Approach to the COVID 19 illness what you should know:

Since January of 2020, COVID 19 has caused a global pandemic with over millions of infections and over half a million deaths. To date there is no accepted regimen of therapy established as a "Gold Standard" although clinical trials with antivirals are currently ongoing. For the individuals who develop severe illness and need support with mechanical ventilation the mortality with the current treatment strategy has a poor outcome. In individuals who have clinical signs and symptoms due to COVID 19 infection early administration of a combination of antivirals and anti-inflammatories will lead to better clinical outcomes and perhaps reduction in viral shedding and mitigation of the epidemic due to reduction in horizontal spread. It is reported that individuals who have recovered from COVID 19 illness very often have a prolonged recovery with considerable long term disability which needs adequate evaluation.

COVID 19 is a newly describes Beta corona virus that was first noted to cause severe illness in Wuhan the capital of the Hubei province in the Peoples Republic of China, that rapidly evolved into a significant pandemic with a large number of infected people. In previously described (corona virus) outbreaks of serious illness due to SARS and MERS effective antiviral therapy has not been established. This has prompted multiple efforts to understand the mechanisms of infection with corona viruses, elucidating the role of the spike protein of corona viruses in cellular entry and the role of various antibodies in blocking the pathogenesis of corona virus infections. There has also been an effort to develop potential therapies (including small molecules) based on the understanding of the structure and pathogenesis of corona virus infections. Laboratory studies have elucidated the promising role of antibody mediated therapeutic strategies for corona virus infections. Anecdotal experience with treatment regimens for corona virus infection causing SARS and MERS have not yielded any regimen of great promise, that would establish any kind of precedent for the current COVID infection induced illness. Early experience with Influenza outbreaks and Ebola Virus Disease rekindled interest in the experience of the use of convalescent plasma for the treatment of illness during the "Spanish Flu" outbreak that suggested improved outcomes with consideration use for contemporary illness due to Influenza and Ebola Virus Disease. There have been several instances of trials of convalescent plasma therapy either alone or in conjunction with other therapies for managing illness due to Ebola Virus Disease, SARS and MERS. Since the first description of COVID 19 infection, increasing anecdotal experience of severe illness due to COVID 19 infections exacting a high toll, interest has centered on anecdotal experience with convalescent plasma as a therapeutic adjunct in the treatment of serious illness due to COVID 19 Although clinical trials with the combination of Lopinavir/Ritonavir; Ribavirin and Interferon beta have demonstrated encouraging results, it is not yet established as the "Gold Standard". It is important to obtain as far as possible comparative data with other regimens of treatment either ongoing or contemplated, therefore obtaining high quality data with a controlled trial design is imperative. Currently anti-virals such as Remdesivir and Favipiravir have received restricted use approval in India based on preliminary clinical data, along with a recommendation to use Dexamethasone in individuals who have hypoxemia (lower levels of

oxygen). Adjunctive treatment with agents like antihistamines (Famotidine); Cholesterol lowering agents (Statins) and N acetylcysteine and other anticoagulants (Low molecular weight heparin or rivaroxaban) are used in selected individuals after clinical evaluation.

As a physician treating infectious diseases I look for the following:

Common Symptoms of COVID 19:

- Fever (Oral temperature of at least 100.5° F or 38. 5° C)
- Agusia/Dysgusia (loss of sensation of taste or unusual or bad taste in mouth)
- Anosmia (loss of sense of smell)
- Nausea/vomiting or Diarrhea
- Malaise (Feeling weak and tired)
- Myalgia (Muscle pain)
- Headache
- Nasal congestion/coryza
- Cough
- Dyspnea (RR> 22) or blood oxygen saturation ≤ 95%, (Shortness of breath, breathing more than 20 times per minute)
- Tachycardia (HR >80) Pulse rate

Uncommon symptoms and signs also noted occasionally with COVID 19:

- Skin rash of many different types
- Severe erythroderma (Diffuse redness of skin) suggestive of Kawasaki disease: Multisystem inflammatory syndrome of Children
- Discomfort in throat
- Neurologic illnesses including severe weakness of lower limbs (Guillain- Barre syndrome)
- Stroke
- Sudden inflammation of heart (Myocarditis)

Any symptoms suggestive of COVID, I recommend the following tests:

1. Nasopharyngeal or oropharyngeal COVID 19 antigen test (rapid with results in a few hours) If antigen test is negative or not available get RTPCR test. Antibody test is not helpful and not recommended.
2. Complete blood picture
3. Serum LDH
4. Serum Creatinine
5. CRP
6. Serum Ferritin
7. In selected cases D dimer

As a specialist with decades of experience managing clinical illnesses in immunocompromised patients as well as experience with epidemiology and public health I believe that it is important to address the unique attributes of this unprecedented public health catastrophe the world is

now experiencing. The following are my personal views about a strategy to address COVID in India under the current epidemic conditions:

Identify; Treat and Trace

Introduction:

SARS-CoV-2 a beta corona virus has now caused a pandemic with millions of infections and substantial morbidity and mortality worldwide. The strategy to address an epidemic like COVID 19 fundamentally rests on the goal of eradication of infection from the population, failing which reducing the prevalence and incidence to below acceptable threshold levels. In view of the fact that SARS- CoV-2 is highly contagious, with no proven effective therapy and lack of adequate preventive measures such as vaccines, non-pharmacologic interventions with historical precedents largely patterned after the 1918 pandemic of influenza are being implemented.

SARS- CoV- 2 is spread through airborne droplets that can spread the infection from an infected individual to a susceptible individual by inhalation of contaminated air or by transfer through touching a contaminated surface. Prevention of acquisition of infection requires an appropriate form of air filter (properly fitted and used masks) used by the infected person; by the uninfected as well as meticulous personal hygiene especially hand cleansing. Using gloves without adequate hand cleansing is ineffective. It is important to understand that the protection afforded by gloves does not last beyond 30 minutes. A sanitary environment by appropriate disinfection of contaminated surfaces is equally important. Ensuring clean air (adequate ventilation); clean hands (personal hygiene) and a clean environment to reduce risk of infection and spread is both an individual and a collective societal responsibility.

It is quite clear from the history of epidemics of infectious diseases that human behavior and the social determinants of health have a strong influence over the natural history of epidemics. The most successful campaigns to address contagious diseases have exploited the synergy between appropriate technology (e.g.: Vaccine) and insightful human factors engineering as a comprehensive multi-pronged strategy. Given the intensity and magnitude of the COVID pandemic it is desirable for the populace at large to accept and implement all of the components of NPI: Social distancing; personal and environmental hygiene with at least greater than 75% adherence to ensure success.

Humans are naturally social beings; fiercely independent and resent external control. The demands of NPI run counter to nature and are probably unrealistic for any reasonable length of time. The present conditions of the COVID pandemic are such that “State” agencies consider it necessary to resort to extraordinary measures such as a “Lockdown”, indeed it is almost impossible for state authorities to contemplate refuting the logic of this strategy given the historical precedent of the 1918 global pandemic of Influenza.

What started out as a limited time "broadly accepted" intervention has evolved into a more coercive "grudgingly accepted" intervention with a debate about the endpoint as well as the risk benefit analysis. The intensity and magnitude of the "lockdown" is unprecedented in its social impact and the staggering economic cost, borne disproportionately by the most vulnerable. The socio-economic cost escalation threatens to overwhelm and negate societal acceptance of the sacrifice needed to save lives. By any analysis, the principal benefit of the lockdown is in flattening the epidemic curve and mitigating the risk of overwhelming health care resources due to an acute unmanageable crisis than actually "eliminating" the contagion. The timing of the lockdown was unable to pre-empt introduction of the contagion into our communities. The debate about whether or not we are in the epidemic stage of community spread is largely academic at this point. The key question is what would make NPI a viable strategy?

THE COERCIVE STRATEGY:

Any coercive strategy for implementation of public policy is prone to systemic distortion as well as pervasive evasion.

a. Evasion: There is an incentive for people to escape adverse impacts of policy. With reference to COVID individuals try to avoid testing and labelling due to adverse consequences such as stigmatization; quarantine at home or institutionalization. This disincentive has an inherent compounding influence due to lack of effective therapy and the very real risk of suboptimal health care under the present circumstances.
b. Systemic Distortion: The implementers of the policies prescribed by the state have shown a predilection towards a blunt sledgehammer approach rather than an appreciative and sensitive minimalist (surgical precision) intervention approach. This has resulted in complaints of "Excesses" as well as allegations of corruption in allowing exemptions from the lockdown etc. There are allegations of both undertesting as well as selective targeting of groups for testing. Whether these distortions are a consequence of actual policy, overtly stated or unspoken, or merely overzealous implementation by officialdom at multiple levels based on interpretations of perceived preferences of the elite is difficult to establish. To add to all of these is the inherent inadequacy of an overburdened and chronically under resourced public health infrastructure trying to cope with an unprecedented challenge.

THE NON-COERCIVE STRATEGY:

The nihilist will dismiss it as Utopian, nevertheless faith in the inherent wisdom of enlightened self-interest of the majority in open societies has historically triumphed over authoritarian regimes. It is only an open society that has the capacity to overcome the weight of accumulated

systemic contradictions in societal hierarchy and control structures through necessary continuous reform. (The end of History and the Last Man by Francis Fukuyama, Freepress 1992) The key attributes of a policy that makes NPI more palatable are the following:

1) Tangible rather than abstract benefits:
    i. Assurance that any inconvenience caused to the most vulnerable is addressed in real time.
    ii. Prompt access to reliable testing and follow up.
    iii. Assurance of access to credible treatment with minimal inconvenience and cost.
2) NPI that is modulated and nuanced with relevance to local conditions.
3) A clearly articulated and implemented strategy of public health measures that integrate early detection with testing and treatment see next section.

"Not by Bread alone" Humans have an indomitable spirit that allows them to overcome any challenge and willingly engage in battle. The need of the hour is to tap into this enormous resource of hope that COVID can be and must be conquered. Success of this strategy requires integration of Prevention; Detection (surveillance, testing and contact tracing) and Treatment into a continuum of responsive and compassionate care. The foundation of this strategy is "Credible Treatment" in the absence of which any resource put into prevention activities are an exercise in futility and quite predictably testing efforts encounter fierce resistance.

TREATMENT:

The absolute prerequisite for any treatment is compassion and equity in access. It took us (health care professionals in particular) many decades to understand and appreciate the superior therapeutic efficacy of "Palliative" care compared to "aggressive" medical care of many cancers. In the context of COVID it is imperative to guard against the perception of assured benefit from regimens based on "recommendations" of health agencies as being "proven" in efficacy. As an advocate of salutogenesis and participatory action strategy in health, I feel it is our responsibility to communicate to our partners in health the best possible understanding of current scientific evidence to facilitate an informed choice. Where evidence of proven therapy is lacking it is necessary to offer alternatives, the most desirable being ethically and scientifically sound clinical trials. The added advantage of such clinical trials is reinforcing the treating clinician with other capable professionals who can assist and supervise the provision of high quality health care and also generate evidence for greater public benefit. High quality treatment requires adequate infrastructure (Hospitals that have adequate space, running water and clean toilets; PPE; Medications; Medical Instrumentation: Diagnostic Laboratories and test reagents) as well as trained personnel who are provided with all necessary implements in real time. The information age has facilitated rapid dissemination of knowledge of best practices however translating such knowledge into actual practice requires a

substantially greater investment in resources urgently! That we have fallen short of providing our frontline personnel adequate PPE with unacceptable outcomes is tragic. Needless to say, such a state is not reassuring to anybody contemplating treatment at such facilities.

Treatment sites:
Institutional:

The advantages of specialized center institutionalization , whether special quarantine units or acute care in a dedicated hospital is the efficiency of concentration of resources in specialized approaches. The secondary advantage would be avoiding cross infections of non COVID patients in general hospitals due to nosocomial transmission. The possible concern of concentrating large numbers of COVID patients in geographically restricted areas is the risk of cross infections/superinfections of individuals. In some infections a previously infected person can be reinfected/superinfected by a heterologous strain of the pathogen acquired from another infected individual. The two distinct populations can then mix and reassort to allow the emergence of a population with attributes acquired from both of the parent populations. This has been seen multiple times in infections such as HIV or CMV and also occurs quite frequently in nature with multiple different strains of influenza viruses mixing and reassorting in birds and pigs. The significance of such reassortment in viral populations is the possible emergence of either enhanced virulence, enhanced replication or resistance to antiviral agents or any combination thereof. Many decades ago, Paul Ewald suggested that all populations of living organisms always evolve strategies for perpetuation of the species regardless of consequences to the host. (The evolution of virulence by Paul W. Ewald. Scientific American; April 1993; 86-93.) Stuart Kauffman's theories of life forms being autocatalytic and auto-poetic (A world beyond Physics. The emergence and evolution of life, by Stuart A. Kauffman. Oxford University press 2019) suggest a mathematical inevitability of population expansion through replication as the primary phenomenon. Any constraints imposed on replication are probably an evolution of strategies imposed on the population for preserving and perpetuating the population. This explains the difference between the population dynamics of Mycobacterium tuberculosis persisting in the latent infection state in small numbers in the host and then opportunistically spreading to other uninfected persons in the appropriate context vs the population dynamics of a gastrointestinal pathogen like Cholera with a greater tendency towards higher replication and much more rapid spread. Any pathogen population is therefore agnostic towards outcomes in the host, its primary imperative is perpetuation of the species. For many respiratory pathogens, the strategy best suited for perpetuation of the species is replication and transmission without immediately killing the host, that a minority of infected hosts develop fatal disease appears to be more a consequence of an exuberant (? Aberrant) host immune response as we see in Mycobacterium tuberculosis and COVID. Paul Ewald further suggests that "Virulence" of a pathogen as manifested in host outcomes may in part be influenced by behaviors in the human population. Inferentially if large numbers of infected individuals allow very efficient transmission of the pathogen by close proximity etc, one would anticipate the emerging populations of COVID to use reassortment as a means to preferentially increase the rate of

replication and transmission without immediate elimination of the host being a constraint on transmission to a new host. The consequences of such a phenomenon make increased transmission efficiency and higher replication mathematically inevitable. For COVID 19 the concern is that enhanced replication with greater viral loads probably contributes to higher mortality in infected individuals. A further concern is that SARS- CoV-2 may actually represent a population with a very high replication rate and therefore this viral quasispecies (Viral Quasispecies by Manfred Eigen Scientific American Vol 269 # 1, July 1993 pp 42-49) may not be amenable to treatment with a single antiviral agent alone thus requiring combination antivirals for effective viral control and prevention of emergence of resistance.

Domiciliary:

The obvious disadvantage of domiciliary quarantine and care is that decentralized resource application is inherently less efficient and in the event of need for critical care impractical. The clear advantage would be greater convenience and comfort for individuals in their own homes/communities as opposed to institutionalization. Considering the fact that all household contacts have already been exposed to the index case there is probably not, any significantly greater concern for household transmission. In circumstances where critical care is not needed and especially if effective medication can be used domiciliary care obviates all of the concerns about cross infections from other institutionalized infected persons as discussed in the previous section.

TESTING:

Clinical testing for SARS- CoV-2 currently relies on detection of the virus in clinical specimens utilizing nucleotide amplification by PCR. The acceptance of testing is tied to perceptions of reliability as well as possible benefit accruing from access to early curative treatment. Conversely the barriers to acceptance are the absence of proven therapies and the very real possibility of stigmatization and involuntary restriction of personal freedom. In a coercive testing environment, there is an incentive for either complete avoidance of testing or using unconventional avenues of testing where it is possible for individuals to conceal both the act of testing as well as the results. For improving acceptability of testing it needs to be voluntary and clearly tied to tangible benefits with mitigation of risks described. The extant and access to testing are also influenced by policy regarding who and how much to test, as well as policy implementation with a systemic incentive or lack thereof to promote testing. Policies surrounding testing influence precision in quantification of the size and character of the epidemic. A policy of very restrictive testing may underestimate the true number of infected individuals and also reduce the probability of early detection of a problematic index case or localized clusters with consequent loss of opportunity for effective epidemic control intervention in a timely manner. A completely uncontrolled access to a liberal regime of testing is wasteful of resources and sometimes creates avoidable distress due to inappropriate testing, particularly a positive test in asymptomatic individuals imposing undue restrictions of personal freedom quite apart from the rare albeit very real possibility of a false positive test. It is

important to acknowledge that at the current level of understanding it is unclear if a positive test in an individual who has clinically recovered translates into an actual risk of transmission of infection to others.

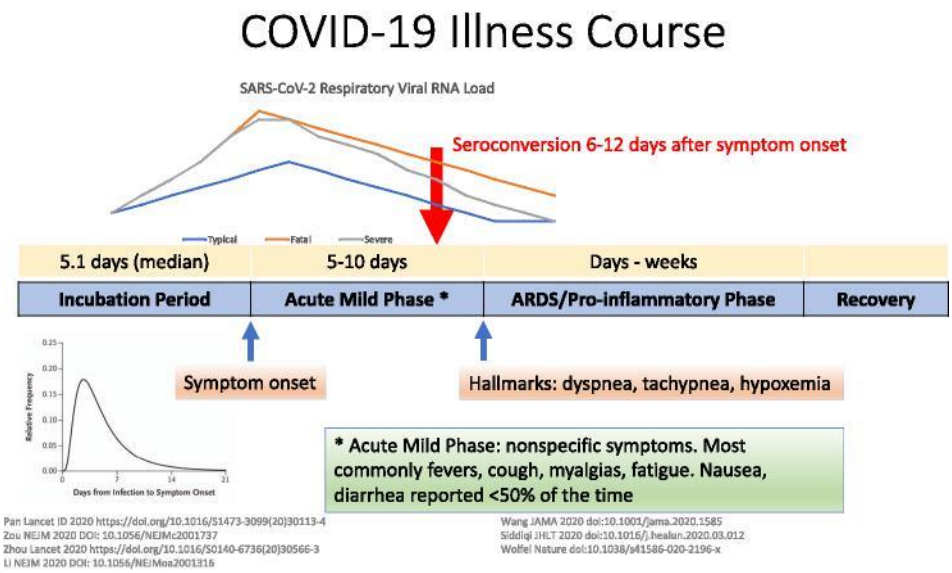
CONTACT TRACING:

In a highly transmissible infection like SARS- CoV-2 contact tracing and testing are invaluable tools of epidemic control. Contact tracing does however raise concerns about privacy of the index case as well as contacts. To be effective privacy concerns need to be addressed with sensitivity in particular when newer tools such as cellular phone contacts and or social media activity are included as strategies to enhance contact tracing. Done inappropriately contact tracing can lead to stereotyping of distorted perceptions of communal behavior. Contact tracing done well with appropriate safeguards, augmented with powerful data processing and analytic tools such as geospatial mapping integrated with other epidemiologic data allow triangulation of all sources of relevant information with powerful insights into epidemic characteristics and possible innovations in epidemic control. Protection of civil liberties and privacy cannot be overemphasized! If the hazard of active and systematic concealment of COVID is to be prevented.

EARLY DETECTION:

Early detection facilitates timely epidemic control interventions. The key tools for early detection are surveillance integrated with testing. Whether surveillance is laboratory based (passive surveillance) or population based is predicated on the type of problem being evaluated. In the context of a large pandemic like COVID 19 multiple methods such as syndromic surveillance integrated with testing and tracing would be most cost effective. A high level of health literacy in the population through effective educational campaigns is potentially helpful in early reporting of conditions that need immediate investigation (active surveillance). Currently sero-epidemiologic studies based on antibody testing for SARS- CoV-2 are just starting. Targeted surveillance and testing of high risk individuals based on epidemiologic factors such as travel to high prevalence areas or contact with infected individuals provides necessary information for intervention as well as measuring effectiveness of epidemic control measures. Random population testing is a tool used to determine community level prevalence and transmission.

The Identify; Treat and Trace strategy is predicated on accumulating scientific evidence that SARS-CoV-2 is susceptible to currently available (some marketed) antiviral agents with an acceptable safety profile and early treatment apart from reducing mortality and morbidity will also reduce horizontal spread and help to contain the epidemic. For best results in individual patients prompt recognition and therapeutic intervention in the early stages of illness is critical.



COVID-19 clinical course of illness. The first phase of COVID-19 infection involves an incubation period of variable duration, with a median of 5.1 days. The second is an acute mild phase that most commonly includes flu-like symptoms like cough, fevers, and myalgias, but can also include gastrointestinal symptoms. Some patients progress to an ARDS hyperinflammatory phase that is often marked by dyspnea, tachypnea, and hypoxemia. The respiratory viral load rises before the onset of symptoms and peaks around the onset of symptoms. It declines over the first week. Severe cases have higher viral loads compared with mild cases. Prolonged viral shedding in severe and mild cases is reported. *Meyerowitz EA, Vannier AGL, Friesen MGN, et al. Rethinking the role of hydroxychloroquine in the treatment of COVID-19. The FASEB Journal. 2020;34(5):6027-6037. doi:10.1096/fj.202000919.*

IDENTIFY:

Early Identification is key to optimum benefit from treatment. It is necessary to identify as quickly as possible those individuals who are candidates for treatment. Until rapid testing using point of care technology becomes available it may be necessary to institute treatment based on syndromic identification of presumed COVID 19 illness.

Individuals presumed to have COVID 19 illness may be additionally risk stratified for urgent transport to inpatient treatment by screening for high risk attributes such as raised CRP, LDH, Ferritin and low lymphocyte counts. Advanced age and concurrent hypertension, diabetes, renal failure, lung disease, heart disease or other chronic illness.

There is an urgent need to implement a strategy of ensuring that all individuals confirmed to have COVID 19 illness are provided appropriate early antiviral treatment and in appropriate clinical conditions other interventions such as anti-inflammatory treatment, prophylactic anticoagulation, adjunctive treatment approaches such as statins and where necessary critical care support with high flow oxygen and/or support with ventilator/pressor etc.

It is clear from current data that a large majority of the individuals with SARS-CoV2 infection are asymptomatic and at least some of the milder illness may be managed with appropriate home care, thus optimizing resource utilization. The imperatives of reducing viral transmission dictate a very liberal policy of antiviral treatment of even minimally symptomatic individuals to ensure that "Treatment is Prevention" is successful.

TREAT:

Treatment is Prevention! This is a paradigm is well proven by evidence from the HIV epidemic. For reducing the risk of transmission, it would be critical to intervene early enough and use antiviral agents that rapidly reduce the viral load and quantity of virus shedding. It is clear from studies of transmission dynamics that the pre-symptomatic rise in viral population is most significant in the 2 days prior the onset of illness as depicted in the figure above.

At the current time there is scientific evidence of benefit from multiple regimens for treatment particularly if it is instituted in the early stages of infection. Clinical trials with favipiravir have also been launched in India.

TRACE:

An intensive tracing strategy will assist in rapid identification of COVID illness at an early stage as well guide appropriate epidemic control interventions such as targeted testing with isolation of infected individuals to limit spread. In view of the rapidity of spread of SARS-CoV-2 in the vulnerable population innovations in tracing such as digital methods along with strong data analytics is desirable. Expeditious investigations of clusters along with contact tracing are invaluable.

Conclusion:

The ideal approach to COVID epidemic response is integrating a foundation of high quality clinical care with appropriate testing and epidemic control measures that provide broad acceptance of voluntary non pharmacologic interventions. In india the COVID epidemic response has been characterized largely by a state imposed coercive non pharmacologic intervention that has now entered into a state of diminishing returns. Considering the fact that 80% of all infected persons are asymptomatic and of those testing positive, less than 4% have a fatal outcome a more nuanced approach to addressing the epidemic is desirable. There is an almost unreal and naïve expectation that the lockdown extended for a long enough period of time will provide the principal solution. There is insufficient recognition or acknowledgement that the lockdown can at best flatten the epidemic curve, buying necessary time for building crucial credible health care systems by augmenting infrastructure and human resources. The scientific and technical response (largely non state entities) to the epidemic in areas of diagnostic technology, vaccine and therapeutic options have far outpaced the cumbersome state regulatory apparatus in place, using legacy processes to evaluate newer modalities. The pandemic has exposed the stark and tragic inadequacy of the health care infrastructure and

human resource capacity to respond to this unprecedented public health emergency. The socio-economic consequences of the lockdown threaten to cause greater damage than the current state of the epidemic. The chronic systemic neglect of public health, environmental degradation and complete disregard for the role of animals in human health needs a transformational paradigm shift towards the goal of "One Health" COVID 19 is a warning wakeup call from nature, we ignore it at our own peril.

Simplified Protocol for Community Based Strategy for COVID Infection:

IDENTIFY:

Current health condition:

1. Age and gender, blood group type if known.
2. Underlying conditions such as Hypertension; Diabetes; Heart problems; Lung problems such as asthma, bronchitis etc; Kidney problems; Liver Problems.
3. Ask about chronic conditions such as current treatment for HIV; Tuberculosis etc.
4. Ask about adherence to medical regimen, medications, diet exercise.
5. Ask about ease of access to health care provider (Doctor, Nurse, Pharmacist, Hospital)

Screen for symptoms of COVID:

Common Symptoms of COVID 19:

- Fever (Oral temperature of at least 100.5° F or 38. 5° C)
- Agusia/Dysgusia (loss of sensation of taste or unusual or bad taste in mouth)
- Anosmia (loss of sense of smell)
- Nausea/vomiting or Diarrhea
- Malaise (Feeling weak and tired)
- Myalgia (Muscle pain)
- Headache
- Nasal congestion/coryza
- Cough
- Dyspnea (RR> 22) or blood oxygen saturation ≤ 95%, (Shortness of breath, breathing more than 20 times per minute)
- Tachycardia (HR >80) Pulse rate

Uncommon symptoms and signs also noted occasionally with COVID 19:

- Skin rash of many different types
- Severe erythroderma (Diffuse redness of skin) suggestive of Kawasaki disease: Multisystem inflammatory syndrome of Children
- Discomfort in throat
- Neurologic illnesses including severe weakness of lower limbs (Guillain- Barre syndrome)
- Stroke

- Sudden inflammation of heart (Myocarditis)

Evaluation:

1. Blood pressure and heart rate
2. Pulse oximetry and respiratory rate (Number of breaths per minute)
3. Random blood sugar by glucometer finger prick
4. Blood tests:
    a. Complete blood picture to look for Lymphopenia
    b. LDH
    c. CRP
    d. Ferritin
    e. D dimer
5. If possible specific tests for COVID such as RTPCR.

Intervention:

1. Counseling about NPI (Masks, social distancing, personal and environmental hygiene)
2. For all asymptomatic with high risk contact home isolation
3. For symptomatic without high risk such as serious underlying illness; high ferritin, low oxygen saturation < 94% with breathing more than 20 times per minute: Basic treatment with:
    a. Colchicine 0.5 mg twice daily; Famotidine 40 mg twice daily; N acetylcysteine 600 mg twice daily.
    b. For early illness with symptoms of less than 3 days addition of Favipiravir for 7 days is an option.
    c. Daily monitoring of symptoms and oximetry
4. For symptomatic with high risk such as serious underlying illness; high ferritin, low oxygen saturation < 94% with breathing more than 20 times per minute:
    a. Supplemental oxygen if oxygen saturation less than 90%
    b. Colchicine 0.5 mg twice daily; Famotidine 40 mg twice daily; N acetylcysteine 600 mg twice daily. Dexamethasone 4 mg twice daily. Atorvastatin 40 mg followed by 10 mg daily. adding Vit D is optional.
        i. Indications for dexamethasone: Any dyspnea; Respiratory rate > 20/minute; Unrelenting cough; exertional dyspnea; Ferritin baseline >800 and or persistently rising ferritin. Course of dexamethasone should be based on clinical response and should be continued until there is sustained clinical improvement.
        ii. Persistent tachycardia and/or extreme fatigue should prompt evaluation for cardiomyopathy with Echocardiography; Troponins; CPK and Electrocardiography.
        iii. Indications for prolonged therapy with colchicine are persistent pleuritic or pericarditic chest pain syndromes, evaluate for possible ACS and or VTE.
    c. For early illness with symptoms of less than 3 days addition of Favipiravir for 7 days is an option.

d. Daily monitoring of symptoms and oximetry
e. Repeat markers of inflammation every 5 days: LDH, Ferritin, D dimer, CRP, Monitor for hyperglycemia (common with no prior history of diabetes mellitus)
f. If D dimer high add LMWH (Enoxaparin 40 mg subcutaneously daily) or Rivaroxaban 10 mg daily for at least 10 days, extend for longer if D dimer is persistently high.
g. Failure to respond to above requires hospitalization for critical care

Uncommon symptoms and signs also noted occasionally with COVID 19:

1. Severe erythroderma (Diffuse redness of skin) suggestive of Kawasaki disease: Multisystem inflammatory syndrome of Children
2. Neurologic illnesses including severe weakness of lower limbs (Guillain- Barre syndrome)
3. Stroke
4. Sudden inflammation of heart (Myocarditis)

Any of above require hospitalization for critical care.

Please see:

COVID Clinical Care Protocol

Trace:

Actively enquire about contacts, travel and trace all for possible contact with index case. All possible contacts should be offered enrollment into: Simplified Protocol for Community Based Strategy for COVID Infection.

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