like that. If it is coming only till the yellow you can go to the doctor and tell: sir. I've been checking at home and still it is coming only till yellow. So the doctor can change the medication. The medication is giving is not sufficient, so he can increase the dose or change the medication so that you can go till green level. So this peak flow meter can be used at home something like a referring or gauging type of equipment which can be useful for the individual. Now coming to the chess radiograph very rarely. The just radiograph also- very rarely. To get the changes at radiographic level,

will take a lot of time. So Asthma predominantly is an acute generally, it is an acute because of the dust particles because of pollen because of chemical because of medication. And various factors and infection and whatever. This is more of acute. So predominantly..-You won't say much radiographic changes in an asthmatic patient. Yes, Your skin test are important because. skin test are important because to know for the allergies, what are the allergies for this particular patient? Is he allergic to medication is allergic to chemicals? Is allergic to food particles- Food items? Is he allergic to his clothes? Physiologic to any chemicals is using soaps paste, whatever. So all these allergic tests are also important- because if the patient is having... If you notice the patient having extensive allergy asthma, he should go for all these test.- allergic tests without any doubt. Coming to the blood picture yes examination you should know because eosinophils basophils and specifically IgE antibody concentration will be increased if the patient is having any of these allergic – asthmatic attacks and allergic problems. So in blood investigation, the ESR will be raised for infection. And for allergic reactions basophils and eosinophils will be raised and allergic antibody concentration will also be raised. So these things are also important, but predominantly asthma is a clinical identity which you can diagnose from clinical picture-one. Spirometry and peak flow meter are very useful, which can be done at home itself. It is a reference point and gives very good indices to the Doctor to modulate the doses for this particular patient. Chest x-ray is not very relevant very rare cases we can, but not very relevant. Skin test are very important, especially in case of allergic reactions and things like that. Blood examination, yes to some extent.

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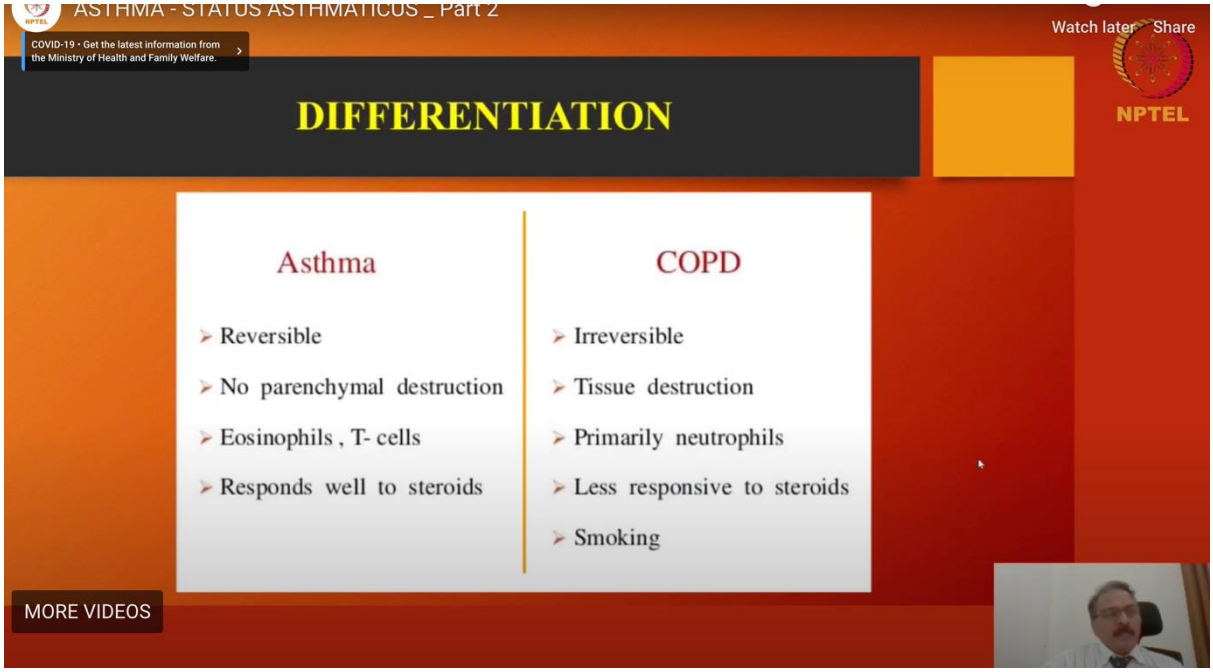

Coming to the differentiation between the ….people should differentiate between when the patient comes in cops and things like that immediately, you should differentiate at least few things between the asthma and COPD. COPD is chronic obstructive pulmonary disease. Asthma is generally reversible. You should ask the patient if it is reversible immediately, you keep getting and going and because of medication and things like that. You should ask. There is no parenchymal destruction in the sense, there is no destruction of the lungs or the bronchioles and things like that. Whereas in COPD, there is tissue destruction so in such conditions, you can see the x-ray findings in COPD whereas in asthma, you don't see any x-ray findings. eosinophils, and T cells are increased in asthma where is in COPD. It is neutrophils that are predominantly high because they are trying to defend your body. It is the first line of defence these cells are much more in COPD than asthma. And asthma response, very well with steroids and whereas this responds very less with steroids because it is not just inflammation it is some amount of difficulty because of smoking or other aspects are the problem so not just steroids are going to help us and maybe we need other medications also with COPD. Whereas Asthma response very well with steroids. This differentiation, you should know, and we should ask leading questions whenever you're treating to know whether the patient is having asthma or COPD.

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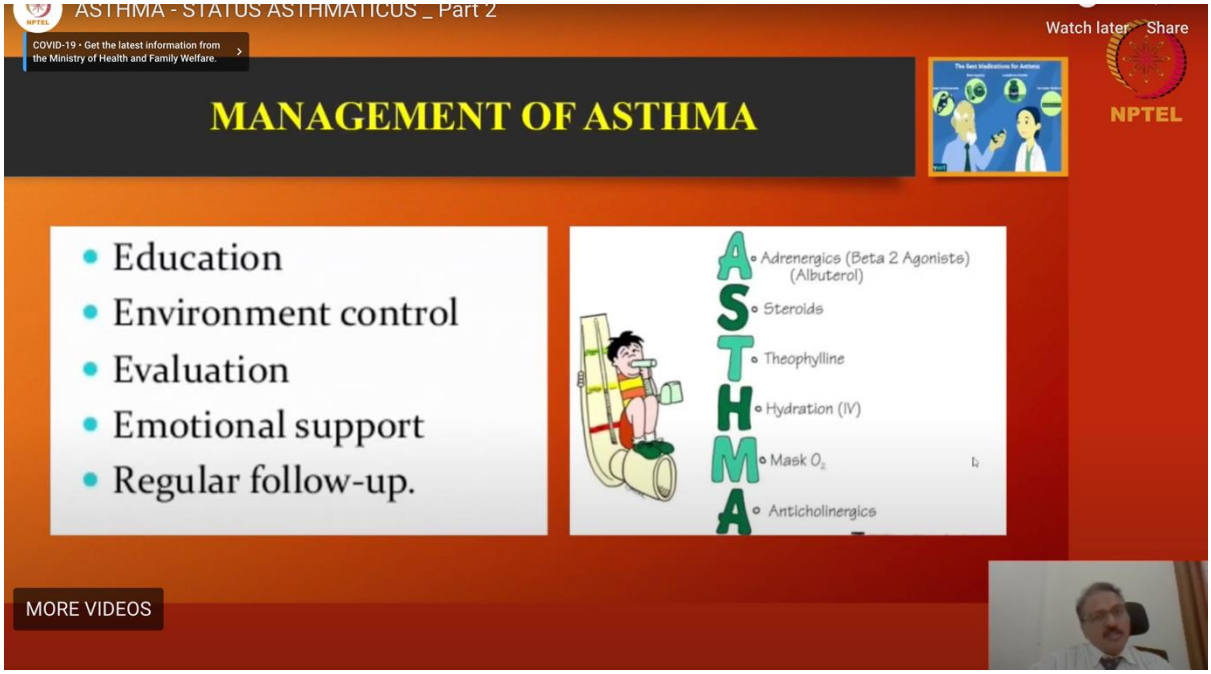

Coming to the management aspect. See though we are dental surgeons and maxillofacial surgeons. We are not going to treat these conditions. But we should have a fair idea of these particular conditions. Because we will be dealing with minor Oral surgical procedures and major oral surgical procedures or simple exodontia like extraction and things like that. But we should know the medical status of this particular condition because this… we should estimate whether to do this case or to postpone. So for that purpose, we should know and We should educate the patient. One of the most important thing is, we should educate the patient of how severe is this particular condition? And how relevant is this particular condition to the procedure, you want to do. You have to explain. You can't say you have asthma, so you can't do it. You have to explain you have to educate your patient. Why we defer because of this particular condition. And you also should explain why you have to control this - Maybe because of the environmental control and things like that. And the patient also have to evaluate you have to evaluate the patient Also have to evaluate, how serious is this condition? How frequent is this condition? What is the medication he is taking? Increasing the dose or decreasing the dose. All those things and then emotional support. If asthma has means, it is not a grave disease. You shouldn't have any psychological depression and things like that. Because Asthma is a very simple and reversible disease. It can be cured even without medications.. So the emotional support also has to be given to the patient it is not that we are not doing the procedure because of the asthma patient - the patient should not go into any

depression. No. That emotional support should be there. And you should also have a regular follow up. These are the things which we talk to the patient, educate the patient create awareness of about the patient about the condition what he has and about the procedure, we are going to do but when it comes to medication, though we are not going to prescribe any medication once you identify and explain to the patient we have to refer the patient to a pulmonologist or physician were basic idea of what medication is, he taking is very important because tomorrow, if we are writing any medication we should see that these medications our medication should not have any hinderance or any disturbance create to the body or it should not aggravate this particular condition. So as the synonym says ASTHMA . A for adrenergic beta 2 adeno receptors agonists are there in which the common thing is salbutamol, as you all know very well. Albuterol is also very commonly used and as well as steroids. And T for theophylline and H for Hydration, in the sense patient has to be hydrated in the form of IV fluids or something like that. M for mask to avoid or any of the pollution or any of the external factors affected to this. Some of the anticholinergics can also be used in the treatment of asthma. But nevertheless, one thing is very clear that we are not going to treat or disturb any of those things, it's just simply asking the patient to wear mask that's one thing you have to tell very clearly and we tell if the patient is in the active phase to refer to the pulmonologist explaining, educating and evaluating and providing additional support is only our job but not prescription of medication.

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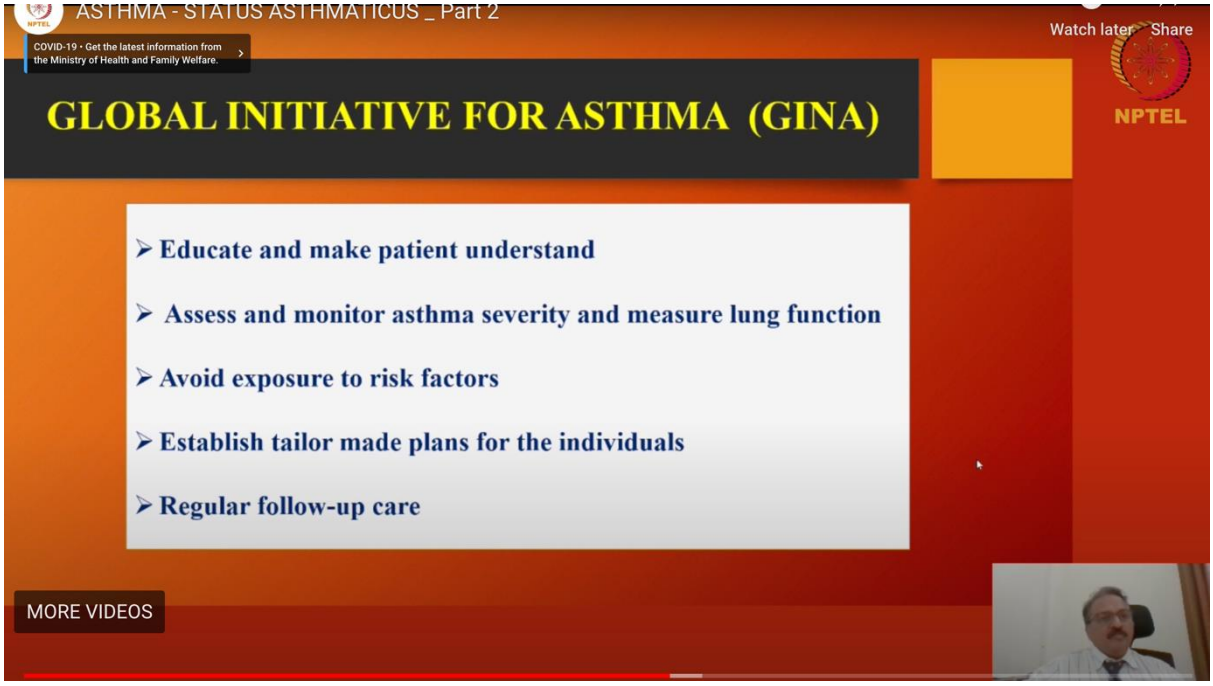

A Global initiative for asthma- it's a wonderful organisation which is called GINA. it is very well, recognise all over the world. It is an organisation like this called global initiative for asthma and they have given this guidelines of what exactly you see in asthmatic patients. First educate and make the patient understand. Then assess and monitor the severity and measure the lung function that can be done by spirometry and peak flow meter – simple these things. Avoid exposure to risk factors- In the sense, any of these extrinsic factors. Establish tailor-made plans for the individuals. That is done by a pathologist or a physician. Tailor made plans in the sense- the medication you write for individual purpose for individual patient for his condition, for his age, for his weight- body weight, those tailor made plans have to be given to the individual. And regular follow-up care is very, very important. All these things you explain to the patient and then send them to the pulmonologist or physician.

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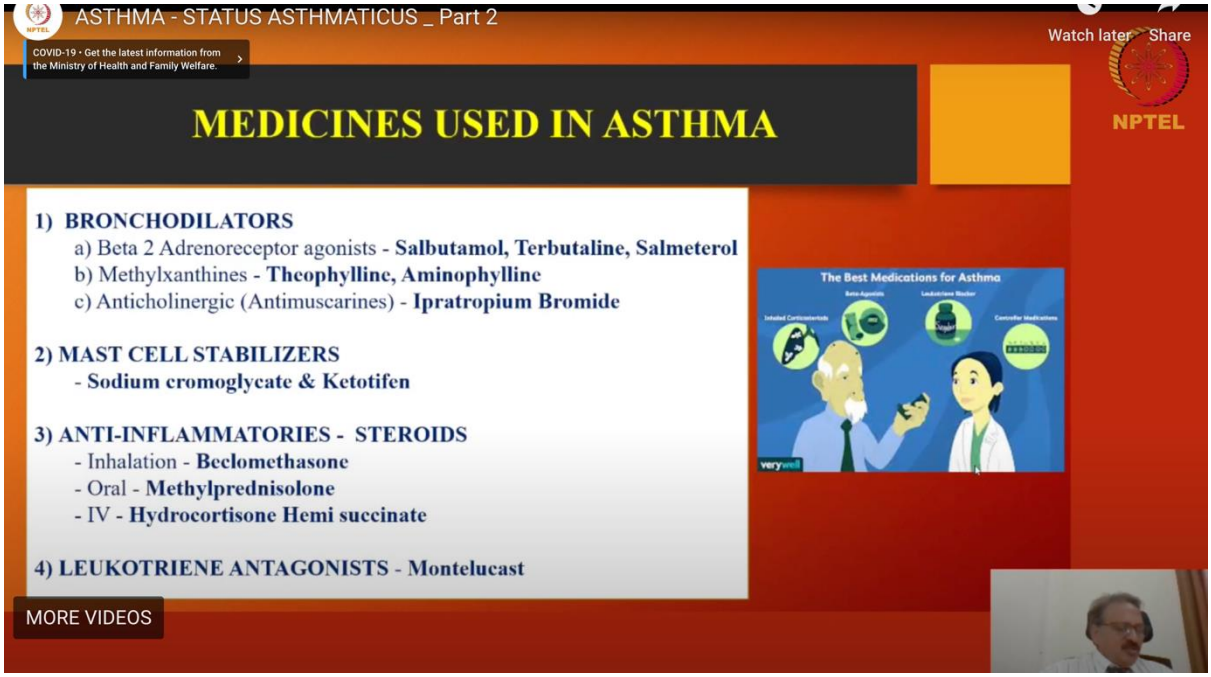

Coming to the medications used in asthma. You all know that there are lots of medication used in asthma. This is only for you to have, what are the medications. But mind you, none of us, we are not writing the medication. And neither you prescribe any of these medications. This is exclusively for you to have the knowledge the basic knowledge about these medications. That's it, and how these medications and our medication will have any effect. While prescribing our medication with these medication, will they have any effort to know for that only. For that particular knowledge, only you should know the medication. But other than that, we are not going to prescribe any of these medications. So what is the problem here? The Bronchioles are constricted and you want to give dilators. so these dilators – there are three variety of bronchodilators – beta2 adrenoreceptor agonists- these act on the beta 2 receptors and these are Salbutamol, Terbutaline and Salmeterol. This Salmeterol is a long acting drug which probably may act close to 16 to 24 h. Salbutamol acts for a limited period from 8-10h. these things will also be prescribed by the pulmonologist or a physician. And methylxanthines – these are things which we have to keep in our dental office ready that is – Theophylline or Aminophylline, which are given intra-venous, also immediately these are to be given through an IV- normal saline through a venous overate so that these also cause bronchodilation. As I said before, anticholinergics which are Ipratropium bromide. This is also in the form of tablets, syrups and everything. These things are all bronchodilators. These are all medication that are commonly used. But in any case, we are not going to have any of these medication. Most important thing is, these Theophylline or Aminophylline should be there in all DENTAL offices in case of any emergency. Now, coming to the mast cell

stabilizers. Mast cells are the ones that blast open and the histamines are released outside. And to protect or stabilize these mast cells there is one medication called sodium cromoglycate and ketotifen , these are the two things which are used to stabilise the mast cells so that they don't break up and release histamines suddenly. So that all those things; will not be released – chemotactic factors are not released into the blood stream so that there is oedema and things like that. No inflammatory reaction there and there is bronchoconstriction and things like that. Then comes to anti-inflammatories- yes, steroids are the more-

NSAID'S we do not use, the reason I will tell later, but anti-inflammatories like the steroids are used especially the inhalational steroids, many people use this that is Beclomethasone, which again causes anti-inflammation so that it does not cause oedema. Then oral in case if the patient is having some difficulty, occasionally then methylprednisolone can be taken. IV – if you want immediate in the dental office or somewhere if the attack is going on.. difficulty in breathing and things like that, immediately push IV- Hydrocortisone hemisuccinate 100 or 150mg intravenously. Immediately he'll have anti-inflammatory action and then then patient survives and then the patient will not have so much of difficulty even during this severe attack. And last and finally Leukotriene antagonist- montelukast, these things are given for long standing, and these things are given by pulmonologist and physicians. But these are the basic medication used for Asthma. Mind you, we are not going to write, except keeping a couple of .. for example-Aminophylline, you keep it in your Dental office for emergency purpose. You keep hydrocortisone hemisuccinate or dexamethasone in your dental office, in case of any of the – asthma, in case of emergency situation to deal with asthma or any other conditions.

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Whereas the regular medication to be given by, physician or the pulmonologist. But what are the considerations in dental treatments? When you consider all those things?

A detailed history is required – you have to ask whether there's any problem in breathing or any wheeze, all those things. Detailed history is very very important and especially if there's any recent episode – when is the recent episode? And how long it is or how severe it is ? what he has done during this particular episode and things like that. And you should also evaluate if this episode is because of anxiety, infection, medications or exposure to any of the allergens. You should know if it is because of internal factors, then you should be more careful or because of external factors then you can avoid that. For example: dust, pollen, chemical and all those things, you can avoid that. We can tell if the patient is comfortable or not with the environment you are providing.

To bring their medication along, it is very very important if they're taking any medications especially Salbutamol or Salmeterol. All these things are taken in the form of inhalation- you have to ask the patient to get it, keep the thing ready in the clinic. Keep Aminophylline ready, keep dexamethasone ready or Hydrocortisone Hemisuccinate ready and then only take up these patients. Elective dental procedures are deferred in active asthmatic conditions. No dental procedure is taken up during active.. In case of passive, emergency dental procedures can be taken up. In case of passive asthma, in the sense, he has asthma, he is under medication but he is having terrible tooth pain or a huge abscess which is causing problem

and things like that, then he can be taken up. But otherwise no dental procedure can be taken during active asthmatic.

Allergy to any medication to be ruled out which is very very important, because you are going to prescribe medications, especially penicillin which causes allergic reactions. In case it causes allergy, again there will be difficulty in breathing during an asthmatic attack. So that has to be very clearly taken in the history itself.

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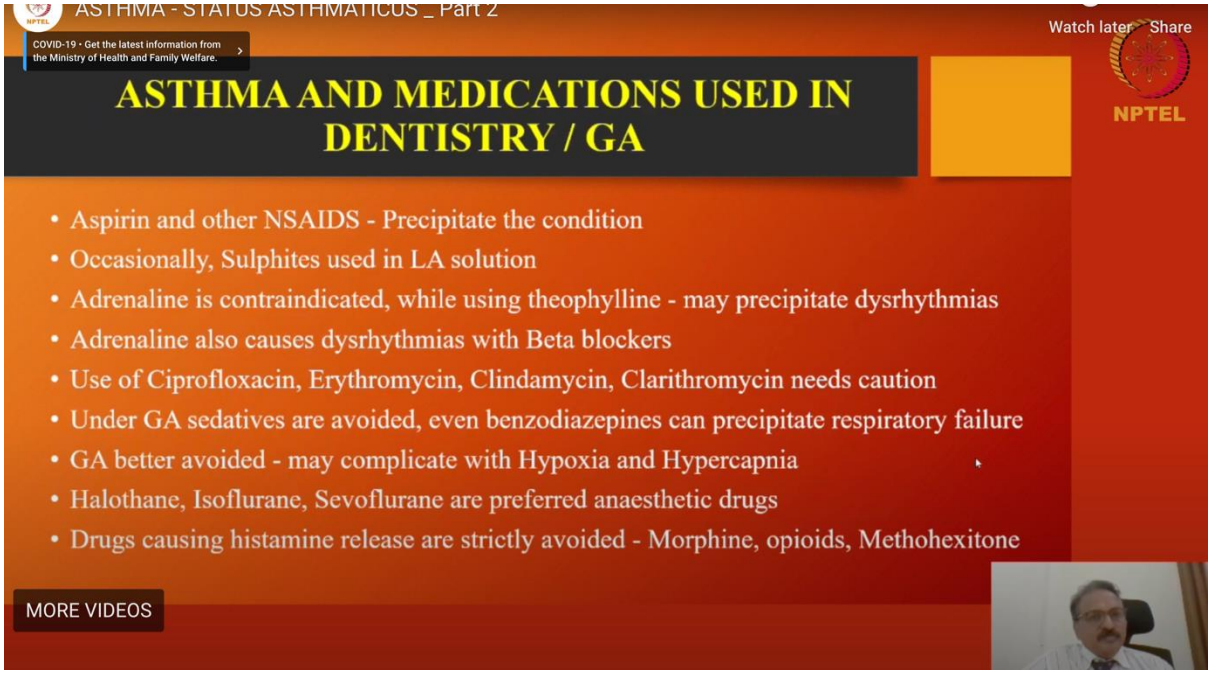

Asthma medication used in dentistry or under general anaesthesia-aspirin or any other NSAIDs do not be prescribed during asthmatic condition because they precipitate the condition. You can ask, why? how?. Yes, NSAIDS or aspirin, they cause proliferation or increase the number of Leukotrienes. Leukotrienes cause a lot of inflammation. Already the patient is having an asthmatic attack previously, he is under … any small inflammatory reaction, immediately there's a chance for the asthma to trigger. When there's an increased amount of leukotrienes, definitely, there is an increased amount of inflammation. When there is inflammation immediately, it is a triggering point for asthma to occur. So, NSAIDs is not prescribed and the patient says there is asthma. Plain paracetamol that too in only limited dose can be prescribed. Occasionally, the sulphites present in local anaesthesia can also precipitate this particular condition. Adrenaline is contraindicated when you are using

theophylline-both together may precipitate dysrhythmias. This causes some amount of problem to the heart. There will be arrhythmias and dysrhythmias. Those things can happen. Either use theophylline or adrenaline, but not both together. Adrenaline alone may cause this dysrhythmia with beta-blockers. Beta blockers, other ones which are mentioned earlier. Use of Ciprofloxacin, Erythromycin, Clindamycin, Clarithromycin needs caution because of various other chelating effects and other things. These also can cause some amount of disturbance. Under GA sedatives are avoided because there is already respiratory distress and because of this respiratory distress, if you give sedation then it is like precipitating the respiratory failure. Already, there is a respiratory distress because of asthma, and you're giving sedatives the respiratory becomes more and more depress, and it can go to respiratory failure. So GA is better avoided because of hypoxia and hypercapnia. Hypercapnia is increased amount of carbon dioxide in the body. Halothane, Isoflurane, Sevoflurane are preferred anaesthetic drugs. In case, if it is mandatory, and you have to do and things like that…then Halothane, Isoflurane, Sevoflurane are drugs which can be used. Drugs, causing histamine release are strictly avoided- like morphine, opioids, methohexitone. These are the drugs which cause release of histamine, which should never be used whenever you want to do any procedure under general anaesthesia.

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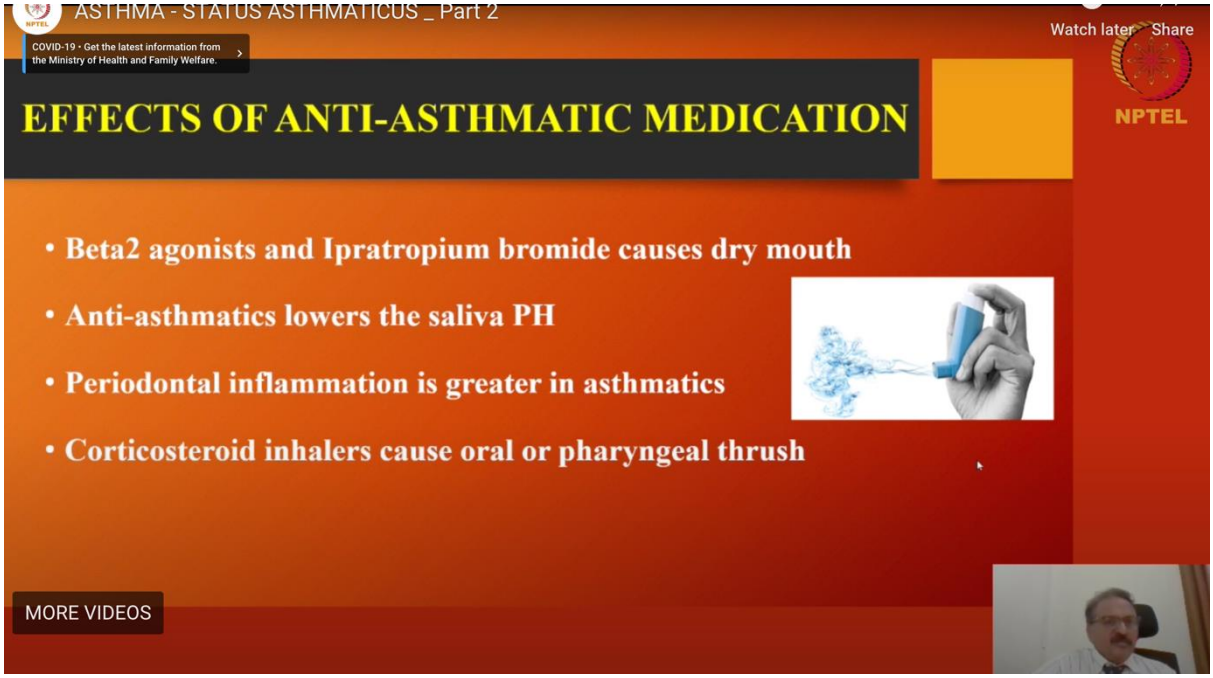

Effects of anti-asthmatic medication: when the patient is taking medication, what all things can be caused in the oral cavity?

Beta 2 adrenoreceptor agonist and Ipratropium bromide can cause dryness of the mouth. So there can be more amount of caries and things like that. Anti-asthmatics lower the pH the salivary pH is lowered – so it is more acidic and things like that. Periodontal inflammation is more in case of asthmatics because of the use of this particular medications. Corticosteroid inhalers- as I said, inhalation of corticosteroids can cause pharyngeal or oral thrush. There is some amount of … more than oral there is pharyngitis or because of this particular fumes in this particular throat region after the use of this particular thing - high chance of infection and because of that there is pharyngeal or oral thrush.

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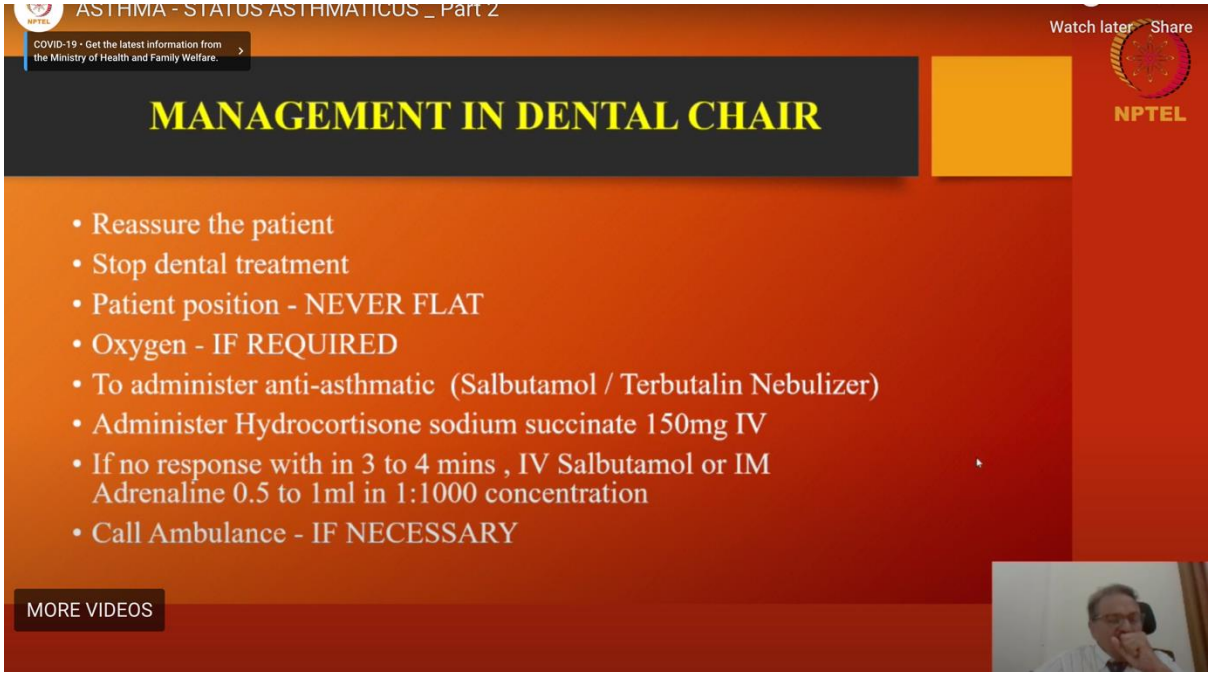

In case the Asthma occurs for some reason in the dental chair, how will you manage? First thing is stop your procedure ,stop anything. Then reassure the patient. Reassure the patient that nothing is going to happen. “take it easy.. maybe because of some chemical- spirit or because of the apprehension, anxiety and all those things, you are getting”. Remove all the instrument, remove everything. Stop the procedure. Never make the patient flat because breathing becomes difficult, so it has to be upright position. On supplement with oxygen, it is better to have a oxygen cylinder- immediately put the mask and then if the patient is having difficulty in breathing, it is easier to apply the mask. Administer antihistamines like Salbutamol or Terbutaline nebulizer if you have it, otherwise if you have any of the emergency medicines like aminophylline or even corticosteroids – immediately give IV Hydrocortisone hemisuccinate 100mg to this particular patient. As I said Hydrocortisone

sodium succinate 150mg. if no response within 3-4 mins, IV Salbutamol or IM Adrenaline 0.5mg in concentration of 1:1000. All this things can be simultaneously done and you need to observe the patient, stop the procedure, reassure the patient, put him in proper position and finally, if the patient is still having some difficulty, call the Ambulance, call the physician and call the pulmonologist. Make everything ready in the hospital and you go along with the patient to the hospital in the Ambulance. Take all these necessary steps during the travel are shifting from your place to the hospital.

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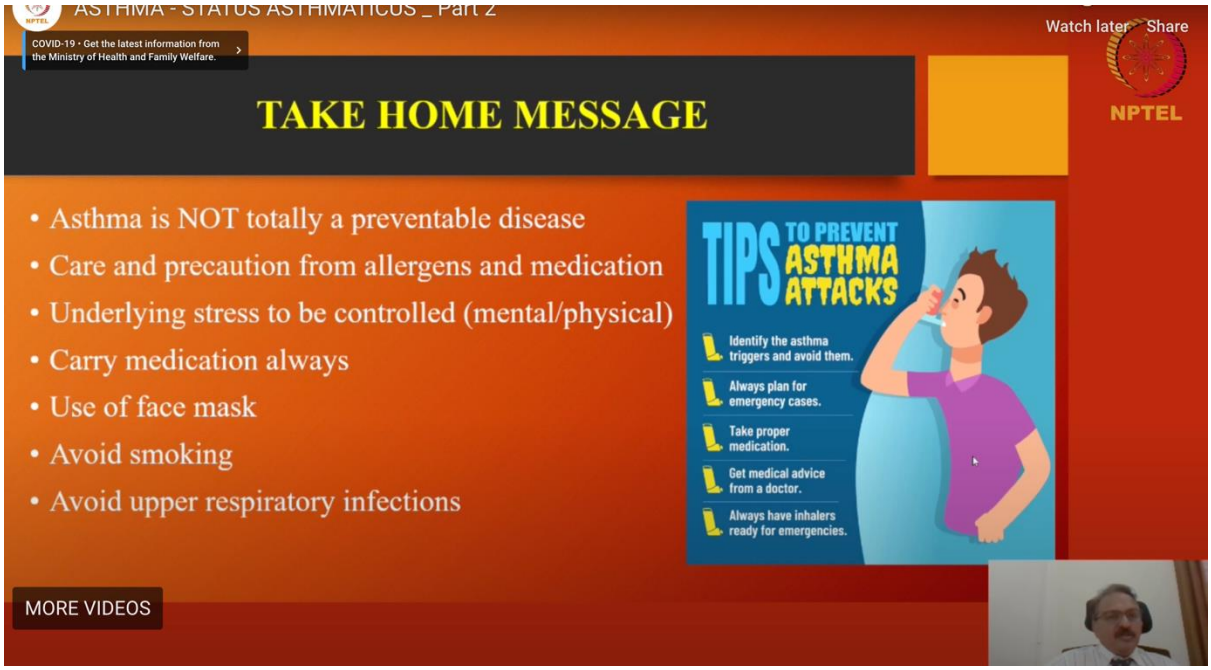

Take a message, Ama is really not a preventable disease. It comes and goes and comes and goes. Sometimes, even without medication, it comes and goes. Care and precaution from allergen and medication is very important. Underlying stress should be controlled. Its not like you take a lot of stress mentally and physically and you suffer with this particular attacks. Carry medication, always if you have any doubt especially in the winter season it is mandatory to carry – just like how you carry your cell phone, Carry this medication. Use face mask- with things going around, at least for a decade , I don't see going around without mask and things like that. Avoid smoking or going to the smoking regions. And avoid upper respiratory tract infections because infection can also trigger asthmatic attacks. So this is what is the take Home message.

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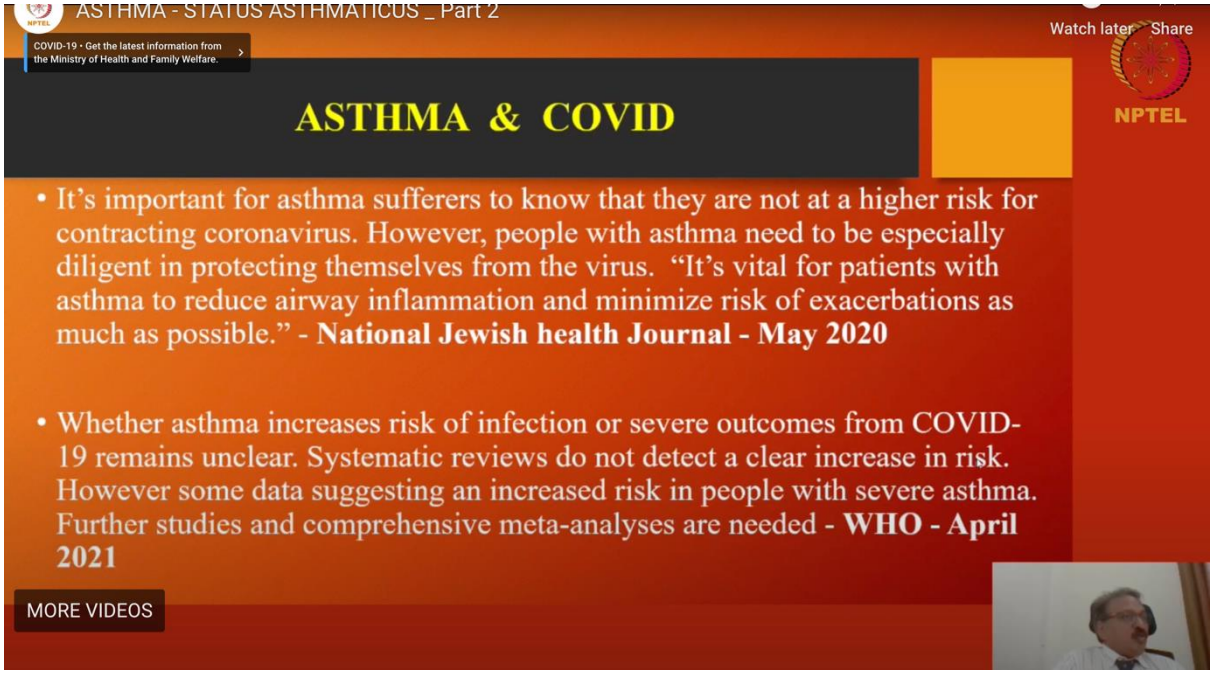

Last, but not the least Asma and Covid. Right now, the burning issue is Covid. Everybody knows that these are the viruses which attack the respiratory mucosa so if this particular mucosa is attacked, and if the patient is having asthma so that is a beautiful article given in the national Jewish health journal of May 2020 "it is important for asthma sufferers to know that they are not at a higher risk for contracting coronavirus" even if the coronavirus attacks the asthma attacks, it is not going to be high risk. "however, people with asthma need to be especially diligent in protecting themselves from the virus". They need to protect from the virus because two things at a time. One side asthma, the other side virus, both attacking the respiratory system. Sometimes, if the patient is having other comorbidities like: diabetes, immune-suppression, and all these things, then they will suffer because of this particular condition. "it is vital for patients with asthma to reduce airway, inflammation, and minimise risk of exacerbations as much as possible". That means your asthmatic attack, and your asthmatic problem should be kept in under control, so that you will not have two things at a time and then suffer more. This is what has been said in the national Jewish health journal.

Now, WHO in 2021 has said "whether asthma increases risk of infection or severe outcomes from Covid19 remains unclear". It is not clear. Because of asthma and COVID- this coronavirus together is still is not clear that there is any sever outcomes. "Systematic review do not detect a clear increase in risk". Systematic reviews have been done but its still saying there's no clear increase in risk. " However some data suggesting an increased risk in patients with severe asthma". In the sense, in severe asthmatic patients with coronavirus

disease, there might be some amount of risk, that is not still clear. " Further studies and comprehensive meta-analysis are needed". This is what is suggested by WHO. So as such, patient who had asthma and now coronavirus disease – no problem. But the patient who is having asthma right now and coronavirus together should be at most care. If the patient is having coronavirus, asthma and diabetes or some immune problem, they are at the high risk. These are the 3 parameters you should keep in mind and accordingly you should control your disease.

I thank Dr. Jimson, mainly who has given this opportunity. I also thank the National Program Technical Enhancement Learning committee which is initiated by IIT supported by Human Resources Development of India, for giving such an opportunity and for creating awareness and teaching motivation to everyone is phenomenal and wonderful idea. Thank you once again. I wish all the best. The person whom you see there is my teacher- because of him, who I am now and what I am and what I can do to others is all because of him. Thank you sir. Thank you everyone.