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RESEARCH ARTICLE

CONGO FEVER – A FATAL HEMORRHAGIC FEVER

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ABSTRACT

Congo fever is a widely distributed vector borne viral disease, seen in different regions of the world. CCHF virus (CCHFV), which belongs to the Nairovirus genus and Bunyaviridae family, is causative agent for this fatal condition. As this virus is highly pathogenic and easily transmissible it forms a threat on Human society and it has a fatality rate of 40-70%.The virus can be transmitted to human being either from animal which is exposed to tick or directly from tick. Human to human transmission is also common through their body secretion, this risk is more common among health professionals. The major symptoms include headache, hyper pyrexia, stomach ache, muscle pain, low blood pressure and flushed face. As the disease progresses, there is appearance of most severe hemorrhagic symptoms such as petechiae, ecchymosis, epistaxis, bleeding gums and emesis. Enzyme linked immunosorbent assay, quantitative polymerase chain reaction, antigen detection, serum neutralization and isolation of the virus by cell culture are the common diagnostic measures used for identifying viral infection. Even though there is no specific management is available for CCHF, immunotherapy and ribavirin have been approved by the World Health Organization for the treatment of CCHFV infection. Nevertheless educating the public regarding the risk factors and control measures can easily help to reduce the spread of this disease to a greater extent, It is very true particularly in developing countries as there is less resources.

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INTRODUCTION

Congo fever, is one of the severe forms of hemorrhagic fever, has been reported in many regions of Africa, Asia, Balkans, Eastern Europe and the Middle East with a near fatal mortality rate. It was described firstly among soviet soldiers in the Crimea in 1944 and was named Crimean fever (Negredo, 2017). The causative agent, congo virus, is maintained in tick species through horizontal and vertical transmission and spreads to domestic animals, which carries again to humans. Congo virus is clustered among seven genotypes; Africa-1, Africa-2, Africa-3, Europe-1, Europe-2, Asia-1 and Asia-2. These seven genotypes are characterized on the basis of genetic variation in small segments of RNA. Congo is highly pathogenic in nature, easily transmissible and has a high case-fatality rate of 40-70% if it's fail to diagnose at first. As CCHFV is highly pathogenic, the culture of the virus is only permitted in biosafety level four and in maximum secured laboratories; there is a possible risk of this virus being used as an agent of bioterrorism or as biological warfare (Crimean-Congo hem, 2018).

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Also, Owing to the widespread geographical distribution of the virus, it must be recognized as a global threat**.** CCHF infects a number of animals, nevertheless it is asymptomatic among the infected animals. However congo fever is highly fatal in humans. Tick is a major vector in transmission of this disease, yet secondary cases are also frequently reported due to human to human transmission via blood in sputum, gums, rectum and urine. Onset of symptoms is less than two weeks following exposure. In humans this disease begins as non specific febrile symptoms, which progress to hemorrhagic syndrome. Generally recovery occurs within two weeks after onset in those who survive this zoonosis (Crimean-Congo hemorrhagic fever virus, 2010).

Definition

Crimean-Congo hemorrhagic fever (CCHF) is a viral zoonosis transmitted by ticks widely distributed in Africa, Asia, and Eastern Europe that cause severe outbreaks in humans (WHO 2009). Crimean-Congo hemorrhagic fever (CCHF) is a tick-borne zoonotic disease which is characterized by initial fever, headache, and malaise followed by gastrointestinal symptoms and, in severe cases, bleeding, shock, and multi-organ system failure.

History

The first reported case of CCHF dates back to the 12th century, where a description of a hemorrhagic syndrome in Tajikistan and the nature of the arthropod that caused the same appears similar to the modern-day CCHF. In the modern era, the disease was first described among Soviet Union military personnel in Crimea during World War II (1944-45) and was named Crimea hemorrhagic fever. Subsequently, it was shown that the virus responsible for Crimea hemorrhagic fever was indistinguishable from Congo virus that caused febrile illness in a child in Belgian Congo. Hence, linkage of these two places names led to new nomenclature of the CCHF virus (Ergönül, 2006). CCHFV evolved 3,100–3,500 years ago. It is believed that changing climate and agricultural practices near this time could be behind its evolution. The disease was known as "Crimean fever" during the Crimean war and contracted by many, including Florence Nightingale. Soviet scientists in Crimea identified this disease, firstly, in 1944 and they named it Crimean hemorrhagic fever. Even though they established its viral etiology by passage of the virus through human "volunteers" without reporting the fatality rate, they were unable to isolate the agent at that time. However In 1956 the Congo virus had first been isolated by physician Ghislaine Courtois, head of the Provincial Medical Laboratory, Stanleyville, in the Belgian Congo. Followed by, in February 1967, virologists Jack Woodall, David Simpson, Ghislaine Courtois and others published initial reports on a virus they called the Congo virus. Thereafter the cases has been reported in Uganda, Samarkand (In June 1967), Russia (1969). The International Committee on Taxonomy of Viruses proposed the new name Congo–Crimean hemorrhagic fever virus, However the Soviets insisted on Crimean–Congo hemorrhagic fever virus. In 1973, against all principles of scientific nomenclature based on priority of publication, it was adopted as the official name, in possibly the first instance of a virus losing its name to politics and the Cold War. Since then, Congo–Crimean or Congo virus has been used in many reports, which would be missed in searches of medical databases using the official name (Caporale, 2009). These reports include records of the occurrence of the virus or antibodies to the virus from Greece, Portugal, South Africa, Madagascar (the first isolation from there), the Maghreb, Dubai, Saudi Arabia, Kuwait and Iraq. Also, it is more prevalent in South Africa with between five and 25 cases reported annually. From 1981 to December 2002, approximately 171 cases had been diagnosed in South Africa. The majority of the cases were from the Karoo, the Western Free State, Northern Cape and North-West Province. Most of the cases were found in these regions were in farmers, farm laborers, hunters and abattoir workers. So far CCHF virus has been observed in over 30 countries.

Virology

PHYLUM : Negarnaviricota
CLASS : Ellioviricetes
ORDER : Bunyavirales
FAMILY : Nairoviridae
GENUS : Orthonairovirus
SPECIES : Crimean-congohemorrhagic fever orthonairovirus

The CCHF virus (CCHFV) is a triple segemented, single stranded, negative sense RNA genome virus belonging to the Nairovirus genus of the Bunyaviridae family. The virions are spherical, measure approximately 85 to 105 nm in diameter, and have a bilayered lipid envelope that is approximately 5 to 7 nm thick and glycoprotein spikes are 8-10 nm in length. The nucleocapsids are filamentous and circular with a length of 200–3000 nm. The virus might enter a cell using the cell surface protein nucleolin. The genome consists of single-stranded RNA with negative polarity, divided into three segments: Small, medium and large segments. These three segments form a complex with nucleocapsid proteins to become a ribo-nucleocapsid (Hakan Leblebicioglu, 2018). The envelope proteins form small projections 5–10 nm long. The virion contains three structural proteins.

i) A nucleocapsid protein
ii) Glycoproteins (Gn and Gc) and
iii) A large polypeptide protein

Under electron microscopy, the virion of CCHF can be differentiated from other members within the Bunyaviridae family, since they possess small morphologic surface units with no central holes arranged in no obvious order.

The family Bunyaviridae includes 5 genera of virus: Orthobunyavirus; Hantavirus; Phlebovirus; Tospovirus; Nairovirus. Genus Nairovirus has approximately 34 described tick-borne viruses that are grouped into seven serogroups. Among these, only three members are known to cause disease in humans and they are CCHF, Nairobi sheep disease virus, and Dugbe virus. Amongst them CCHV is the most significant for public health.

MODE OF TRANSMISSION

Vertical transmission

During the development stage (metamorphosis), from larva to the adult stage,, tick vectors support the replication of the virus present inside their body tissues. Thereafter the virus is transmitted to eggs and adult females, then from adult females to adult males, respectively. The virus gets replicated in the mid gut lining of the tick and finally disseminates to different body tissues, for example, reproductive organs and salivary glands. Hence, via transovarian transmission, thousands of infected eggs are being produced, which are sufficient enough to maintain a large population of infected ticks (Hoogstraal, 1979).

Horizontal transmission

During the season of summer and spring, the transmission of CCHFV between ticks and animals is more common as it's the time for larvae and nymphs develop into the adult form by taking the blood meal for their growth (Ticks have 4 life stages: Egg, Larvae, Nymph and Adult). A bite of the infected tick to their host leads to the transmission of the virus from the tick to their host, and subsequently, there is virus replication in the host tissue and virus replication in their blood stream (Khan *et al.,* 1997). Moreover it leads to infection among healthy ticks also, when this infected host feeds the same. The virus infection has been commonly seen among smaller wildlife species such as hares, hedgehogs that harbor the tick vectors that are at immature stages. Immature ticks (nymphs) generally inhabit in smaller animals while mature ticks spread the infection to large vertebrates such as livestock.

Non-viremic transmission

This is another type of viral transmission that doesn't need an animal to be viremic, but directly spread from the infected to healthy ticks when feeding together. During co-feeding, viral substances present in the saliva of ticks accelerate the viral transmission.

Transmission to birds

Birds are commonly resistant to becoming viremic with the exception of ostriches. No specific antibodies are detected in different species of birds infected with the virus, as CCHFV do not rely on birds as a host for its replication.

Transmission to humans

Humans are considered as the dead-end host of congo virus. CCHFV infection is most common in rural areas where exposure to Hyalomma ticks is very high and people become infected when bitten by infected ticks or via tick fluid getting into cuts and abrasions in the skin, or mucous membranes (Khan *et al.,* 1997). This kinds of transmission occurs only during the short period when the animal is infectious, to be more clear from the day three after the animal is infected until day seven). Humans can be exposed to infected blood during slaughtering, dehorning, castration, vaccination, the cutting of identity notches in the ears, or the attachment of ear tags. In butcher's shops transmission can also occur by contact with infected animal blood. Physical contact with infected persons via their bodily fluids or blood can transmit the virus from person to person within 7–10 days of illness. Mostly health care professionals are more likely to expose to the infective person's body fluid. In addition to that, cases of mother to child transmission has been reported. The infection can also be acquired by percutaneous and permucosal route by contact with animal blood or tissues and drinking unpasteurized milk (Mehrabi tavana, 2008).The chance of aerosol transmission is also suspected in few cases in Russia, but no definite evidence exists.

Incubation period

The incubation period ranges from 1 to 12 days depending on the mode of transmission**.** Generally the incubation period is typically 3-7 days from animal exposure and 1-3 days from a tick bite.

Incidence

CCHF is the second most widespread of all medically important arboviruses, after dengue virus. Since 1967 nearly 140 outbreaks has been involved around the world and more than 5000 cases have been reported, globally. A total of 52 countries have been identified as endemic or potentially endemic regions, reporting substantial number of cases every year. There is, also, report of nosocomial outbreaks in different parts of the world due to the improper practice of infection control techniques (Mertens *et al.,* 2013).

Risk factors

- Certain areas like Southern and Eastern Europe, Central Asia, Africa, Southeast Asia, and the Middle East where the virus is typically present.
- Spring season: During summer and spring months (June- October), larvae and nymphs develop into adult form by taking the blood meal for their growth from the animals, Hence during this seasonal time the spread of CCHFV between ticks and animals is more comparatively. Therefore, travellers undertaking outdoor activities such as camping or hiking, especially during the peak transmission season from Spring to Fall, are at greater risk.
- Occupationl risk: Healthcare practitioners, agricultural workers, abattoir employees, and veterinarians are more likely to expose towards the infected animals or persons. Nosocomial infection is more common among health care workers, particularly during the hemorrhagic period of the disease. Laboratory personnel, in particular, dealing with viral samples are more likely to get the disease if they didn't follow standard precautions. Animal herders, livestock workers, and slaughterhouse workers are also high risk people to get exposed towards the infected virus (Peters, 1997).
- Crushing and rubbing the infected tick on skin or slaughtering the infected animal is also one of the main risk factors towards the exposure of CCHFV.
- Droplet-respiratory route of infection is also one of the risk factors of CCHF as per the research evidences.
- Individuals and international travelers with contact to livestock in endemic regions may also be exposed more frequently.
- Domestic livestock are regarded as the main hosts of the disease and can spread the disease during their viremic stage to humans.
- High-risk behaviors, such as slaughtering, animal handling and/or examining livestock without wearing masks or gloves, and unauthorized slaughtering of animals, facilitate the transmission of the disease (Al-Abri *et al.,* 2017).
- Improper infection-control procedures and bio-hazardous waste management.
- Humans are infected either by tick bites or exposure to contaminated blood or excreta of the reservoir or transiently viremic domestic animals, or from other infected human being. Human-to-human transmission occurs through direct contact with blood or bodily fluids of infected persons.

Pathophysiology

The pathogenesis of CCHF is not well understood. Congo fever virus disable the host immune response, firstly, after the patient being infected with the virus. Thereafter, CCHFV attack or manipulate the human cell which, is initiating antiviral response, is characterized by rapid replication of the virus along with dysregulation of the vascular system and lymphoid organs. When there is destruction of endothelium, it stimulates platelet aggregation as well as degranulation, which further leads to failure of hemostatic mechanism with subsequent activation of the intrinsic coagulation cascade. Marked pro-inflammatory response disproportional to the extent of lesion is a striking feature seen in these patients. The proinflammatory cytokines are key regulators in the pathogenesis and mortality of patients with CCHF. Levels of Interleukin (IL)-6 and Tumor Necrosis Factor (TNF)-α are shown to be significantly higher in patients with fatal CCHF as compared to those with non-fatal infection (Saadia Aslam, 2015).

Clinical features

The incubation period ranges from 1 to 12 days depending on the mode of transmission. Genreally, after 1-3 days followed by a tick bite or 5-6 days after exposure to blood or body fluid, flu-like symptoms appear, and which may resolve after one to two weeks. 75% of the cases, usually, shows hemorrhagic manifestations within 3-5 days of the onset of illness. Human beings are the only host of CCHFV in whom the clinical features of the disease are evident. Patient generally present with the abrupt onset of clinical features (Simpson *et al.,* 1967). The typical course of CCHF infection has four distinct phases Incubation period, Pre-hemorrhagic phase, Hemorrhagic phase, and Convalescent phase.

- **The incubation period** for CCHF virus is in the range of 1 to12 days depend upon the different route of infection, viral load and the source of infection.. The abrupt onset and short incubation period help to differentiate CCHF from tick bite fever. Generally the patient feels extremely unwell during the time of disease condition (Stephen).

- **The prehemorrhagic phase** is characterized by nonspecific prodromal symptoms during which it mimics other viral diseases. The major symptoms include hyper pyrexia, pain over the muscles, severe headache, nausea, agitation, mental confusion, abdominal pain, sensitivity to light, photophobia and non-bloody diarrhea. Followed by cardio vascular changes include hypotension, relative bradycardia, tachypnea, neuro psychiatric manifestations such as agitation, mental confusion, delirium, aggression, mood swing, sensitivity to light, and conjunctivitis, pharyngitis, and cutaneous flushing(flushed face) or rash. This phase usually lasts for 4-5 days and in vast majority of the cases, it progresses to the next serious stage named hemorrhagic phase.

- **The hemorrhagic phase** is generally short and has a rapid course with signs of progressive hemorrhage and diathesis. These include petechiae (red spots on skin), bleeding from the bowel leading to the vomiting of blood (often confused with a stomach ulcer), ecchymosis (extravasation of blood), epistaxis (nose bleeding), conjunctival hemorrhage, purpura, hemoptysis, bruising of skin, bleeding into muscles (haematoma), oozing from injection sites etc. and Certain patients may also have hepatosplenomegaly, Localized abdominal pain in the upper right side, Rashes on the skin, these all signs shows jaundice. Acute respiratory distress syndrome (ARDS) and diffuse alveolar hemorrhage, accompanied by systemic inflammatory reaction, have also been reported during hemorrhagic manifestations. Blood tests show a low number of platelets and generally a decrease in the white cells. The bleeding is due to an effect on the clotting mechanisms in the body, including a decrease in the platelets in the blood. As disease progress, Liver, kidney and lung failure may also occur and the patient may become comatose. When the disease is not treated, patients may succumb due to multiorgan failure, disseminated intravascular coagulation, and circulatory shock (Suma, 2011).

- **The convalescent period**: The disease is fatal, generally, 40-60% of cases. In the survivors (Full recovery can take a complete year), the convalescent period begins 10-20 days after the onset of illness. During this phase, patients may have feeble pulse, tachycardia, loss of hearing, and loss of memory and hair. However, these after effects have been reported only in few outbreaks. Mortality rates of nosocomial infections are often much higher than those acquired naturally through tick bites and may be related to the level of viremia. In fatal cases, there was little evidence of an antibody response; evidence shows that viral load is higher and antibody production is weaker in fatal cases.

Diagnostic measures

It is very mandatory to diagnose this case as early as possible since there is higher risk of transmission as well as nosocomial infection. As the clinical presentation of this disease is non specific, it is essential to have a high index suspicion (The Indian express, 2018). Collect the history regarding the travel towards the endemic areas, tick bite, and exposure to blood or tissues of livestock or human patients. Common diagnostic modalities to assess CCHF virus include

- Viral isolation: Cell culture (restricted to biosafety level-4 laboratories)
- Molecular methods: Reverse transcription polymerase chain reaction (RT-PCR).
- Serological assays: Serologic testing by enzyme linked immunosorbent assay (ELISA) or indirect fluorescent antibody (IFA)

i) **Viral isolation:** Isolation by cell culture is the most definitive, simplest and fastest as compared with the traditional methods of intracerebral inoculation of a sample in newborn mice. Viral isolation is done by using cell lines such as LLC-MK2, Vero, BHK-21, and SW-13.4 and can be achieved in 2-5 days. But viral isolation is useful only in the early phase of infection when the viral load is high. Moreover, this can be done only by the biosafety level 4 containment facilities.

ii) **Molecular methods:** Demonstration of viral genome is, by far, the most definitive form of diagnosis. Reverse-transcriptase PCR (RT PCR) is the method of choice for rapid laboratory diagnosis of CCHF virus infection. The benefit over the previous one is their rapidity when compared to virus culture, and a presumptive diagnosis can be made within 8 hour. Automated real-time assay is one of the improvised form of molecular method with the added advantages like lower contamination rate, higher sensitivity, and specificity and provides results in a few minutes. Drosten et al., developed a one-step real-time RT-PCR assay for identifying CCHFV using primers to the nucleoprotein gene; using DNA-intercalating dye, SybrGreen I. A real-time RT-PCR assay was developed, later, by using TaqMan-Minor Groove Binding Protein (MGB) probe, which had higher specificity and a shorter probe length (Van Eeden *et al.,* 1985).

iii) **Serological assays:** Serological methods have been developed to diagnose CCHF by using inactivated virus or extracts from infected suckling mouse brain. it is useful to do a serological test during the second week of illness. Serological tests formerly used for the detection of antibody to the virus. However indirect Immunofluorescence (IF) could identify IgG and IgM antibody responses by days 7-9 of illness. So these

conventional serodiagnostic tests have largely replaced with Ezyme-Linked Immunosorbent Assay (ELISA) to detect specific IgM and IgG. Specific IgM persists for up to 4 months of post-infection among the clients, while IgG remains detectable for at least 5 years. Therefore current infection is confirmed by demonstrating IgM by using IgM antibody capture. Recently, a recombinant nucleoprotein (rNP)-based IgG ELISA was developed for serological diagnosis of CCHF virus infections; this was shown to be a valuable tool for diagnosis and epidemiological investigations of CCHFV infections. Similarly, CCHFV rNP-based IgM-capture ELISA has shown to be a useful method for diagnosis of CCHFV infections (Whitehouse, 2004).

Differential diagnosis

It is very important to identify CCHF as its transmit very easily among human being. However it's quite difficult to differentiate the same at the earliest period owing to its vague features. Morover it shows more or less same features of Malaria, typhoid fever, leptospirosis, rickettsial infection, viral hemorrhagic fevers, meningococcemia, borreliosis (relapsing fever),yellow fever, dengue fever, Omsk hemorrhagic fever and Kyasanur Forest disease (World Health organization, 2013).

Preventive measures

Currently, two vaccines against CCHFV have been developed. The first one is a formalin-inactivated vaccine, which was developed in Bulgaria from infected suckling mouse brain and it has been used in Soviet union and Bulgaria. The second is a DNA vaccine tested in mice; neither vaccine has undergone official randomized clinical trials. Since 1970s, several vaccine trials around the world against CCHF have been terminated due to its high toxicity. Hence the better way to protect against CCHFV are Tick control and limitation of exposure to infected livestock or human (World Health organization, 2013). The mainstay of prevention and control of CCHF viral infection should target both at the community level and in the nosocomial set up. At the community level, care should be taken to prevent human contact with livestock and minimize the tick burden in these vertebrate hosts. Measures such as avoidance of tick habitat, regular examination of clothing and skin for ticks, and use of tick repellents (use repellents containing 20%-30% DEET or 20% Picardin) should be taken to prevent tick bites. Both Fully covered and neutral coloured, breathable garments (long sleeved shirts and pants) are, also, recommended to prevent tick attachment to body parts. While handling livestock or domesticated animals, appropriate acaricidal agents should be used to control tick. Animals could be protected by applying acaricides spot-ons, dips or impregnated collar treatments. Protective clothing and gloves should be highly recommended whenever there is a possibility of contact with skin or mucous membranes of viremic animals, particularly when blood and tissues are handled. For reducing the possibility of animal to human transmission, quarantine measures should be taken while importing animals and they should be treated with pesticides regularly. Maintenance of hygienic conditions during slaughtering, butchering and culling procedures in slaughterhouses or at home is necessary (World Health organization, 2013). Consumption of unpasteurized milk and uncooked meat should be avoided. Human-to-human transmission of CCHF virus is usually seen when direct contact with blood and body fluids occurs, especially in a healthcare centers when appropriate infection control measures are not taken. Strict universal precautions are mandatory when caring for patients and this can be achieved by barrier nursing, isolation, and use of protective wears such as gloves, gowns, face-shields, and goggles with side shields. Safe burial practices, including the use of liquid bleach solution as a disinfectant, and covering the body in polythene bags have been useful to prevent the transmission. Laboratory workers must follow stringent biosafety precautions and viral isolation techniques. CCHF virus can be inactivated by disinfectants including 1% hypochlorite and 2% glutaraldehyde; these can be destroyed by heating at 56°C (133°F) for 30 min. disposal of used instruments and equipment, including needles, syringes and employing safe burial practices, should be implemented. Prophylactic treatment with ribavirin has occasionally been used after high-risk exposures but its role is controversial.

Management

Congo fever has a high fatality rate of 40-60%. Hence if a case is suspected, it needs immediate medical attention. The symptoms of this condition is difficult to manage if it's diagnosed late and it can leads to multi organ system failure and even death. So, early intervention is very much crucial. However the treatment options specific to this illness is still limited. The patient should be isolated in a hospital ward/room and anyone coming in to contact with the patient is required to wear protective clothing including gloves, special gowns, face masks and eye goggles or visors. The general approach in treatment of patients with CCHF viral infection depends on the severity of the clinical manifestation. Treatment for CCHF is primarily supportive which include.

- Managing fluid and electrolyte imbalances: Replacement of blood, platelet, and plasma has proven effective for saving the life of the patient, in particular patients with hemorrhagic manifestation. Replace blood components that aid clotting.
- Oxygenation and hemodynamic support
- Appropriate treatment of secondary infections: Treatment generally focus on the guidelines for severe septicemia. Anti-malarials and broad spectrum antibiotics should be considered until the diagnosis of CCHF can be confirmed.

According to World Health Organization (WHO), ribavirin is the anti-viral medication of choice for CCHF and the recommended dose is an initial dose of 30 mg/kg followed by 15 mg/kg for four days and then 7.5 mg/kg for six days for a total of 10 days. However, a systematic meta-analysis against this with their results and it's proved that no change in mortality rate with the use of ribavirin in the randomized control studies, while pooled observational studies showed reduction in mortality by 44%. Tasdelen *et al*. also have shown the beneficial effect of ribavirin if given at an early phase of the CCHF. Persons who have unprotected contact with someone with CCHF should be monitored and post-exposure treatment with oral ribavirin considered. For effective results, ribavirin is used along with supportive therapy, such as interferons. In numerous *in vitro* studies, interferon type-I is shown to have antiviral activity, nevertheless, no clinical data is available on supporting the use of interferon (Van Eeden *et al.,* 1985). Apart from the specific antiviral therapy, the role of immunotherapy in the form of immunoglobulin has also been studied. A new specific immunoglobulin CCHF-Venin that contains antibodies

to CCHF virus was prepared from the plasma pool of boosted donors by a combined ethanol-polyethylene glycol fractionation method with an ion-exchange purification step. However, unlike that on Ebola virus, limited studies are available, which show the beneficial effects of immunotherapy in CCHF.

Prognosis

The case-fatality rate is 40-60% as per the evidences (Whitehouse, 2004). Moreover main manifestations and complications such as shock, bleeding, neurological manifestations, high viremia, aspartate aminotransferase (AST) > 150 IU/L, and pregnancy leads to a poor prognosis. Although convalescence may last up to a year, survivors usually have no lasting sequelae. The long-term effects of CCHF infection have not been studied well enough in survivors to determine whether or not specific complications exist.

Conclusion

CCHF not only forms an important public health threat but has a significant effect on the healthcare professionals also, especially in resource-poor countries. CCHF is harmful in the sense that it does not have any specific treatment till now. CCHF is a zoonotic disease, and tick vectors are widespread globally; thus, numerous animals can be hosts. In this regard, individuals associated with animals and healthcare workers that have contact with patients with CCHF are at greatest risk of CCHFV infection. The only way to avoid this widespread infection is prevention of transmission of this fatal zoonotic disease through the public awareness. In many of the developing countries, the disease poses more serious effects due to inadequate resources. Hence it is important to reinforce the control measures to prevent the transmission of the disease to new areas is necessary. Monitoring of virus circulation in zoonotic foci and education to the high-risk group members are vital; these are currently the main methods of infection control.

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