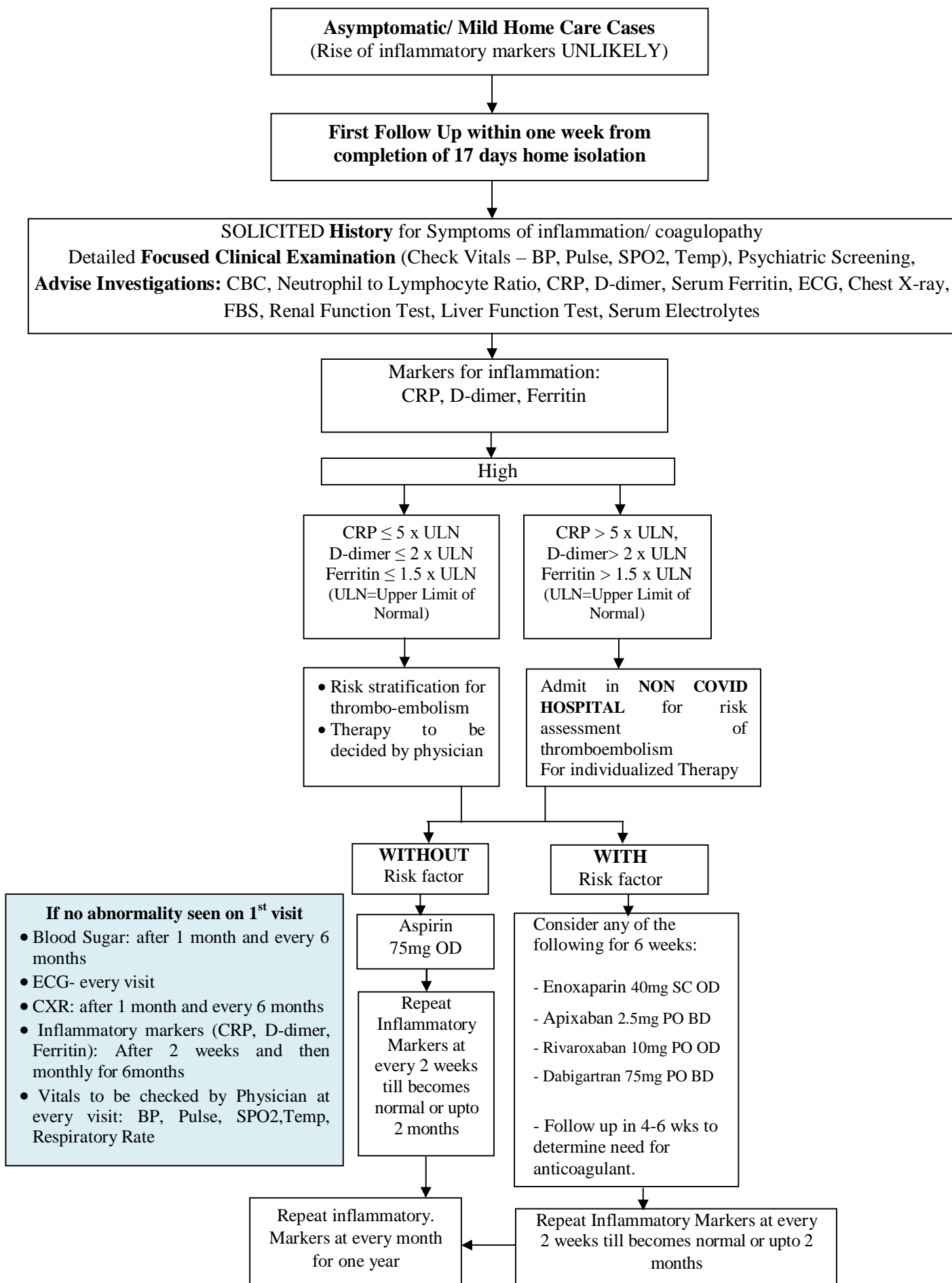




POST COVID FOLLOW UP GUIDELINES

**Department of Health & Family Welfare
Govt of West Bengal**

POST COVID FOLLOW UP –FLOWCHART 1

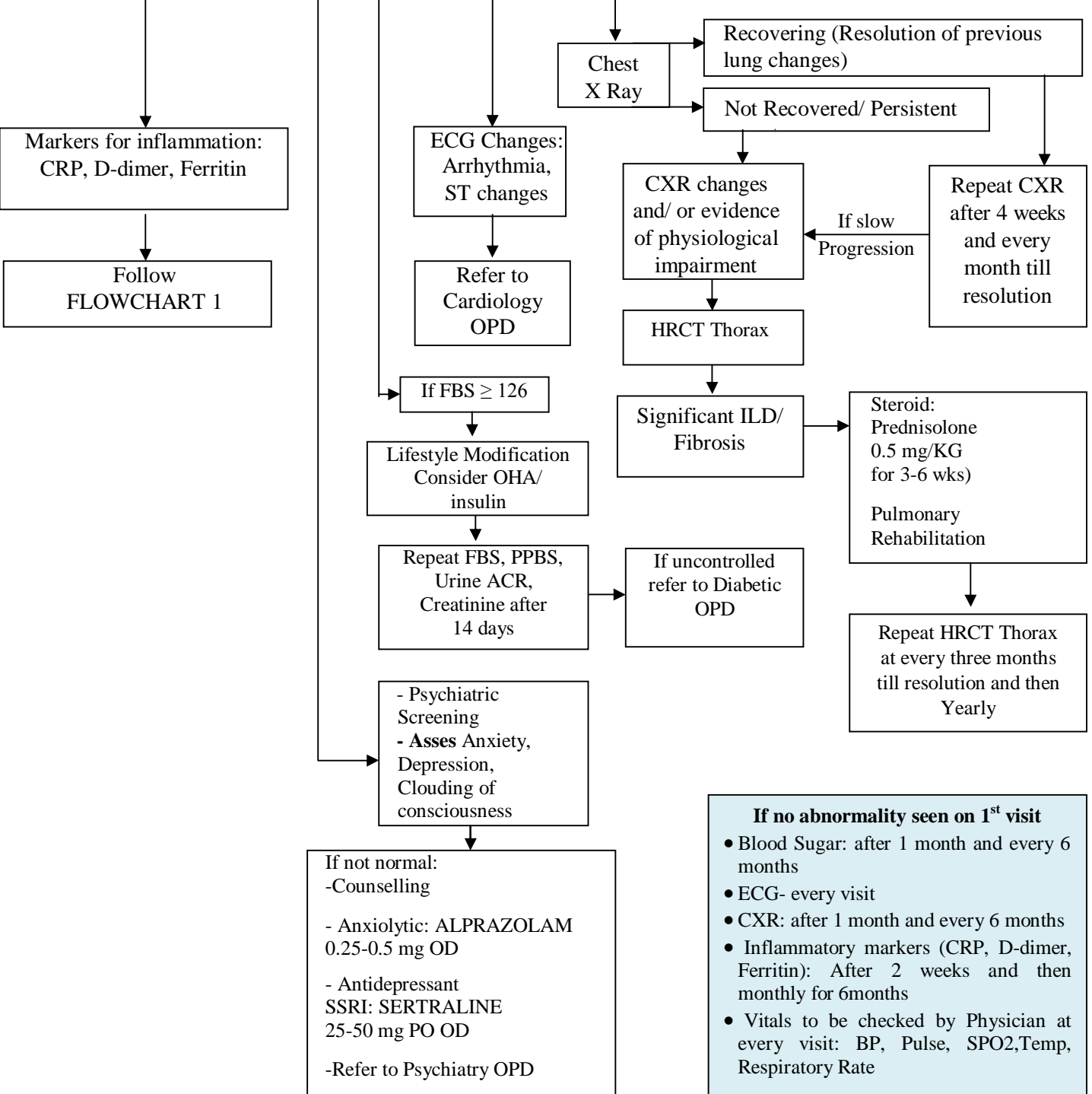


POST COVID FOLLOW UP- FLOWCHART 2

Moderate-Severe In-Hospital Cases
(Rise of inflammatory markers LIKELY)

First Follow Up:
within 2 weeks from discharge

SOLICITED History for Symptoms of inflammation/ coagulopathy
Detailed **Focused Clinical Examination** (Check Vitals – BP, Pulse, SPO2, Temp), Psychiatric Screening,
Advise Investigations: CBC, Neutrophil to Lymphocyte Ratio, CRP, D-dimer, Serum Ferritin, ECG, Chest X-ray,
FBS, Renal Function Test, Liver Function Test, Serum Electrolytes



POST COVID FOLLOW UP

Two categories:

1. **Post-acute COVID-19** as extending beyond three weeks from the onset of first symptoms
2. **Chronic COVID-19** as extending beyond 12 weeks.

Respiratory System

- **Pulmonary fibrosis:**
 - Shortness of Breath
 - Pulse Oximetry at home (Below 94% → Consult doctor)
 - **Investigation:** Follow up Chest X ray → HRCT Thorax, Pulmonary Function Test
 - **Treatment: Steroid** (Prednisolone 0.5 mg/Kg for 3-6 wks)
- **Pulmonary Rehabilitation**
- **Pulmonary Thromboembolism:**
 - Risk assessment of thrombo-embolism. High risk in cases with D-dimer two times of Normal values, obesity, cancer etc.
 - should be offered 4-6 weeks of thrombo-prophylaxis post discharge
 - Consider: Consider any of the following for 6 weeks:
 - Enoxaparin 40 mg SC OD
 - Apixaban 2.5 mg PO BD
 - Rivaroxaban 10 mg OD
 - Dabigatran 75 mg BD

Cardiovascular System

- **Palpitation:**
 - ECG: exclude arrhythmia
 - May consider B Blocker (Bisoprolol 2.5mg to 10mg)
 - If arrhythmia: Refer to cardiology OPD
- **Ischemic Heart Disease:**
 - ECG: look for ST changes
 - Echocardiography: look for LVEF, RWMA
 - May consider Aspirin 75mg OD
 - Coronary Angiogram

Musculo-skeletal System

- **Persistent Joint Pain**
- **Reactive Arthritis**[symmetric arthralgia of the large joints]
- **Rheumatoid Arthritis**[arthralgia of the small joints]
 - Exercise (upto permissible limit)
 - Hot Compress
 - Tab Paracetamol 650 mg thrice to four times daily

Endocrine System

- **Diabetes**
 - Lifestyle modification
 - Consider Oral Hypoglycemic Agents/Insulin
 - Follow up with FBS, PPBS, Urea, Creatinine, Urine ACR

Nervous System:

- **Common non-specific neurological symptoms**
 - Headaches
 - Dizziness
 - Cognitive blunting (“brain fog”)
- **Rare neurological symptoms**
 - Ischaemic stroke
 - Seizures
 - Encephalitis
 - Cranial neuropathies

Psychiatry

- **Anxiety and Sleep Deprivation**
 - Anxiolytic: ALPRAZOLAM 0.25-0.5 mg OD
 - Sleep Deprivation : CLONAZEPAM 0.25-0.5 mg OD
 - Alteration of Sleep Cycle: MELATONIN 3-10mg per day
- **Depression**
 - Antidepressant : SSRI: SERTRALINE 25-50 mg PO OD
- **Post-Traumatic Stress Disorder**
- **Somatoform Pain Disorder**
- **Panic Disorder**
- **Erectile Dysfunction**
- **Chronic Fatigue Syndrome**
 - Counselling
 - Refer to Psychiatry OPD

If no abnormality seen on 1st visit

- Blood Sugar: after 1 month and every 6 months
- ECG- every visit
- CXR: after 1 month and every 6 months
- Inflammatory markers (CRP, D-dimer, Ferritin): After 2 weeks and then monthly for 6months
- Vitals to be checked by Physician at every visit: BP, Pulse, SPO2,Temp, Respiratory Rate

COVID FOLLOW UP GUIDELINES

After a relatively mild acute illness **Post-acute covid-19 (“long COVID”)** may occur which seems to be a multisystem disease. Some people may show delay in resolution of COVID-19 symptoms. Broadly, such patients can be divided into those who may have serious sequelae (such as thromboembolic complications) and those with a non-specific clinical picture, often dominated by fatigue and breathlessness.^[1]

We define into two categories-

1. **Post-acute covid-19** as extending beyond three weeks from the onset of first symptoms and
2. **Chronic covid-19** as extending beyond 12 weeks.^[2]
 - Management of covid-19 after the first three weeks is currently based on limited evidence
 - Approximately 10% of people experience prolonged illness after covid-19^[3]
 - Many such patients recover spontaneously (if slowly) with holistic support, rest, symptomatic treatment and gradual increase in activity
 - Home pulse oximetry can be helpful in monitoring breathlessness
 - Indications for specialist assessment include clinical concern along with respiratory, cardiac, neurological symptoms that are new, persistent, or progressive
 - A recent US study found that only 65% of people had returned to their previous level of health 14-21 days after a positive test.^[4]
 - Patient should follow up on 14th & 28th day post discharge. Then monthly for next 1 year. Follow up schedule may be altered according to patients' clinical condition.

Post COVID Symptoms:

It is not known why some people's recovery is prolonged. Persistent viraemia due to weak or absent antibody response, relapse or re-infection, inflammatory and other immune reactions, deconditioning, and mental factors such as post-traumatic stress may all contribute.^[5] Long term respiratory, musculoskeletal, and neuropsychiatric sequelae have been described for other corona viruses (SARS and MERS), and these have pathophysiological parallels with post-acute covid-19.^[6]

Even so-called mild COVID-19 may be associated with long term symptoms, most commonly cough, low grade fever, and fatigue, all of which may relapse and remit.^[2,7] Other reported symptoms include shortness of breath, chest pain, headaches, neuro-cognitive difficulties, muscle pains and weakness, gastrointestinal upset, rashes, metabolic disruption (such as poor control of diabetes), thrombo-embolic conditions, and depression and other mental health conditions.^[2,8] There seems to be no need to refer or investigate these if the patient is otherwise well.

Table 1: LONG COMPLICATIONS POF COVID-19^[8]

| Organ Systems affected | Complications |
|------------------------|---|
| Cardiology | <ul style="list-style-type: none">• Increased incidence of cardiovascular disease- Arrhythmia, Heart failure, Myocarditis, Coronary artery disease.• Palpitation and tachycardia is the commonest symptom. |

| | |
|-----------------------|---|
| Respiratory | <ul style="list-style-type: none"> • Intralobular and Interlobular Septum Thickening • Impaired FEV 25-75 • Reduced Diffusion Capacity • Fibrosis usually not progressive |
| Endocrine & Metabolic | <ul style="list-style-type: none"> • Increased Risk of Dyslipidaemia • Increased Risk of Hyperglycaemia • Hypocortisolism • Primary and Central Hypothyroidism |
| Neuro-musculoskeletal | <ul style="list-style-type: none"> • Persistent Musculoskeletal Aches and Pains • Reactive Arthritis[symmetric arthralgia of the large joints] • Rheumatoid Arthritis like presentation[arthralgia of the small joints] • Femoral Head Necrosis |
| Psychiatric | <ul style="list-style-type: none"> • Depression • Post-Traumatic Stress Disorder • Somatoform Pain Disorder • Panic Disorder • Erectile Dysfunction • Chronic Fatigue Syndrome • Compromised Quality of Life |

Investigations required in follow up:^[1]

- **Complete hemogram**– look for leukocytosis, lymphopenia, anemia, Neutrophil-Lymphocyte Ratio
- **C-reactive Protein, ESR, ferritin, LDH** - may be elevated; indicates persistent inflammation
- **Coagulation profile (BT, CT, P-Time, INR, APTT, D-dimer)**-altered in thromboembolic disease
- **Serum Urea, creatinine, Urine for routine examination, urine spot Albumin: Creatinine ratio (ACR), eGFR**- for Renal dysfunction
- **Fasting blood sugar, PPBS**- for existing and new onset diabetics
- **Procalcitonin**- for new onset bacterial infection
- Other tests- **Liver Function Test, Lipid profile, electrolytes, ECG, Chest- X-ray (PA view) – digital, HRCT of Thorax, Spirometry, DLCO, CT- Pulmonary angiogram** (in selected cases)

RESPIRATORY SYSTEM:

- The most serious and potentially life limiting complications of COVID-19 such as pulmonary fibrosis and pulmonary vascular disease.
- Patients with hitherto undiagnosed pre-existing respiratory disease are opportunistically identified and managed as appropriate
- Patients who have breathlessness, oxygen requirements- rehabilitation, palliative care/ symptom management and psychosocial needs, should be addressed accordingly.
- Patients with clinic- radiological diagnosis of pneumonia and needed oxygen prescription should be asked for repeat Chest imaging after 4 weeks, then monthly till resolution. However, patients with persistent respiratory symptoms should be advised an earlier chest imaging.
- Post ‘COVID holistic assessment’^[9] includes:

- Assessment and management of breathlessness .
 - Symptom or palliative care management where required (cough suppressants, PPI in case of reflux)
 - Assessment and management of oxygen requirements (pulse oximetry @ home for severe/moderate cases)
 - Consideration of rehabilitation needs and onward referral where required
 - Psychosocial and anxiety assessment and onward referral where required
 - Assessment and management of dysfunctional breathing
 - Consideration of a new diagnosis of venous thrombo-embolic disease (VTE)
- Follow up X- rays are designated as recovered if it shows full resolution of previous lung changes (or if there are only minor insignificant changes such as small areas of atelectasis)
 - In some cases, a patient will be clinically improving but the CXR may still have persisting changes that require further assessment. In this scenario, consider arranging a further CXR after 4 weeks or HRCT of thorax (if available)
 - If the CXR has not cleared satisfactorily and/or the patient has ongoing respiratory symptoms, consider;
 - Pulmonary function testing
 - 6 minute-walk test with assessment of oxygen saturation
 - Echocardiogram
 - Sputum sample if coughing for > two weeks to exclude Tuberculosis
 - Assess need for referral to rehabilitation services
 - A new diagnosis of Pulmonary Embolism (PE) or post-PE complications if diagnosed during acute illness
 - Patients with Severe COVID and extensive lung involvement should be followed by HRCT thorax. Follow up CT may show regressing/ stationary/ progressive lesions. For progressive/ stationary lesions a course of steroids (prednisolone 0.5 mg/kg) may be considered with periodic CT screening.
 - If there are persistent CXR changes and/or evidence of physiological impairment is found from investigations above, consider a pre-contrast high resolution volumetric CT and a CT pulmonary angiogram (CTPA) to assess for the presence of both interstitial lung disease and pulmonary emboli.
 - If there is evidence of clinically significant interstitial lung disease (ILD) such as organising pneumonia or pulmonary fibrosis, patients should be considered for Steroids (prednisolone). Pirfenidone (200 mg TDS- increase to 800 mg TDS over weeks monitoring LFT) till now not recommended, but under evaluation.
 - Patients with higher risk of thrombo-embolism (high D-dimer, obesity, cancer etc.) should be offered 4-6 weeks of thrombo-prophylaxis post discharge.

- Patients diagnosed with pulmonary embolism should followed up with clinical respiratory assessment, chest imaging, and coagulation profile should be offered anticoagulation (NOAC/ VKA) and to be followed up on existing guidelines.
- Patients with post COVID pulmonary hypertension should be treated on existing guidelines.^[11]
- Post viral persistent cough may be managed with simple breathing control exercises and medication where indicated (such as cough suppressants/ proton pump inhibitors if reflux is suspected)
- The “breathing control” technique is aimed at normalising breathing patterns and increasing the efficiency of the respiratory muscles (including the diaphragm) resulting in less energy expenditure, less airway irritation, reduced fatigue, and improvement in breathlessness. The patient should sit in a supported position and breathe in and out slowly, preferably in through the nose and out through the mouth, while relaxing the chest and shoulders and allowing the tummy to rise. They should aim for an inspiration to expiration ratio of 1:2. This technique can be used frequently throughout the day, in 5-10minute bursts (or longer if helpful)
- Hypoxia may reflect impaired oxygen diffusion and is a recognized feature of covid-19. It may be asymptomatic (so called silent hypoxia) or symptomatic (reflecting increased work of breathing, or secondary pathology such as a bacterial pneumonia or thrombo-embolism). Oxygen saturation probes (pulse oximeters) are recommended as part of the assessment of acute post covid-19 patients. Self-monitoring of oxygen saturations over three to five days may be useful in the assessment and reassurance of patients with persistent dyspnoea in the post-acute phase, especially those in whom baseline saturations are normal and no other cause for dyspnoea is found on thorough evaluation. An exertional desaturation test should be performed as part of baseline assessment for patients whose resting pulse oximeter reading is 96% or above but whose symptoms suggest exertional desaturation (such as light-headedness or severe breathlessness on exercise). Patient should be subjected to 6 minute-walk test - A fall of 3% in the saturation or saturation falling below 93%are considered significant and should undergo further investigations.
- Pulmonary rehabilitation:^[1]Those who have had significant respiratory illness may benefit from pulmonary rehabilitation, defined as “a multidisciplinary intervention based on personalised evaluation and treatment which includes, but is not limited to, exercise training, education, and behavioural modification designed to improve the physical and psychological condition of people with respiratory disease.”

CARDIOVASCULAR SYSTEM:

- Many cases of Post Covid Acute MI were reported throughout the country. So assessment of all risk factors and protecting from the development of MI is one of the key target for Post Covid Follow up.
- Increased risk including pro-inflammatory changes in the cellular composition of the atherosclerotic lesions, persistent systemic inflammatory activity, high circulating inflammatory markers, persistent pro coagulant state with higher levels of coagulation markers and persistence of dysfunction in organs such as kidneys which can directly or indirectly impair the CVD parameters. ^[10]

- **Hypertension:** Antihypertensives (including ACE/ARB) should be prescribed immediately post discharge and medications may be altered on BP control in subsequent visits. Post discharge it is seen that patient requires lesser dose of antihypertensives post discharge.
- Intense cardiovascular exercise must be avoided for three months in all patients after myocarditis or pericarditis; athletes are advised to take three to six months of complete rest from cardiovascular training followed by specialist follow-up, with return to sport guided by functional status, biomarkers, absence of dysrhythmias, and evidence of normal left ventricular systolic function.^[12]
- Palpitation is commonest symptom in Post COVID patient and can be feature of underlying Myocarditis and should be carefully evaluated. Myocarditis with Normal EF is more common than reduced EF. Beta-blockers [metoprolol and bisoprolol] may be used for management of palpitation.
- Stress Cardiomyopathy also not uncommon.
- **Ischemic Heart Disease:** Antiplatelets, statins, antianginal drugs may be continued in usual doses as per cardiological indications

NERVOUS SYSTEM:

- Ischaemic stroke, seizures, encephalitis, and cranial neuropathies have been described after covid-19, but these all seem to be rare.^[13] Common non-specific neurological symptoms, which seem to co-occur with fatigue and breathlessness, include headaches, dizziness, and cognitive blunting (“brain fog”).^[2] Until evidence based guidance appears on how to manage or when to refer such symptoms, we recommend supportive management and symptom monitoring in primary care

ENDOCRINE AND METABOLISM:

- As post- COVID patients tend to have Hyperglycaemia; early post discharge period (up to 7 days) we recommend insulin later may be switched to oral agents.
- Thyroid disorder may follow post COVID. So thyroid profile should be advised.
- Post COVID patients may show Dyslipidaemia which is be treated with existing lipid guidelines.

OLDER PATIENTS:

- COVID-19 tends to affect older patients more severely. Those who survive are at high risk of sarcopenia, malnutrition, depression and delirium.
- Post-COVID-19 chronic pain may affect patients of any age but seems to be commoner in elderly patients.^[14]

MENTAL HEALTH:

- Most publications on covid-19 and mental health have emphasized individual reactions to the pandemic such as anxiety, stress, and conditions related to broken routines, loneliness, and social isolation in uninfected individuals.
- While a minority of patients may benefit from referral to mental health services, it is important not to pathologize the majority. Physical manifestations of covid-19 may distort responses to assessment tools (such as the PHQ9 OR DASS21score) designed to measure anxiety and depression in a physically healthy population, though these complications may occur.

FATIGUE:

- The profound and prolonged nature of fatigue in some post-acute covid-19 patients shares features with chronic fatigue syndrome described after other serious infections including SARS, MERS, and community acquired pneumonia. Pending direct evidence from research studies, we suggest that exercise in such patients should be undertaken cautiously and cut back if the patient develops fever, breathlessness, severe fatigue, or muscle aches. ^[1]

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Name:

Age:

Gender:

Comorbidity: DM/ HTN/CKD/ CLD/ IHD/ Malignancy/ Immunosuppressive therapy/ AIDS

Covid 19 positive on: RTPCR/ RAT/ Others:

Treated in Home Isolation/ Safe home/ Hospital/ CCU:

If admitted, Date of Admission:

Date of Discharge:

Medication on discharge:

Chief Complaints:

Vitals:

| General Examination | | Systemic Examination | |
|---------------------|--|------------------------|--|
| Pulse Rate | | Chest | |
| Temperature | | Cardiac Examination | |
| Blood Pressure | | Abdomen | |
| Oxygen Saturation | | Neurology | |
| Respiratory Rate | | Psychiatric Evaluation | |
| 6 minute walk test | | Others | |

| | Baseline (If Available) | 1 st Visit | 2 nd Visit | 3 rd visit | 4 th Visit | 5 th Visit |
|---|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Date | | | | | | |
| Hb | | | | | | |
| TLC | | | | | | |
| N:L | | | | | | |
| CRP | | | | | | |
| FBS | | | | | | |
| Creatinine | | | | | | |
| LFT | | | | | | |
| Ferritin | | | | | | |
| D dimer | | | | | | |
| ECG (If Normal, Every 6m) | | | | | | |
| Chest Xray (If Normal, Every 6m) | | | | | | |
| HRCT Thorax | | | | | | |
| Echocardiography | | | | | | |