



A review on Covid-19 (Corona Virus Disease), Transmission and Pathological effects

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Received date:12Jun 2022 Accepted:(485) 30 Jun 2022 page: (29-33) Published:30 Jun 2022

Abstract

In response to public health, it is necessary to write a review on COVID-19 disease as emerging zoonotic disease. Transmission of the new pathogen SARS-CoV-2 virus have several ways , spill – over or Evolutionary jump help virus to spread from one host to another with a rapid adaptation (Epidemiological cycling) .

Covid-19 can transmitted from animals to humans (Zoonotic disease) or from humans to animals (Zooanthroponosis) or from humans to humans (Emerging Infectious disease) or from animals to animals as infectious disease .

On other hand some several wild animals considered reservoir host such as bats , snakes , frogs , hedge-hog , wild rats , marmots and rabbits . [17 , 16]

Since December 2019 when Covid-19 emerged in human from seafood market at Wuhan , Huanan city south China , rapidly transmitted all over the world as viral outbreak .

Introduction :

Zoonosis is an infection that is naturally transmitted from vertebrates animals to human , therefore animal population are maintained continuous source of human infection [25 , 26]

Fisher [6] mentioned that Viral infection can be acquired by humans through direct contact with animals or indirect exposure by vector-borne or by food-borne.

Spill-over events is the term used to describe when a virus has overcome naturally

occurring barriers necessary to spill over from one species to another leading to a new infection. Spill-over is a chance occurring , normal cycling infection , and frequently seen in human with immunodeficiency . In recent years HIV Ebola , Influenza , yellow fever , dengue , measles were studied as viral out break [27] .

Zoonotic viral infection (Covid-19 , AID, Influenza and Rabies) can occur due to wild animals (free or domesticated) as a emerging diseases from animals to humans .

Zoonotic transmission of viral diseases , 70% of these diseases were originated from wild animals while 30% were originated from domesticated wild animals [11 , 12 , 18] .

[25 , 26] wrote a list of epidemic diseases such as Covid-19 , Ebola , Lassa fever , SARS-cov-2, Rift Valley fever.

[29] considered Covid- 19 as a zoonotic , pandemic disease , similar to the SARS – CoV – 1 that emerged during 2002 .

[26] official data reported 4,628,903 confirmed cases and 312,009 deaths on 18 may 2020 due to COVID-19 infection .

Patients suffered from acute respiratory sings , symptoms were recorded , Autopsies were done for dead human patients in USA

in National Center for Emerging and Zoonotic Infectious Diseases . These cases were consulted (positive to PCR test for CoV- 2) . Swab specimens collected before and after death . Routine hematoxyline - eosin stains were performed for histopathologic evaluation . Electron microscopy diagnosis was done for the same specimens (lung and upper respiratory tract) fixed in formalin . Rabbits used as experimental animals preparing polyclonal antibody against SARS- CoV -2 .

In this review most characterization of Covid – 19 as zoonotic disease are summarized from several researches and reports .

Results :

COVID-19 :

Pandemic outbreak of Covid-19 caused by SARS-CoV-2 is a natural and has an animal origin through spillover infection

The first infection of human with COVID-19 were detected and confirmed in 41 cases in Wuhan city, Hubei Province in Seafood market in China , where a live and slaughtered animals are purchased in this market , like hundreds markets in that region [28 , 23 , 24 , 5] .

Transmission :

Causes of human infection , characterized by mild pathological changes in upper respiratory tract but can infect the lower respiratory tract and cause a sever and fatal respiratory syndrome [1 , 32] .

COVID-19 spreads from person to person mainly through respiratory route by coughing , sneezing , talking , breathing . Infected droplets or aerosols get into mouth , nose and eyes (airborne). Kissing , direct contact can easily transmit the virus leading to COVID-19 disease [1] .

COVID-19 transmit through food (Foodborne) , drinking water, breast milk , contamination with infected feces and urine , Also can transmitted from mother to her baby during pregnancy . Vectors can play important role in cause of transmission virus among animals and from animals to human .

One of the most important of cause of infection is the food which is depend on

animals (domestic and wild) such as dog , cats poultry , camels , bats , minks , rats , wolves , foxes , bamboo fishes . Hundreds markets are selling live and slaughtered animals in Wuhan , As well as Food production in restaurants and home deliveries sometimes contaminated [9 , 15]

Experiments were done on animals who had exposed to infected human (positive owners for COVID-19) , these animals include domesticated cats , dogs , ferrets , managed mink , lions and tigers (zooanthroponosis) . Studies have shown that cats , ferrets and primates are susceptible to infection with SARS-CoV- 2 and can transmit the virus . Zoo animals including a tiger and lion were reported to have been infected by zoo career . Zooanthroponosis infections (human to animals) in Netherland , Spain and Denmark also reported [16 , 21 , 20] . [14 , 15] . Worked on human- animal interactions and bat coronavirus spillover potential among rural residents in southern China and reported meat factories were the source of infection , Serological surveillance of the workers and farmers proved that .

[9] mentioned that risk of Coronavirus transmission is increase along with wildlife consumption by human in South East Asia , fur and network trade marketing , as well as zoo-anthroponosis (reverse zoonosis) occur .

Other researchers speculated the proximal origin of SARS-CoV-2 could have resulted from natural selection in animal species before its evolutionary jump into humans or after a zoonotic transfer. the virus was naturally selected within the human population. [1 , 2]

A study was done by [12] Concluded increase of viral abundance with growing domesticated animals species population in proximity to human , changes in livestock food system in response to increase demand for animal products .

Swab samples collected from surfaces and cages in the market tested were positive for SARS-CoV-2 , majority of positive samples

were taken from animals , wild animals reared in captivity farm .

Pathophysiology :

Samples of (COVID-19) were prepared from people suffered sever acute respiratory syndrome (Histopathological lesions , predominant in respiratory tissues) . coronavirus 2 (SARS-CoV-2) , upper respiratory tract (nose , throat and sinuses) are effected as well as the lower respiratory tract (trachea , bronchi , bronchioles and alveoli) also affected , therefore lung mostly affected by COVID-19 infection , finally respiratory failure [3] . [3 , 32] isolated a novel coronavirus . from patients with pneumonia . SARS-CoV-2 may also affect central nervous system (virus detected in cerebrospinal fluid of autopsies) . [12] .

COVID-19 can cause acute myocardial injury and damage to the cardiovascular system . An acute cardiac injury was found in 12 % of infected people admitted to the hospital in Wuhan , China and with high rates of cardiovascular symptoms [30 , 31] .

Main pathological findings at autopsy are : Lung consolidation and pulmonary oedema . Bronchopneumonia , Serous exudation with fibrin exudation (Serofibrinous exudate) with sever acute respiratory Syndrome coronavirus 2 infection , multinucleated giant cells are present in lung tissue , alveolar spaces contain extracellular virions (electron microscope) . Macroscopic pericarditis , Intravenous Coagulation (Thrombosis) in heart and brain [19] .

[19] published a research work on effects COVID-19 on liver cause injury , damage to the liver tissue and at the end hepatic failure .

Signs and Symptoms :

Coronavirus have variable signs and symptoms , fever or chills (sometimes low and others high fever) , loss of taste , loss of smell , cough , shortness of breath or difficulty , Fatigue , difficulty in walking . Mortality rates for COVID-19 vary but higher among the elderly persons that suffering from immunosuppression [19] ,

people suffering diabetes , hypertension , heart disease [1 , 30 , 31] .

Complications :

[22] worked on hematological findings and Complications , secondary infection with opportunistic bacteria . Most complications are including pneumonia , kidney failure , thrombosis , heart attack , enteritis , multi-organs failure .

Management and Treatment :

COVID-19 patients must be wear simple face mask and need supportive care include fluid therapy , Oxygen support .

Patients must be under health care with special diet to improve immunity . Cell mediated immunity and antibody production . Immunity of this disease long – lasting in people who recover from the disease. [7 , 8] .

At the beginning , hydroxychloroquine or chloroquine used as treatment with vasodilators , corticosteroids , immune therapy , lipoic acid , bevacizumab , interferon beta . Food and Drug Administration (FDA) in united states gave the drug an emergency use authorization [10] .

Conclusions :

1 – Pandemic outbreak of COVID-19 caused by SARS – CoV- 2 . 2 – Direct or indirect main sources of outbreak are animals and their products .

3 – Raw or Under cooked meat is a source of transmission of virus from animals(wild and domestic) to human .

4 – Wild life is a reservoir host for coronavirus and many causative agents for several diseases .

5 – Social distancing and wearing Surgical mask to control and prevent droplets transmission .

7 – Maintain good ventilation and good air circulation .

8 - Increase risk of death with Elderly people suffered chronic diseases , diabetes , hypertension , heart diseases and immunosuppression .

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