



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH  
An official Publication of Human Journals

ISSN 2349-7203




Human Journals

**Review Article**

July 2024 Vol.:30, Issue:7

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## Management of Post-Covid Symptoms



IJPPR  
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH  
An official Publication of Human Journals



ISSN 2349-7203

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**Submitted:** 20 June 2024  
**Accepted:** 27 June 2024  
**Published:** 30 July 2024

**Keywords:** post-COVID, post-pandemic era, physical and psychological manifestations

### ABSTRACT

The management of post-COVID symptoms presents a significant challenge in the aftermath of the global pandemic. This abstract explores various strategies and considerations in addressing these lingering health issues. Post-COVID symptoms, often termed "long COVID," encompass a range of physical and psychological manifestations that can persist for weeks to months after the acute infection. Effective management requires a multidisciplinary approach involving healthcare providers, researchers, policymakers, and community support systems. Key components include comprehensive clinical assessment to identify specific symptoms and their severity, personalized treatment plans tailored to individual needs, and ongoing monitoring to track progress and adjust interventions as necessary. Supportive care, including physical rehabilitation, respiratory therapy, mental health counselling, and nutritional guidance, plays a crucial role in improving outcomes and quality of life for affected individuals. Furthermore, education and awareness campaigns are essential to inform the public and healthcare professionals about the evolving understanding of post-COVID symptoms and best practices for management. Collaborative efforts across healthcare sectors and global cooperation are vital in addressing the long-term health impacts of COVID-19 and mitigating its societal burden. In order to effectively manage post-COVID symptoms and encourage recovery in the post-pandemic era, this study emphasizes the significance of integrated, patient-centred approaches.



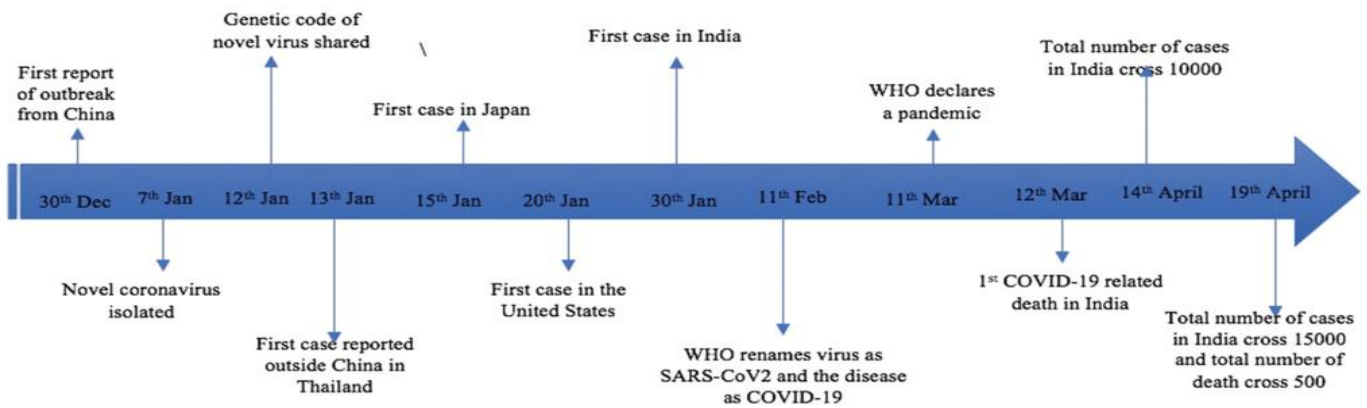
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**INTRODUCTION: -**

COVID-19 is also known as coronavirus disease 2019. The WHO uses the name [SARS-COV 2] severe acute respiratory syndrome coronavirus 2 for the virus.<sup>1</sup> The outbreak and spread of Covid 19 is a very critical issue it spread rapidly from person to person by droplets of sneeze or cough, till now millions of people are infected and more than ten thousand people are dead.<sup>2</sup>The symptoms seen in the patient are fever, dry cough, fatigue, sour throat in mild cases and may last for 2 weeks. In severe condition patient showing respiratory distress and respiratory failure need to be hospitalized and may last for 6 to 4 weeks.<sup>3</sup> COVID 19 can be diagnosed by performing RTPCR [Reverse Transcriptase Polymerase Chain Reaction], CT scan, and Blood test.<sup>4</sup> For mild cases, supportive treatment can be done including antibiotics, vitamins, trace elements, and antipyretics, while patients with respiratory distress, oxygen therapy with or without mechanical ventilation should be introduced and individualised.<sup>5</sup>

**Defining Post-COVID 19**



**Fig. 1** Timeline of important events between December 2019 to April 2020.

Journal of Digestive Endoscopy Vol. 11 No. 1/2020

It is defined as from the occurrence of first symptoms and it extending beyond 3 weeks called has mild or acute post-Covid 19, in chronic Covid 19 it may extend up to 12 weeks.<sup>6</sup>

**Outbreak**

The report from China coronavirus spreads blisteringly and cases are increasing exponentially. On January 11 the first case was reported outside mainland China in Thailand.

And in a month disease infected all Continents except Antarctica. In India COVID 19 was reported on January 30, 2020. This rose to three cases by February 3, 2020. In March, it started to increase every day. The first COVID 19 affected death was reported on March 12, 2020. By the second week of April, it spread to all states of India except Sikkim.<sup>7</sup>

## **WHO, CDC STATISTICS OF COVID 19 CASES TILL JULY 16 2021: -**

### **India**

**Total cases:** - 3, 10, 29,274 **Deaths:** - 4, 12,584 **Recovered:** - 3, 01, 80,059.

### **Globally**

**Total cases:** - 18, 90, 45,864 **Deaths:** - 40, 68.999.

### **Categorization of Post Covid Symptoms**

Can be classified basically in 3 different ways: -

1. Based on severity: -
  - a. Mild Symptoms: - Joint pain, Muscle pain.
  - b. Critical Symptoms: - Pulmonary fibrosis, Renal failure, Myocarditis, Arrhythmia, Stroke.<sup>2</sup>
2. Based on Transition phase: -
  - a. Phase 1: - **Acute Post-COVID Symptoms:** -Symptoms from 5weeks to12 weeks.
  - b. Phase 2: -**Long Post-COVID Symptoms:** - Symptoms from 12weeks to24weeks.
  - c. Phase 3: -**Persistent Post-COVID Symptoms:**-Symptoms lasting more than 24weeks.<sup>8</sup>
3. Based on different body symptoms: -
  - a. Respiratory Post-Covid Manifestation: - Fatigue, Dyspnoea, Cough, Throat pain.
  - b. Musculoskeletal Post-Covid Manifestation: - Myalgia, Arthralgia.
  - c. Neurocognitive Post-Covid Manifestation: - Brain Fog, Dizziness, Confusion.
  - d. Gastrointestinal Post-Covid Manifestation: - Diarrhoea, Abdominal Pain, Vomiting.

e. Psychological related Post-Covid Manifestation: - PTSD, Anxiety, Depression, and Insomnia.

f. Cardio logical Post-Covid Manifestation: - Chest pain, Palpitation, Tachycardia Myocarditis, Arrhythmia.

g. Other Manifestation: - Thromboembolism,<sup>6</sup> Pulmonary fibrosis,<sup>2</sup> Ageusia, Anosmia.<sup>8</sup>

### **CDC CRITERIAS FOR QUARNTINE: -**

Who needs to be Quarantine?

- People who have been in close contact with the one who has Covid 19 Need to be quarantined.
- People who have tested positive for COVID-19 within the past 3 months and recovered do not have to quarantine or get tested again as long as they do not develop new symptoms.<sup>9</sup>

What counts as close contact?

- You were within 6 feet of someone who has COVID-19 for a total of 15 minutes or more.
- You provided care at home to someone who is sick with COVID-19.
- You had direct physical contact with the person (hugged or kissed them).
- You shared eating or drinking utensils.
- They sneezed, coughed, or somehow got respiratory droplets on you.

Steps to take

- Stay home and monitor your health.
- Stay home for 14 days after your last contact with a person who has COVID-19.
- Watch for fever (100.4°F), cough, shortness of breath, or other symptoms of COVID-19.
- If possible, stay away from others, especially people who are at higher risk of getting very sick from COVID-19.<sup>9</sup>

After stopping quarantine, you should

- Watch for symptoms until 14 days after exposure.
- If you have symptoms, immediately self-isolate and contact your local public health authority or healthcare provider.
- Wear a mask, stay at least 6 feet from others, wash your hands, avoid crowds, and take other steps to prevent the spread of COVID-19.<sup>9</sup>

### **PROTOCOL FOR GENERALMANAGEMENT OF POST-COVID MANIFESTATION**

At individual level: -

1. Regular use of mask, Hand Sanitizer, Respiratory hygiene, and social distancing.
2. Drink an adequate amount of warm water.
3. If health permits, regular household work is to be done. Professional work to be stopped in a graded manner.
4. Regularly exercise Yoga Sana, Pranayama, and Meditation, as much as health permits need to be performed or as prescribed.
5. Breathing exercises should be done as prescribed by the treating physician.
6. DASH Diet needs to be taken, freshly cooked food.
7. Sleep Hygiene is very crucial.
8. Medication adherence is very important as prescribed by the Doctor.
9. Avoid Smoking and Consumption of Alcohol.
10. Self-Health Monitoring is necessary [Temperature, BP, CBG,]
11. Look for early warning signs like high-grade fever, breathlessness, SpO<sub>2</sub> <95%, unexplained chest pain, new onset of confusion, focal weakness.<sup>10</sup>

### **At the level of community**

1. The recovered individual should share the positive experience with friends and relatives using social media.
2. Take the support of community-based self-help groups, civil society organizations, and qualified professionals for the recovery and rehabilitation process.
3. Undergo if require psycho-social support from peers, community health workers, counsellors. If required seek mental health support service.<sup>10</sup>

### **In a healthcare facility setting**

1. The first Follow up visit should be seven days after discharge.
2. The patients who had undergone home isolation, if they complain of persisting symptoms, will visit the nearest health facility.
3. Severe cases requiring critical care support will require more stringent follow-up.
4. Poly-therapy & Pharmacy needs to be avoided due to unknown drug-drug interactions, which may lead to Serious Adverse Events (SAE) or Adverse Effects (AE).<sup>10</sup>

## **MANAGEMENT OF POST-COVID SYMPTOMS**

### **Respiratory Post-Covid Manifestation**

**Fatigue:** -Post viral fatigue and fragility is a common occurrence in all types of viral infections. The perdure fatigue in post covid patients is turning out more complicated and challenging than what happens in the other viral diseases.<sup>11</sup>

The cause for post-viral fatigue remains Idiopathic. But people who manifest severe respiratory complications with covid infection, this appears to be due to the over activation of immune response termed as a cytokine storm.<sup>11</sup>

Mainly it can be managed by taking things easy and taking rest and plenty of sleep, also with this patient should do mild physical activity, eating a healthy diet, and avoiding the stressful situation.<sup>11</sup>

Do not return to school, work, and domestic duties, some people get cured by performing meditation and yoga.<sup>11</sup>

**Cough:** -The British Thoracic Society has defined chronic cough as one that is obsolete beyond eight weeks. Can be managed by breathing techniques such as diaphragmatic breathing or slow breathing, yoga techniques.<sup>6</sup>

The UK National Institute for Health and Care Excellence guidelines suggest that Covid 19 cough can be managed by intake of honey or opioid derived anti-tussive can be prescribed, opiates such as low dose morphine, codeine can be given, generally oral corticosteroids are often prescribed for the management of cough in covid patients.<sup>6</sup>

**Throat pain:** - It is one of the common problems faced by the covid patients, it can be managed mainly by: -

Lifestyle modification needs to be followed 7-8hours of sleep is mandatory, healthy diet intake, performing regular physical activity can reduce pain in the patients.<sup>13</sup>

Cognitive-behavioural therapy [CBT] like,<sup>13</sup>

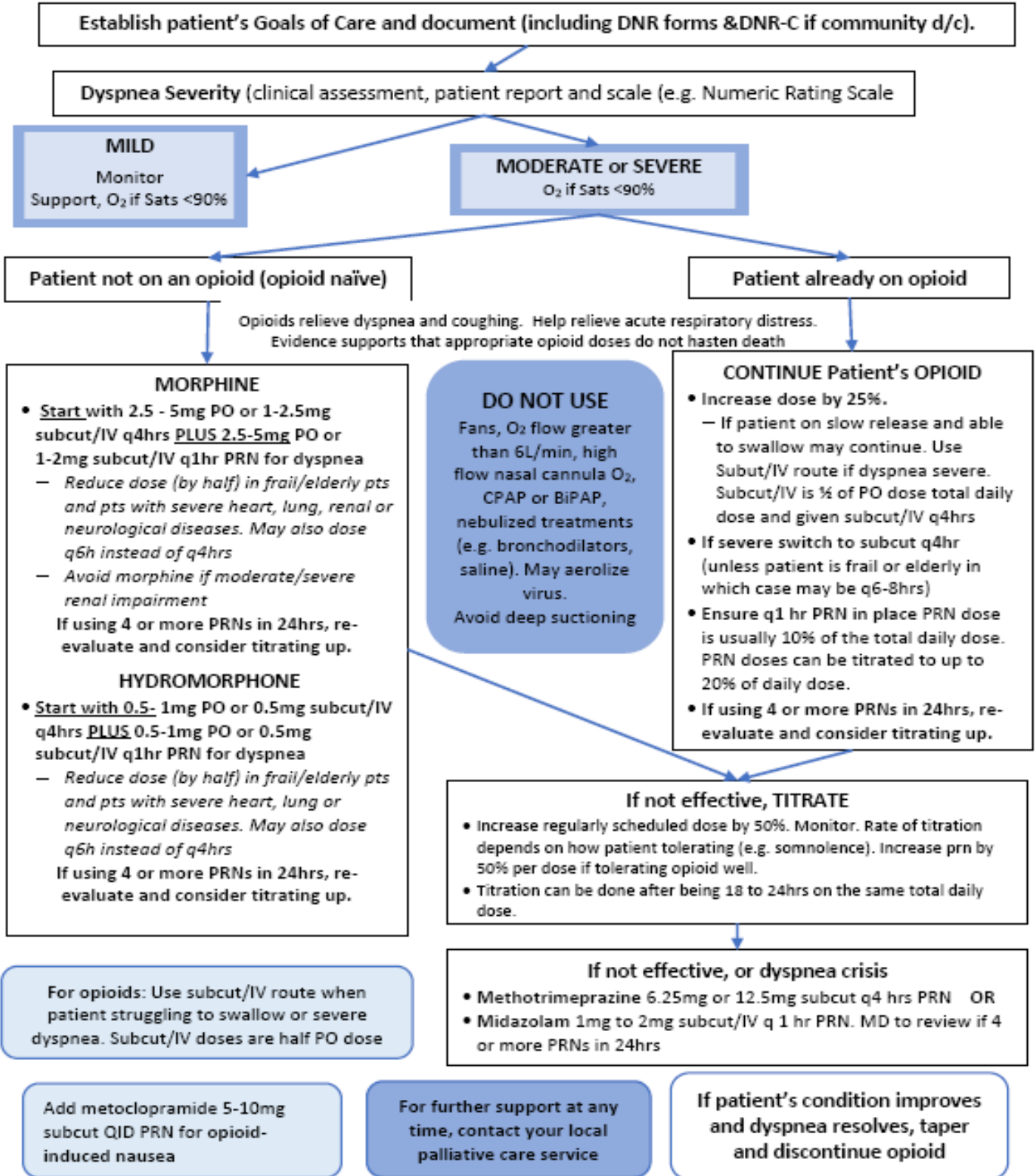
- Talk therapy,
- Massage therapy,
- Acupuncture

Medication like NSAIDs can be prescribed for the management of pain, OTC pain relievers can be recommended.

Mask should be wearing regularly.<sup>13</sup>



**MCMaster PROTOCOL: MANAGEMENT OF DYSPNEA FOR PATIENTS WITH COVID-19**





## MUSCULOSKELETAL POST-COVID MANIFESTATION

**Myalgia and arthralgia:** - Muscle and bone pain<sup>14</sup>

Musculoskeletal post covid manifestation commonly occurs pain in shoulder, neck, and knee problems. Ailing may be the reason the myalgia and arthralgia because these joints and muscles are better in a regular move but the covid patients are less active than usual people, this can lead to pain, stiffness, and muscle weakness.<sup>14</sup>

It can be managed by performing a mild exercise, it's safe to perform a mild exercise in post covid patients also general physical activity like washing clothes, housework, gardening, hobbies, and work.<sup>14</sup>

Flexibility exercise will help your myalgia and arthralgia by performing stretching frequently of legs and arms, yoga in the morning can reduce the pain.

A muscle-strengthening activity like weight lifting, climbing stairs, cycling will strengthen the muscles.<sup>14</sup>

Simple pain killers can be applied on the site of pain like emollients can be applied and paracetamol can be taken twice a day for severe pain.<sup>14</sup>

### Neurocognitive Post-Covid Manifestation

**Brain fog, Dizziness, short- and long-term memory loss, confusion:-** All these conditions are seen in the cognitive post covid symptoms.<sup>15</sup>

Short-term confusion and memory loss are nothing but difficulty in working, remembering the simple things during a conversation, the medical problems like frequent Headache, Pain, Insomnia, and Anxiety can lead to cognitive problems.<sup>15</sup>

Use of some drugs like Anti-convulsant, Anti-psychotic, and Anti-depressants, Sedatives, and hypnotics frequent use may cause cognitive dysfunction.<sup>15</sup>

It is managed by taking rest avoiding drugs, taking a healthy diet, and increasing physical activity, having plenty of sleep will reduce the manifestation in case of uncontrolled outbreak pharmacological treatment is required should consult the doctor.<sup>15</sup>

Rarely it causes Ischemic stroke, encephalitis, seizures.

### **Gastrointestinal Post-Covid Manifestation**

**Diarrhea, Abdominal pain, vomiting:** - These are commonly caused problems due to frequent drug use, hence

Lifestyle modification like Taking rest, eating healthy food, fiber-rich diet can reduce the symptoms still didn't cure can intervene for Drug therapy.

Drug therapy: - PPIs can be taken, for abdominal pain, Anti-diarrhoeal can be induced to manage diarrhoea, and Antiemetic can be prescribed once daily for vomiting.

Plenty of sleep, Lukewarm water can be taken with it.

### **Psychological Related Post-Covid Manifestation**

**Sleep:** - Hypersomnia is a natural cause for healing of the diseases, hence plenty of sleep, good quality of sleep, sleeping at the exact time at night if necessary, and morning nap will help for the management of the diseases.<sup>11</sup>

Simply strategies to improve quality of sleep: -<sup>11</sup>

- Having a warm bath or relaxing before going to sleep can in the quality of sleep.
- Avoid alcohol and heavy meals before hitting the sack.
- Avoid caffeine-containing drugs before sleep.
- Sleep REM should be managed properly at an accurate time, sleeping at night time and waking in the morning time should be proper.
- Keep the bedroom silent and peaceful as much as possible.<sup>11</sup>

### **Drug treatment**

- Sleep Deprivation: - CLONAZEPAM 0.25-0.5 mg OD<sup>16</sup>
- Alteration of Sleep REM: - MELATONIN 3-10mg per day<sup>16</sup>

**Anxiety and depression: -**

Condition like a Broken routine of sleep, Stress, Smoking, Alcohol, Loneliness, Social isolation may cause Anxiety and depression.<sup>16</sup>

Can be managed by:

- Reducing the stressed situation.
- Having a proper and good quality of REM sleep.
- Avoid smoking and alcohol.
- CBT.
- Self-care.<sup>6</sup>
- Diet and hydration.<sup>6</sup>

**Drug Therapy: -**

- Anxiolytic: - ALPRAZOLAM 0.25-0.5 mg OD<sup>16</sup>
- Antidepressant: - SSRIs: - SERTRALINE 25-50 mg PO OD<sup>16</sup>

**Assessment: -<sup>16</sup>**

- PHQ9 score
- DASS21score<sup>16</sup>

Can be used for the assessment of the psychiatric-related post covid symptoms.

In case of emergency uncontrolled condition kindly consult the Psychiatrist as soon as possible don't delay.<sup>16</sup>

**CARDIOLOGICAL POST-COVID MANIFESTATION**

**Chest pain:** -It is a common post-covid manifestation.

Careful past medical history is mandatory and assessment needs to be performed carefully and immediately, Sometime cardiology referral may be required.<sup>6</sup>

Diagnosis: - <sup>6</sup>

- ECG
- ECHO
- CT or MRI of the chest can be done<sup>6</sup>

### **Tachycardia, Myocarditis, Palpitation: -**

These are the commonest problems that are seen in the post covid patients; hence they can manage by: -

- Intense exercise needs to be avoided for 3 months in myocarditis patients.<sup>16</sup>
- For athletes, it is advised to take 3 to 6 months of complete rest before they join the sports.<sup>16</sup>

Myocarditis with normal ejection fraction is common then myocarditis with reduced ejection fraction and even palpitation is the commonly caused hence can be treated by: -

- Beta-Blockers: - Metoprolol and bisoprolol 2.5 to 10mg<sup>16</sup>

### MISCELLANEOUS

### **MANAGEMENT OF PULMONARY EMBOLISM**

Observational data shows that around 7-40 % of covid patients need mechanical support of ventilation in PE/DVT patients.<sup>17</sup> Hypotension, tachycardia, palpitation, uncontrolled respiratory exacerbation are the major risk factors for the PE.<sup>17</sup>

It is diagnosed by the D-dimer testing, Normal D- dimer level shows a decrease in PE/DVT, The abnormal D-dimer results in an increased risk of PE/DVT.<sup>17</sup>

Management: -

- 4-to-6-week prophylaxis Anti-thrombotic can be administered. <sup>16</sup>

- Enoxaparin 40 mg SC OD. <sup>16</sup>
- Apixaban 2.5 mg PO BD. <sup>16</sup>
- Rivaroxaban 10 mg OD. <sup>16</sup>
- Dabigatran 75 mg BD<sup>16</sup>

In the early stage, we can provide Aspirin 75mg as prophylaxis.

### MANAGEMENT OF PULMONARY FIBROSIS

It is a respiratory disorder that is caused due to Viral pneumonia, Pneumonitis, Sepsis, Trauma due to Mechanical ventilation [MV], Thromboembolism, Patient self-induced lung injury these factors can lead to pulmonary fibrosis.<sup>18</sup>

Risk factor: -<sup>18</sup>

- Age 60+
- Increased respiratory rate
- Hypertension
- High CRP level
- Low Lymphocytes<sup>18</sup>

Diagnosis: -<sup>18</sup>

- Radiologic and pathologic test
- Pulmonary function test
- HRCT Scan [High-resolution CT scan]<sup>18</sup>

Treatment: -<sup>16, 18</sup>

- Oxygen therapy.
- Pulse Oximetry at home (Below 94% Consult doctor).

- Pulmonary rehabilitation. <sup>16,18</sup>

## CONCLUSION

Covid 19 is a viral disease where it mainly infects the respiratory system manifesting cough, cold, fever, fatigue, headache, myalgia, dyspnoea hence need to be treated vigorously or there is a chance of spreading from one person to another by sneezing and cough droplets. Hence the patient who recovered from the covid there is a chance of manifesting post covid symptoms hence should be intervened and treated properly of all the manifestation. As author tried to explain how we can manage them.

EVERYONE GET FULLY VACCINATED WITH AVAILABLE VACCINE NEARBY HOSPITALS.

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