



## ABSTRACT

COVID 19 – Health and Family Welfare department – Protocol for Management of Diabetes in Covid-19 and Management of Covid patients with Co-Morbidities – Orders – Issued.

### HEALTH AND FAMILY WELFARE (P1) DEPARTMENT

G.O.(Ms).No. 352

Dated: 19.08.2021

பிலவ, ஆவணி – 03

திருவள்ளூர் ஆண்டு – 2052

Read:

1. G.O.(Ms)No.257, Health and Family Welfare (P1) Department, dated 31.05.2021.
2. G.O.(Ms)No.264, Health and Family Welfare (P1) Department, dated 03.06.2021.
3. From the Director of Medical Education, letter Ref No.3677/ H&D /2/3/2020, dated 16.08.2021.

### ORDER:

In Government Order first read above, the Government have issued revised treatment protocol for patients with corona virus infection in supersession of the G.O.(Ms)No.239, Health and Family Welfare (P1) Department, dated 13.05.2021. In Government Order second read above, Government had constituted State Task Force Committee to assist the Government on COVID-19 Management Activities.

2. The Director of Medical Education has sent a draft Protocol for Management of Diabetes in Covid-19 and Management of Covid patients with Co-Morbidities which has been approved by the State Task Force Committee.

3. The Government have accept the draft Protocol for Management of Diabetes in Covid-19 and management of Covid patients with Co-Morbidities approved by the State Task Force Committee and issue the following Protocol for Management of Diabetes in Covid-19 and management of Covid patients with Co-Morbidities with immediate effect :-

### PROTOCOL FOR MANAGEMENT OF DIABETES IN COVID 19

1. Patients with type 2 diabetes are more likely to have serious complications, more intensive care units (ICU) admissions, longer length of stay, and die from COVID-19. Although there are limited data, patients with type 1 diabetes have increased mortality from COVID-19 compared to the general population.
2. COVID-19 infection appears to precipitate severe manifestations of diabetes, including diabetic ketoacidosis (DKA), Hyperosmolar Hyperglycemic state (HHS), and severe insulin resistance.

3. Sick-day management is directed towards preventing hypoglycemia, significant hyperglycemia, and Diabetic Ketoacidosis.
4. For patients with a known history of diabetes, or in patients with metabolic acidosis on initial admission, look for urine ketones.
5. There are no data to inform precise glycemic targets for patients with COVID-19. In general, the goals are the same as in other hospitalized patients (eg, avoid severe hyperglycemia, volume depletion, and electrolyte abnormalities; avoid hypoglycemia; ensure adequate nutrition). A blood glucose target of 140 to 180 mg/dL is reasonable for most hospitalized patients.
6. Many oral agents have specific contraindications that may occur in hospitalized patients. Therefore, home diabetes medications are usually discontinued. In particular, sodium-glucose co-transporter 2 (SGLT2) inhibitors should be discontinued due to increased risk of dehydration and volume contraction. Metformin is contraindicated in situations in which renal function and/or hemodynamic status is either impaired or threatened, due to the increased risk of lactic acidosis, and therefore should be discontinued at least temporarily until the clinical course is more certain. Other diabetes medications may not be appropriate due to adverse side-effect profile.
7. Insulin is the preferred treatment for hyperglycemia in patients hospitalized with moderate to severe COVID-19. For patients with type 2 diabetes, the need for insulin therapy may be temporary. Patients with type 1 diabetes have an absolute requirement for insulin at **all times**, whether or not they are eating, to prevent ketosis.
8. Subcutaneous insulin protocols are being used with increasing frequency to treat mild to moderate DKA during the COVID-19 pandemic when intravenous insulin may not be practical owing to the need to limit frequency of contact of staff with patients. In this setting, dosing and monitoring are being performed every two to four hours. Subcutaneous insulin protocols are not used in patients with severe DKA; severe cardiac, renal, or hepatic Co-Morbidities or in women who are pregnant.
9. Severe insulin resistance has been observed in severely ill patients with COVID-19. The degree of insulin resistance may improve quickly with resolution of COVID-19, resulting in a sudden decrease in insulin requirements.
10. Identify the septic focus and initiate appropriate antibiotics if indicated.
11. Mortality in patients with covid pneumonia with diabetes is increased by:
  - 6.2% - in those patients with controlled blood sugars at time of admission
  - 14.8% - in those patients whose sugars(>200mg%) are not under control at the time of admission
  - 28.8% -in those patients who have uncontrolled sugars (>300mg%) at the time of admission



12. Patient who is a known diabetic on OHA and asymptomatic covid +ve status

- If blood sugar  $>200\text{mg}\%$  , Sulphonylureas and Miglitinide may be continued
- SGLT2i may be stopped in patient who are not able to eat and maintain adequate hydration .Those who are maintaining normal diet and fluid and those who are already on it may be continued.
- Those with nausea, vomiting, diarrhea withhold GLP 1 analogue and Metformin.
- Patients who are unable to take anti diabetic drugs, once daily intermediate or long acting insulin may be added if blood sugar is more than  $200\text{mg}\%$ .
- All patient should maintain hydration by drinking 250 ml of water / fluids 2 hrly to maintain urinary and insensible loss.
- In type I diabetes always continue basal insulin even if they are not eating .
- If blood sugar  $>240\text{mg}\%$  look for urine acetone .

13. In Hospitalized patients:

- Check for urine acetone
- Glycemic target should be  $140\text{-}180\text{-mg}\%$
- Stop OHA's and GLP1 analogue
- SGLT2 I should be stopped due to volume depletion and DKA.
- Insulin is preferred agent to prevent ketosis.
- If the patient is not eating regularly – Basal bolus regimen can be initiated
- In patients who were previously treated with insulin and not eating regularly, reduce the dose 0- 50% initially which is typically covered by intermediate acting insulin with correction by rapid/ short acting insulin if blood sugar  $>180\text{mg}\%$ .

14. Type 2 DM

- Eating normal diet with mild – moderate COVID – treat as out patient if glucose is well under control
- However SGLT2i, GLP1 agonist, should be stopped.
- If blood sugar  $>200\text{mg}\%$  stop OHA , start basal insulin  $0.2 - 0.3\text{ u/kg}$  - NPH two divided doses or glargine single dose
- Prandial insulin  $0.05 - 0.1\text{u/kg/dose}$

15. Severe insulin resistance in covid due to inflammatory markers like – IL-6 presenting with uncontrolled diabetes without ketosis:

- Two daily dose of long acting insulin may be used
- Critically ill ICU patients - Basal bolus regimen.
- If Dexamethasone is used for the treatment for the inflammatory process we often treat with NPH – 0.2 -0.3 u/kg in 2 divided doses.

#### 16. DKA subcutaneous insulin protocol –

For mild Diabetic Ketosis – (ambulant ketosis):

- PH >7, HCO<sub>3</sub> >10meq/L, K >3.5meq/L, awake or alert mentation – advice subcutaneous insulin every 4<sup>th</sup> hourly and maintain blood sugar between 140-180 mg% by meticulous monitoring with blood sugar, electrolytes, hydration status and other parameters

Moderate Diabetic Ketosis protocol for clinically stable patients – (ambulant ketosis)

- Initiate and 0.2u/kg subcutaneously every 4<sup>th</sup> hrly
- When glucose reaches 250mg% reduce the dose of insulin to 0.1u/kg 4<sup>th</sup> hrly.

Severe Diabetic Ketoacidosis:

- INSULIN INFUSION:
  - Do not start if K<sup>+</sup> <3.5mmol/l
  - Insulin bolus: 0.1 U/kg
  - Insulin infusion: 0.1 units/kg/hr
  - Infusion is continued till the blood glucose reaches 250mg%, later continue 1-2 u/hr rapid acting insulin until bicarbonate reaches > 15 with clinical improvement and till urine acetone becomes negative
  - Consider dextrose infusion in patients who are unable to eat, if blood sugar is less than 250mg% and urine acetone is persistently positive and continue till urine acetone becomes negative
  - Infusion may be given at a rate of 50-100 ml/hr
  - Kcl is added to the fluid at a rate of 10-20meq/ 500ml of NS if K<sup>+</sup> is < than 4 meq/l
  - Bicarbonate is not recommended routinely, it may be considered in patients who are in shock or coma/ ph<6.9/ bicarbonate <5meq/l/ severe hyperkalemia.
  - However the maintenance of hydration status is of paramount importance in managing patients with Diabetic ketoacidosis



**PROTOCOL FOR MANAGEMENT OF COVID PATIENTS WITH CO-MORBIDITIES:-**

**1. CARDIAC FAILURE**

<p>covid +ve (incidental) with heart failure</p>	<p>covid pneumonia with heart failure</p>	<p>severe covid pneumonia in a patient with coronary heart disease</p>
<p>History and clinical examination: - Acute onset breathlessness with PND and orthopnoea and fall in saturation with feeble pulse and tachycardia and bilateral basal rales.</p>	<p>History and clinical examination - H/o fever, cough 2-3 days prior to admission in a previously CAD, T2DM, SHTN, CKD presenting with acute breathlessness with desaturation</p>	<p>History and clinical examination - H/o fever, dry cough 3 -5 days prior to admission in a previously CAD, T2DM, SHTN, CKD - With severe desaturation - Pr&lt;100/min with BP under control - RR increased (&gt;28/min) - No orthopnea/ PND</p>
<p>Investigations: - ECG, Xray chest, echocardiography to look for left ventricular ejection fraction and wall motion abnormalities.  - Covid +ve by RTPCR</p>	<p>Investigations: - ECG, Xray chest, echocardiography to look for left ventricular ejection fraction and wall motion abnormalities.  - Covid +ve by RTPCR  - CT chest suggestive of covid pneumonia and ECHO suggestive of heart failure ( HFrEF / HFpEF)</p>	<p>Investigations: - ECG, Xray chest, echocardiography to look for left ventricular ejection fraction and wall motion abnormalities.  - Covid +ve by RTPCR  - CT chest suggestive of covid pneumonia – bilateral peripheral lower lobe GGO with nodular opacities  - ECHO findings not suggestive of heart failure</p>
<p>Treatment: 1. Back rest at 45-60 degree 2. If Spo2&lt; 94% Nasal oxygen -6-8 l/min/NRM 4-5 l/min 3. CPAP if RR&gt; 28/min 4. To maintain target Spo2&gt;92% and PaO2 &gt;60mmhg 5. Treat precipitating factors like severe Shtn/ MI/ valvular heart disease 6. Inj. Furosemide at a initial dose of 20-80 mg iv over several minutes followed by repeat doses of 20-40mg if necessary. 7. Inj. NTG if SBP&gt; 160 mmhg</p>	<p>Treatment: 1. Back rest at 45-60 degree 2. If Spo2&lt; 94% Nasal oxygen -6-8 l/min/NRM 4-5 l/min 3. CPAP if RR&gt; 28/min 4. To maintain target Spo2&gt;92% and PaO2 &gt;60mmhg 5. Treat precipitating factors like severe Shtn/ MI/ valvular heart disease 6. Inj. Furosemide at a initial dose of 20-80 mg iv over several minutes followed by repeat doses of 20-40mg if necessary. 7. Inj. NTG if SBP&gt; 160 mmhg</p>	<p>Treatment: 1. CPAP 2. Maintain Spo2&gt;92% 3. Inj. Methylprednisolone 0.5-1mg/kg/day for 3-5 days followed by tapering dose or Inj. Dexamethasone 8mg/day for 7-10 days 4. Inj. Enoxaparin 0.6 mg s/c BD 5. Inj. Remdesivir if no contraindications. 6. All supportive measures 7. In addition, consider treatment for co morbids. 8. Intubation and mechanical ventilation if patient hemodynamically unstable or in unconscious state.</p>



8. Inotropes in patient with concomitant hypertension and shock 9. Inj. Morphine sulphate 2-4 mg if needed	8. Inotropes in patient with concomitant hypertension and shock 9. Inj. Morphine sulphate 2-4 mg if needed 10. To add Inj. Enoxaparin and steroids 11. Inj. Remdesivir may be considered	
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2. COVID PNEUMONIA WITH BRONCHIAL ASTHMA AND COPD:
- Manage acute severe asthma as per guidelines
  - In addition consider LMWH/ antiviral – Remdesivir if no contraindications.
  - Early CPAP may be considered

3. COVID PNEUMONIA WITH CKD:

- Treatment may be judged as per the clinical condition according to the severity of comorbids and covid pneumonia as per the guidelines.
- Consider UFH
- Primary treatment is volume reduction with diuretics and renal replacement therapy

NOTE:

- CT chest is the most important investigation to differentiate GGO of covid pneumonia from co morbidities like cardiac failure and volume overload in CKD mixed with reticulonodular pattern and nodular opacities whereas in cardiac failure and ckd, GGO are more central, diffuse and uniform with bilateral pleural effusion and spares peripheries.

**(BY ORDER OF THE GOVERNOR)**

**J.RADHAKRISHNAN  
PRINCIPAL SECRETARY TO GOVERNMENT**

To

- The Principal Secretary/Commissioner, Greater Chennai Corporation, Chennai – 600 003.
- The Director of Public Health and Preventive Medicine, Chennai – 600 006.
- The Director of Medical Education, Chennai – 600 010.
- The Director of Medical and Rural Health Services, Chennai – 600 006.
- The Municipal Administration and Water Supply Department, Chennai-600 009.
- The Rural Development and Panchayat Raj Department, Chennai-600 009.
- All District Collectors.

Copy to:-

- The Senior Personal Assistant to Hon'ble Minister (Medical and Family Welfare), Chennai – 600 009.
- The Principal Private Secretary to Chief Secretary, Chennai – 600 009.
- Data Cell/ Stock File / Spare Copy.

**//FORWARDED BY ORDER//**

**SECTION OFFICER**

*S. Radhakrishnan*  
19/8/21  
*Fr*  
19/8/21