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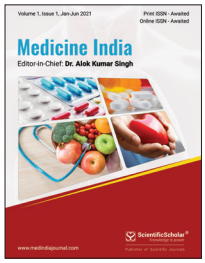

Review Article

COVID-19 in elderly: Management issues

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ABSTRACT

Introduction: COVID 19 has once again brought to the forefront the issue of vulnerability of the geriatric population to diseases. Advanced age itself and comorbidities (obesity, DM, HTN/IHD, COPD, CLD, CKD, immunocompromised states, transplant, malignancy and CHD), which increase with age, are the main risk factors for contracting severe COVID 19. Immunosenescence, unpredictable disease course, atypical symptoms, pathophysiological changes in respiratory system and a state of hypercoagulability associated with aging are responsible for increased severity and mortality of SARS CoV 2 in the elderly.

Management:

Diagnosis: RT PCR is the gold standard investigation for diagnosis though it has approximately 33% false negative rate.

Classification: On the basis of dyspnea, respiratory rate and SpO_2 in room air, patients are classified as mild, moderate and severe cases. On the basis of severity of case, investigation and monitoring is planned.

Treatment: Mild cases are advised home isolation whereas moderate and severe cases require hospitalization. Mild cases usually subside with use of anti pyretics, immunomodulators (Zinc, Vit C, D), hydration, anti tussives and anti virals (Doxycycline, Ivermectin, Favipiravir). Oxygen therapy and steroids form the mainstay of treatment in moderate and severe cases. Anti coagulants, anti viral (Remdesivir) and monoclonal antibody (Tocilizumab) are used as and when required. Newer drugs like antibody cocktail and 2-DG have also been developed. Chest physiotherapy (proning and spirometric exercise) enhances recovery.

Prevention: COVID appropriate behavior (use of mask, hand hygiene and physical distancing) and priority vaccination of elderly are the most important tools to safeguard geriatric population.

Keywords: COVID-19, COVID, Elderly, Management, Geriatric

INTRODUCTION

SARS-CoV2 has taken the world by storm and rapidly emerged as a pandemic. World witnessed the catastrophe unleashed by COVID-19 pandemic which started toward the end of 2019 to continue as several waves throughout the world. It brought even the developed countries to their knees as health-care facilities were overwhelmed due to sudden upsurge and treatment protocols were still in nascent stage. Life world around was brought to a grinding halt as stringent lockdowns were imposed as a desperate measure to give health-care infrastructure breathing space as well as to formulate effective strategies for prevention and management of COVID-19. The first wave in India affected mostly elderly people and adults

with comorbidities. Second wave on the other hand affected relatively younger population though elderly and those with comorbidities were still at high risk. The disease severity was also relatively higher in geriatric population and more so in those with comorbidities. As the genomic sequencing of SARS-CoV2 was carried out, various variants of concern were identified of which B.1.617.2 (Delta variant) emerged dominant and had increased transmissibility.

SPECIAL CONSIDERATIONS IN ELDERLY

While managing elderly patients of Covid-19 we should be very cautious. Often COVID-19 has been described as a "predictably unpredictable disease" due to its inconsistent clinical course.[1] It is a dictum that atypical presentations of diseases are very common in elderly and same is true for COVID-19 as well. Atypical symptoms such as delirium and abdominal pain maybe present in elderly patients afflicted with COVID-19 whereas fever and cough maybe absent.[2] The reasons behind decreased incidence of fever in the elderly maybe their low basal temperature and disturbances in thermal homeostasis.[3] As older people take many drugs for their various diseases (poly-pharmacy) and hence, are vulnerable to drug interaction and side effects. Treating physician should be very cautious while prescribing new drugs to them. Here, withdrawal or reduction in the dose of drug is more important than adding any new drug. Wang *et al*. suggested that advanced age is the most important predictor for fatal outcome.[4] It has been observed in many studies that both the severity and mortality rate of disease increases with increasing age.[5-7] The mean age of non-survivors was significantly higher than survivors.[6,7] Incidence of comorbidities such as DM, HTN, IHD, and CKD increases with increasing age which makes elderly more vulnerable for severity and complications of COVID-19. There is a progressive decline in both innate and adaptive immunity with increasing age (Immunosenescence) which makes them more susceptible to various infections and diseases as well as are responsible for poor response to vaccination in them.[8] Aging is associated with certain pathophysiological changes in the respiratory system as well which makes it more vulnerable to COVID-19. There is decreased capacity of clearance of inhaled particles from small airway regions with increasing age due to decrease in cilia and ciliated cells. Volume of nasal cavity increases with advancing age along with simultaneous decrease in nasal resistance. Furthermore, collapsibility of upper airways is greater in men than women with advancing age which may account for gender predilection.[3] With increasing age certain coagulation factors such as fibrinogen, factors V, VII, VIII, IX, and XIII increase due to which older patients have a state of hypercoagulability and hence are more vulnerable for serious complications of COVID-19.[2] Usually testosterone levels decrease in males with advancing age. It has been found that in males having low testosterone levels on admission severity of disease, inflammation, and mortality from COVID-19 were higher than those having normal testosterone levels. This predisposed elderly males for worse outcomes.

DIAGNOSIS

RT PCR (Reverse Transcriptase Polymerase Chain Reaction) of samples obtained from nasopharyngeal and oropharyngeal swabs is the gold standard test for diagnosing COVID-19. Usually, it becomes positive on 5th day of symptom onset. The cycle threshold (CT) value on RT PCR gives an idea of viral load in patient. It is positive only in 67% of cases which means that if we are testing 100 patients of COVID-19 with RT PCR then only 67 will show positive result and rest 33 will be negative (false negative). This high rate of false negativity lead to emergence of the concept of Presumptive COVID (RT-PCR negative but symptoms and other tests, e.g. HRCT Thorax/X RAY Chest, CRP, NLR, SpO_2, respiratory rate are suggestive of COVID-19). Other tests such as TruNAAT, and rapid antigen test are also employed for diagnosis of COVID-19. These provide results in a shorter span of time than RT-PCR but are less reliable.

CLASSIFICATION

COVID-19 patients are categorized as mild, moderate, and severe cases on the basis of severity of illness.

Mild

Here, the patient has only upper respiratory tract symptoms and/or fever without dyspnea or hypoxia. In this condition, respiratory rate is <24/min and SpO_2 is >94% in room air.

Moderate

Here along with mild symptoms patients also have dyspnea. The respiratory rate is 24–30/min and SpO_2 is 90–93% in room air.

Severe

Here along with moderate symptoms patients also have severe dyspnea. The respiratory rate is >30/min and SpO_2 <90% in room air.

Treatment protocols and outcome depend on severity, risk factors, and comorbidities.

High risk group

These are patients having age >60 years, obesity, DM, HTN/IHD, COPD/Chronic lung disease, CLD, CKD,

immunocompromised status, organ transplant, malignancy, and congenital heart disease.

INVESTIGATIONS

Baseline

At time of diagnosis – CBC, LFT, RFT, Blood sugar profile, CRP, Procalcitonin, serum ferritin, D-Dimer, LDH, Chest X*ray, and ECG.

In mild cases, these tests should be repeated at every 72 h, and if two consecutive sets of reports are normal then third set is not required if the patient is asymptomatic.

In moderate cases Urine R/M and C/S, blood culture, IL-6, ABG, PT-INR, and Sr. electrolytes should also be performed as baseline investigation.

CBC should be performed daily; Sr. electrolytes, blood urea, and Sr. creatinine should also be checked daily if kidney function is deranged and ECG should also be done daily if needed. Other tests should be repeated every 48–72 h. X-ray chest should also be repeated if patient is deteriorating. Pro-BNP and Trop T may be done if needed.

In severe cases, same baseline investigation as in moderate cases should be done. Here, daily CBC, RBS, chest X-ray, and ECG should be done along with daily Sr. electrolytes, blood urea, and Sr. creatinine in those with deranged kidney function. ABG should be checked 8 hourly. Other tests should be repeated at 48–72 h interval.

HRCT Thorax should be done at the time of admission. It usually becomes positive on 4th day of symptom onset and parameters provided on HRCT such as CT severity score and CO-RADS score are helpful in management.

MONITORING

SpO_2

Intermittently in mild cases and continuously in moderate and severe cases. It serves as a clinical indicator of disease progression and recovery.

BP

In mild cases 12 hourly recording should be done. In moderate cases recordings should be done at 2 hourly intervals and in severe cases at 15 min intervals.

Temp

4 hourly recording in all types.

Blood sugar

In mild cases once daily in nondiabetics and 3–4 times daily in diabetics. In moderate cases 6 hourly recording for basal-bolus regimen and 1–2 hourly for deranged blood glucose levels. In severe cases, 4 hourly recording in all the patients and 1–2 hourly recording for deranged blood glucose levels or on insulin infusion.

Urine output

In mild and moderate cases, 12 hourly in all the patients and 4 hourly in deranged renal function/reduced urine output conditions. In severe case hourly recording should be done.

ECG

At the onset in mild cases and continuous monitoring in moderate and severe cases.

TREATMENT

Treatment is initiated on the basis of severity of disease in patient. In mild cases, home isolation and care are advised; in moderate and severe cases hospitalization is advised.

HYDRATION

Adequate hydration and euvolemia should be maintained all patients.

PARACETAMOL

It is prescribed as an anti-pyretic. In both mild and moderate cases, 650 mg tab should be given when needed. In severe cases inj. Paracetamol 500 mg should be given when needed.

ANTIVIRAL THERAPY

Tab Favipiravir 1800 mg BD on day 1 followed by 800 mg BD for 14 days should be given in mild cases. Tab Doxycycline 100 mg BD for 5 days with tab Ivermectin 12 mg once daily for 3 days can also be given in place of Favipiravir in mild cases.

Inj. Remdesivir 100 mg BD on day 1 followed by 100 mg daily for 4 days should be prescribed for moderate to severe cases within 10 days of onset of symptoms. It should be mixed with 100 mL NS to be infused over 30–60 min and flushed with 30 mL NS thereafter. Contraindications of Remdesivir-

- Should not be prescribed with HCQ or Favipiravir
- If AST/ALT ratio >5 times of the upper limit of normal
- In cases of severe renal impairment (i.e., eGFR <30ml/min/1.73m^2)
- In pregnancy, lactating mothers and children <12 years of age

IMMUNOMODULATORS

Tab Zinc 50 mg BD for 14 days should be prescribed in all the cases.

Tab Vitamin C should be given 500 mg BD for 3 days followed by 500 mg once daily for 14 days in both mild and moderate cases. In severe cases 1 amp (1500 mg) should be given daily for 3 days followed by oral dose.

Tab Vitamin D should be given in the dose of 60k IU per day for 3 days, followed by 60k IU weekly for 2 months in both mild and moderate cases. In severe cases Tab Vitamin D 60K IU daily should be prescribed for 5 days followed by 60k IU weekly for 2 months.

Antitussives

Syp Dextromethorphan (sugar free) 5 mL TDS should be given in all the cases till needed.

Steroids

They are prescribed for their anti-inflammatory effects and form the cornerstone of treatment of COVID-19. In mild and moderate cases, Budesonide powder (800 mcg) 2 puffs by Turbohaler should be given twice daily.

Inj. Dexamethasone 6 mg (0.1–0.2 mg/Kg) i.v. should be given once daily for 3–5 days in moderate cases and 6 mg (0.2–0.4 mg/Kg) BD for 5–7 days in severe cases. In any case it should not be prescribed for >10 days.

Alternatively, inj. Methylprednisolone (0.5–1 mg/Kg) i.v. for 3–5 days in moderate and (1–2 mg/kg) for 5–7 days in severe cases can be given. In any case, it should not be prescribed for >10 days. Inj. Hydrocortisone can also be prescribed in severe cases.

In the elderly, there is a caveat while using steroids because of their metabolic side effects which can exacerbate preexisting comorbidities such as DM, HTN, psychiatric illnesses, cataract, and the risk of bone fractures. Good glycemic control is warranted when steroids are being prescribed to patients by regular monitoring of blood glucose levels and by prescribing Insulin to patients whenever necessary. The type of insulin prescribed depends on the type of steroid required. Long acting steroids such as Dexamethasone require use of basal insulin, Methylprednisolone/Prednisolone requires use of NPH insulin, and short acting steroids such as Hydrocortisone require use of regular insulin. Good control over HTN is also required.

ANTI-COAGULANTS

LMWH 40 mg s.c. once daily in moderate cases and BD in severe cases is indicated (if D-Dimer levels >3 fold). Dose should be increased to 60 mg if the weight of the patient is >60 Kg. Contraindications to the therapy are end-stage renal disease, bleeding disorders, platelet count <25,000 per cmm, and in post-surgery cases. In ESRD unfractionated heparin 5000 U s.c. BD should be given.

Oxygen therapy

It forms the mainstay of treatment. Oxygen supplementation is to be done in patients with SpO_2 levels <94%. As disease severity increases, SpO_2 levels fall and oxygen requirement increases. Oxygen supplementation is done depending on flow rate required using various devices such as nasal prong and no rebreathing face mask. Target SpO_2 levels should be ≥94% with minimum flow rate. Severe cases might require high flow nasal cannula, non-invasive ventilation using CPAP/BiPAP, invasive ventilation using endotracheal intubation, or extracorporeal membrane oxygenation. While oxygen supplementation, special consideration should be given to humidification (using distilled water) and maintaining sterility of the humidifier and delivery devices to avoid complications. As patient recovers, oxygen supplementation is gradually tapered and ultimately weaned off.

Tocilizumab

It is a monoclonal antibody which can be used in severe disease with progressively increasing O_2 requirement, no improvement despite steroid use and also in those having diffuse bilateral infiltrates on chest X-ray or having evidence of cytokine storm.

Cytokine storm – it is evident when any two of three are present

1. Rise in Serum Ferritin level >3 folds
2. Rise in CRP level >20 mg/L
3. Rise in IL-6 level >3 folds. Preference should be given to those who have IL-6 level >100 pg/mL.

Inj. Tocilizumab is contraindicated in those having any active infection, evidence of malignancy, immunocompromised status, Serum Procalcitonin >0.5 ng/mL or rising trend, ANC <2000/mm^3, and Platelet count <1 lakh/mm^3.

Dose – 4–8 mg/Kg (max. 800 mg once) in 100 mL NS infused over 1 h. The dose can be repeated once after 12 or 24 h as per requirement.

After giving Tocilizumab strict monitoring should be done for secondary infections and neutropenia.

NEWER DRUGS

Antibody cocktail

It is a combination of monoclonal antibodies (Casirivimab and Imdevimab) which are useful in high risk mild

to moderate cases. It combats COVID-19 like natural antibodies. It must be administered within 48–72 h of being diagnosed COVID-19 positive and before 7 days in those above 12 years of age and weight >40 Kg.

2-DG (2-deoxy-D-Glucose) – it is an Indian drug developed against COVID-19 and is available in sachets for oral consumption after dissolving in water. It concentrates in virus affected cells and interferes with energy utilization and hence stops viral replication. It should be prescribed as early as possible in moderate to severe disease for a maximum duration of up to 10 days.

PHYSIOTHERAPY

Awake self proning – it is beneficial in those who require O_2 > 4 L/min and have normal mental status. Change of posture every 30 min is recommended between lying on sides and proning. Chest percussions are also helpful.

Deep and slow breathing exercises are helpful along with spirometric exercises in recovering patients for decreasing oxygen demand.

POST-COVID SEQUELAE

- Lung Fibrosis
- UTI
- Fungal infections (Mucormycosis, Candidiasis etc.)
- These are more common in elderly age group as compared to younger population.

PREVENTION

COVID appropriate behavior – these include proper use of mask (preferably 3 layer or N95) which covers nose and mouth, frequent hand washing/sanitization, maintaining physical distance of 2 m and avoidance of crowded and poorly ventilated spaces.

Vaccination is the most promising method of COVID-19 prevention. A slew of vaccines have been developed in record time including indigenous ones (Covishield, Covaxin), mRNA based (Pfizer and Moderna), and Sputnik V. Novel approaches such as nasal spray vaccines have also been developed. All the vaccines have established safety and efficacy against SARS CoV 2 in trials. Trials are ongoing for efficacy against newer strains. Moreover, vaccination with appropriate dosage and interval is unanimously protective against progression of disease and nearly eliminates chances of contracting severe disease. Keeping this in mind, the geriatric population, which is predisposed to having severe COVID-19 due to various factors, has been given preference for vaccination and it should be readily availed.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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