Coronavirus Disease 2019: Corona Viruses and Blood Safety - A Review

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Abstract

The main aim of the study is to understand the current information of corona transmission and blood safety measures taken during handling blood safety products of corona infected patients.Coronaviruses are in the subfamily Ortho Coronaviridae of the Coronaviridae family.It is a type of viral virus that causes inflammation in your nose, sinus, or upper throat.Most coronaviruses are not harmful.The virus may result from pneumonia, respiratory failure, septic shock, and death. Many complications of Coronavirus disease 2019 (COVID 19) may result from a condition known as cytokine release syndrome or a cytokine storm. This study mainly aims at the awareness and perception of rural and urban people about covid-19 virus. .Finding advance in blood safety to avoid blood contamination. It will help to provide a proper diagnosis of the disease and understand current information on coronavirus transmission and blood safety measures during the course of the infected patient's blood safety procedures.To assess public health risks and the risk of occupationally acquired disease which may be associated with the management of infectious waste, understanding these factors is required.The storage, processing and examination of blood specimens from Covid-19 patients must be carried out by qualified staff in suitably equipped laboratories, previously educated on the technical and safety procedures.A blood-borne illness is a disease which can spread by blood and other body fluids contamination. Blood can contain various types of pathogens, mainly microorganisms like bacteria and parasites, and non-living infectious agents such as viruses. Through taking preventive steps in the handling of blood products and storage of blood products for infection, contamination will be reduced and the public will not be affected.

Keywords: *Blood safety, Coronavirus, Disposal, Handling, Spread, Blood borne.*

Introduction

Coronaviruses make up the Ortho Corona Virinae sub - family and are enveloped viruses with a single-stranded RNA genetic code as well as a nucleocapsid helical uniformity in the family Coronaviridae, order Nidovirales and realm Ribovirus.[1] The genome size of coronaviruses varies between around 26 and 32 kilobases[2], one of the largest among RNA viruses.They have distinctive club-shaped spikes that extend from their surface , producing a picture reminiscent of the solar corona from which their name derives in electron micrographs [3].

A coronavirus is a type of viral virus that causes inflammation in your nose, sinus, or upper throat.Most coronaviruses are not harmful[4].The World Health Organization described SARS-CoV-2 as a new form of coronavirus in early 2020, following an outbreak in China in December 2019. Coronavirus disease 2019 (COVID-19) is a disease caused by SARS-CoV-2 that

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can cause inflammation in the respiratory tract. It can affect the upper respiratory tract (sinuses, nose and throat) or lower respiratory tract (windpipe and lungs)[5]. It spreads the same way that other coronaviruses do, primarily through contact between persons.The other coronaviruses cause most of the colds that affect us during the year but do not pose a significant threat to otherwise healthy people. The 2019 novel coronavirus (COVID-19) is an infectious infection that can transmit directly or indirectly from one person to another, causing respiratory diseases ranging from common cold to acute respiratory syndrome[6]. This virus was first discovered in Wuhan , China. COVID-19, according to the World Health Organization, is a major health problem and has a higher risk of extreme disease, which is spreading rapidly around the world. A total of 87,137 confirmed cases were reported worldwide until March 3, 2020. Of these, 2977 (3.42 percent) were fatal.

BLOOD SAFETY IN CORONA INFECTION

Spread of Coronavirus:

Respiratory infectious diseases can be transported by droplets of various sizes: if the droplet particles are > 5-10 μm in diameter, they are called respiratory droplets, and if they are < 5 μm in diameter, they were also made reference to it as aerosol droplets.According to available data, COVID-19 virus is transmitted mainly among people through respiratory secretions and communication paths. Airborne communication wasn't really noted in an assessment of 75,465 COVID-19 cases in China.Transmission of droplets occurs when a person is in close contact (within 1 m) with someone with respiratory symptoms (e.g., coughing or sneezing) and is therefore at risk of exposure to potentially infectious respiratory droplets through his / her mucosa (mouth and nose) or conjunctiva (eyes)[7,8]. In the immediate environment around the infected person transmission may also occur via fomites. Consequently, COVID-19 virus transmission can occur through direct contact with infected people and indirect contact with surfaces in the immediate environment or with items used on the infected person (e.g., stethoscope or thermometer)[9].Airborne transmission is distinct from droplet transmission because it refers to the presence of microbes within droplet nuclei, which are usually referred to as particles < 5 μm in diameter, can remain in the air for long periods of time, and can be transmitted to others over distances greater than 1 m.i.l.e,Endotracheal intubation, bronchoscopy, open suction, nebulizer therapy, manual ventilation before intubation, disconnection of the patient from the ventilator, non-invasive positive pressure ventilation, tracheostomy and cardiopulmonary rehabilitation[10]. There is some evidence that infection with COVID-19 can lead to bowel infection and can be found in faeces. To date, however, only one study has developed the COVID-19 virus from a single stool specimen. To date, no cases of faecal−oral COVID-19 virus transmission have been reported[11].

Blood Borne Disease and Coronavirus:

Bloodborne pathogens are microorganisms that are carried in the blood, such as viruses or bacteria, and can cause disease in humans.There are many different bloodborne pathogens including malaria, syphilis, and brucellosis, most commonly hepatitis B (HBV), hepatitis C (HCV), and the HIV virus.Bloodborne pathogens such as HBV and HIV can be transmitted by contact with contaminated human blood and other body fluids such as.A blood-borne illness is a disease which can spread by blood and other body fluids contamination[12]. Blood can contain various types of pathogens, mainly microorganisms like bacteria and parasites, and non-living infectious agents such as viruses. CDC-NIOSH cites, in particular , three bloodborne pathogens, all viruses, as being of primary concern to health workers: HIV, hepatitis B (HVB), & hepatitis C (HVC)[13].

It is more useful to classify diseases that are not usually transmitted directly by blood contact, but rather by insects or other vectors as vector-borne diseases, even though the causative agent may be found in the blood. Because it is difficult to determine what pathogens any given blood sample contains, and certain blood-borne diseases are lethal, all blood (and any body fluid) is regarded as potentially infectious by common practice. Precautions for blood and body fluid[14] are a kind of infection prevention procedure that aims to prevent transmission of this form of disease.

Needle Stick Injury:

Many healthcare workers are at increased risk of unintended needle stick injuries because of the environment in which they work. Injury from infected

sharp instruments and needles poses a significant occupational threat for healthcare employees[15]. The prevalence of such viruses is unknown in the hospital patient population and in healthcare workers There is a chance of occupational transmission of bloodborne pathogens such as Aids, hepatitis B and C and other diseases[16]. The overall risk of HIV transmission to a health care worker following percutaneous exposure to HIV contaminated blood was estimated at 3 in 1000. According to a WHO study, the estimated annual proportion of health care workers (HCW) exposed to blood-borne pathogens worldwide was 2.6 per cent for HCV, 5.9 per cent for HBV, and 0.5 per cent for HIV, corresponding to around 16,000 HCV infections and 66,000 HBV infections worldwide. Injuries recorded by standard occupational reporting systems can underestimate the true rate of injury as much as 10 times[17]. Needle stick injuries have major indirect effects in the delivery of healthcare, especially in developing countries, where the skilled workforce in the population is already reduced in terms of the disease burden. Such accidents not only potentiate health effects, but also cause emotional distress in health care personnel, leading to missing workdays and directly affects the health care services and resources.

Handling of Blood Safety in Clinical Laboratory:

The storage, processing and examination of blood specimens from Covid-19 patients must be carried out by qualified staff in suitably equipped laboratories, previously educated on the technical and safety procedures[18]. In all cases, national laboratory biosafety standards should be followed, and general information is also available at the World Health Organization (WHO) laboratory. .In Modena, blood specimens from Covid-19 patients are treated in a Biosafety Level (BLS)-2 laboratory equipped with Biological Safety Cabinets (BSC) of Class II. Both cabinets are fitted everyday with an internal waste (containing 0.5% bleach) where any polluted biological material is discarded[19]. Both laboratory staff need to wear personal protective equipment. In detail, personnel must wear disposable gloves, laboratory coats, and surgical masks when working in the laboratory area, required to prevent the spread of unwanted droplets[20]. Such measure is also necessary to avoid the spread of the infection in the event of an asymptomatic infection by a researcher. Laboratory clothing is kept in the laboratory, and should never be used outside. For all ongoing tests doors of the laboratory are kept locked[21].

The storage, processing and examination of blood specimens from Covid-19 patients must be carried out by qualified staff in suitably equipped laboratories, previously educated on the technical and safety procedures[22]. Local laboratory biosafety standards should be followed under all cases, and general guidance is also available in the World Health Organization (WHO) Laboratory Biosafety Manual. Blood specimens from patients with Covid-19 are treated in the Biosafety Level (BLS)-2 laboratory equipped with Class II Biosafety Cabinets (BSC) in Modena. All cabinets are equipped with one every day internal waste (containing 0.5% bleach) where any possible contaminated biological material is discarded[23].

Inside the laboratory there is a distance of at least 1 m between people, and where possible the presence in each room should be limited to just one person. If this is not possible, it is important not to have two operators sitting too close to the same cytometer or computer using the same instrument (e.g., like a 180 cm cabinet) or two researchers[24].

Disposal of Corona Infected Waste Product :

To assess public health risks and the risk of occupationally acquired disease which may be associated with the management of infectious waste, an understanding of these factors is required[25].Infectious waste means that active pathogenic microorganisms are present at a sufficient concentration to infect a susceptible human host[26]. If the level of pathogenic organisms is below that which can enter and reproduce inside the host, there is no risk of illness.A patient in a healthcare facility, an experimental animal in an infectious disease vivarium, or the culture medium used to propagate an infectious agent may be the source of the infectious wastes.The principal responsibility for the safe handling and disposal of infectious waste rests with the waste generator. That duty continues to the final disposal point and though other parties are involved in the processing of the waste[27]. The generator will carry out inspections or take other steps to ensure that the waste is properly treated and disposed of, even though the handling of infectious waste is also a problem for waste hauliers and

operators of treatment facilities. Innovations in waste management like in the educational system are also upcoming in this pandemic era. Additionally, federal, state , or local regulations may have to be observed to control medical waste disposal and record keeping. Wearing protective gloves and frequent handwashing are the most critical practices for all workers handling infectious waste. Handling of infected objects gloves and a laboratory coat are recommended. When soiled, or damaged, gloves and clothing should be changed[28].

The type of laboratory activity will determine whether further protective measures are necessary. Laboratory operations with a high risk of contamination caused by infectious fluid spills or droplet production on plastic-backed absorbent bench paper should be carried out[29]. Workers who handle infectious waste in an autoclave should wear a rubber apron, sturdy shoes, asbestos-free heat-resistant gloves, and face shield to protect against injuries that may occur when the autoclave is loaded or unloaded.The method of choice for treating large quantities of hazardous waste , animal carcasses and toxic bedding products is incineration. Because incinerators are usually located some distance from the laboratory, additional precautions are needed to handle and package infectious waste.[30]

Conclusion

While coronaviruses mainly cause mild to serious respiratory infections, it is worth considering the potential for transfusion transmission. Coronavirus infection can result in a spectrum of diseases, from mild respiratory symptoms to severe, life-threatening pneumonia. Therefore, it is critical to consider the potential for transmission of this infection by blood transfusionBy taking preventive measures in the handling of blood products and in the disposal of infectious blood products, contamination will be minimized and there will be no public effect.Those patients recovering from COVID-19 should avoid donating blood for at least 28 days after symptom resolution and completion of therapy.This might avoid spread of infection to others.

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