EBOLA VIRUS - AN AYURVEDIC APPROACH
Trivedi Atal Bihari¹, Mahajan Nitin², Sharma Raman³
¹Associate Prof. H.O.D; ²Asstt. Prof. P.G  P.G. Deptt of Kayachikitsa; ³P G Scholar
J.I.A.R, Jammu, India

ABSTRACT

Ebola virus (EBOV, formally designated Zaire Ebolavirus) is one of the five known viruses within the genus Ebola virus. Four of the five known Ebola viruses, including EBOV, cause a severe and often fatal and hemorrhagic fever in humans and other mammals, known as Ebola virus disease (EBD). The illness is characterized with a high temperature of about 39 °C, hematemesis, diarrhea with blood, retrosternal abdominal pain, prostration with heavy articulations, and rapid evolution death after a mean of three days. Various concepts are dealt in Ayurveda, which is applicable in different conditions. Among these concepts there are some of the concepts which are related to disease aspects as well. Few of the concepts relevant in this context are:- SankramikaRogaNidana, NidanarthakaraRoga, RaktaPitta, EkadashaRupiRajyakshama, RaktashtiviSannipataJwara, DhatugataJwara. Ebola hemorrhagic fever conceptually can be correlated to VyadhiSankara. Mode of progress of disease can be related to DhatugataJwara in Rasa-Asthi-Rakta-ShukragataJwara sequence and NidanarthakaraRoga. Considering signs and symptoms of ebolahaemorrhagic fever it can be related to acute exaggeration of EkadashiRupiRajyakshama, RaktaPitta different types and RaktashtiviSannipataJwara. Concept mentioned in Ayurveda- if a disease is caused due to strong or may etiological factors and the signs and symptoms are fully and severely manifested then it will lead to loss of consciousness, orientation and kill the patient can be related to severity, fatality of Ebola Hemorrhagic Fever.

Keywords:Ebola, Sankramana, Nidanarthakara, Ayurveda.

INTRODUCTION

Ebola, previously known as Ebola Hemorrhagic Fever, is a rare and deadly disease caused by infection with one of the Ebola virus species. Ebola can cause disease in humans and non-human primates (monkeys, gorillas and chimpanzees). Ebola is a rare disease caused by infection with a virus of the family Filoviridae, genus Ebola virus. There are five identified Ebola virus species. Four of the five have caused disease in humans:- Ebola virus (Zaire ebolavirus); Sudan virus (sudanebolavirus); Tai Forest Virus (Tai Forest ebolavirus, formerly cote d’Ivoire ebolavirus); and Bundibugyo virus (Bundibugyoebolavirus). The fifth Reston virus (Reston ebolavirus), has caused disease in non human primates but not in humans¹.

Ebola viruses are found in several African countries. Ebola was first discovered in 1976 near Ebola River in what is now the Democratic Republic of the Congo. Since, then outbreaks have appeared sporadically in Africa.

The natural reservoir host of Ebola viruses remains unknown. However, on the basis of evidence and the nature of similar viruses, researchers believe that the virus is animal born and that bats are the most likely reservoir. Four of the five subtypes occur in an animal host native to Africa. A Similar host, most likely in the Philip-
pines, is probably associated with the Ebola- Reston subtype, which was isolated from cynomologous monkeys that were imported to the United States and Italy from the Philippines. The virus is not known to be native to the other continents, such as North America².

Mode of Transmission of Ebola Hemorrhagic Fever:
It is thought that fruit bats of the Pteropodidae family are natural Ebola virus host. Ebola is introduced into the human population through close contact with the blood, secretion, organs, or other body fluids of infected animals such as chimpanzees, gorillas, fruit bats, forest antelope and porcupines found ill or dead or in the rain forest. Ebola then spreads through human to human transmission via direct contact with the blood secretions, organs or other bodily fluids of infected people, and with surfaces and materials contaminated with these fluids. Semen is infectious in survivors for up to 50 days. Transmission through oral exposure and through conjunctiva exposure is likely. Ebola virus incubates in infected humans for 2-21 days, with the majority of patients becoming symptomatic after 8-9 days. Once infected, patients can experience severe symptoms within 1-2 days³.

Early signs and symptoms of Ebola Hemorrhagic Fever:-
The onset of illness is abrupt and is characterized by fever, headache, joint and muscle aches, sore throat, difficulty in breathing, swallowing, hiccups and weakness, followed by diarrhea, vomiting and abdominal pain⁴.

Second stage signs and symptoms of Ebola Hemorrhagic Fever:-
More severe symptoms, such as coagulopathy with thrombocytopenia can develop in as soon as 24-48 hrs, leading to bleeding from the nasal or oral cavities, along with hemorrhagic skin blisters. Bleeding into the skin may create petechiae, purpura, ecchymosis, and hematoma (especially around needle injection sites). Heavy bleeding is rare and usually confined to gastrointestinal tract⁵.

Late stage of Ebola Hemorrhagic Fever:
The development of renal failure, leading to multisystem organ failure along with disseminated intravascular coagulation, can then rapidly insure over 3-5 days, along with significant volume loss. Patient who develop a fulminant course often die within 8-9 days. Those who survive beyond two weeks have a better prognosis for survival⁶.

Ayurvedic Concept:- Ayurveda is considered as the Science of Life. In the history of ayurveda it is mentioned that Punarvasu Atreya taught the knowledge of Ayurveda to his six disciples. Among them Agnivesha composed a treatise known as Agnivesha Tantra which is later recomposed by Charaka and popularly known as Charaka Samhita. It is being told that whatever is there in this Samhita is everywhere and at the same time what is not found elsewhere⁷.

The knowledge of other tantras is a mere waste if he has not studied Sushruta Samhita, at the same time who has not gone through Charaka samhita can not be a successful vaidya (physician). It refers that to become a uttama vaidya one should be well versed in all disciplines of Ayurveda. Few of the concepts relevant in this context are mentioned below:-

Many diseases may have one common manifestation; like Jwara is the common manifestation seen in many diseases. Many diseases have many manifestations; like other features than Jwara in this example. One disease may have one manifestation like in JwaraShareeraManaTapa might be the only manifestation. One dis-
ease may have many manifestations like other linga and upadrava in case of jwara. This concept of Ayurveda is considered as VyadhiSankara. The same concept can be applied in case of etiological factor. Many etiological factors can cause one disease or may cause many diseases. This concept of Ayurveda is considered as HetuSankara.

Sexual intercourse, close body contact via breath, via various body secretions, by using clothing, utilization of sitting, sleeping place of diseased person all these are the etiological factors for the SankramikaRogagalikekustha, Jwara, Sosha, Netrabhishyanda. The concept of janapadodwansa also should be considered by Vayu, Jala, Desha, kala factors.

The concept of NidanarthakaraRoga is a unique concept of Ayurveda. For example, Jwara will lead to the disease RaktaPitta, RaktaPitta may lead to Jwara and it may lead to Sosha and finally death.

In RasagataJwara features like Pyrexia, Myalgia, Excessive yawning may be present. In AsthidhatugataJwara there will be bodypain, restlessness, breathing difficulty. In RaktaDhatugataJwara features like petechiae, excessive thirst, hemoptysis, burning sensation, discoloration, impaired orientation, and consciousness, etc are seen. RaktaPitta is a disease in which blood will be coming from external orifices. In case of UrdhwaRaktaPitta blood comes out from mouth, eyes, etc. In AdhogaRaktaPitta blood comes out through Guda, Mutramarga. In Tiryagata RaktaPitta blood tends to come out of romakuPa.

The features of EkadashiRupaRajvakshama are- Heaviness in head, sore throat, cough, breathing difficulty, diarrhea, back pain, myalgia, tastelessness, sputum, hemoptysis.

In RaktaStiviSannipataJwara features like blood coming out of mouth, fever, vomiting, excessive thirst, confusion, pain, diarrhea, hiccups, distension of abdomen, giddiness, burning sensation in eyes, breathing difficulty, unconsciousness, blackish-red discoloration of tongue with petechiae.

If a disease is caused due to strong or many etiological factors and the signs and symptoms are fully and severely manifested then it will lead to loss of consciousness, orientation and kill the patient.

If the DoshikaJwara is being manifested with all its features are mentioned then it will kill the individual in seven, ten and twelve days in case of vataja, pitta and kaphajaJwara respectively and major features observed will be inappropriate talking, giddiness, breathing difficulty respectively.

**Materials And Methods:**

The Ebola Hemorrhagic fever was studied from modern Medical Textbooks and from Internet sources. Later the BruhTrayi and other classical Textbooks of Ayurveda were scrutinized regarding the references for various disease conditions and various concepts regarding disease. Later, supportive correlation was done between Ayurvedic and Modern views to build valid and reliable hypothesis regarding the concepts of Ayurveda in relation to Ebola Hemorrhagic Fever.

**DISCUSSION**

Agni in Sanskrit means fire. In Ayurveda, Agni is the digestive and metabolic “fire” produced by the doshas that grasps the essence of nourishment from food, feelings and thoughts and transforms it into a form your body can use. Agni helps various tissues of the body produced secretions, metabolic reactions, and other processes needed to create energy and maintain and repair the body. Agni is also part of the immune system since its
heat destroys harmful organisms and toxins. The activity of Agni varies throughout the day and maintaining the strength and natural ebb and flow of your digestive fires is needed for good digestion, good immune function, and resistance to disease. Agni is needed to form ojas.

Unlike bacteria, viruses invade healthy living cells in order to reproduce making them difficult to destroy without negative side effects there are no medicines that safely kill viruses but many drugs suppress symptoms by inhibiting viral reproduction. The body’s own immune system offers the best course of treatment. ayurvedic drugs bolsters the body’s defenses at the cellular level, stimulating the immune system. Alkaloids present in these drugs stimulate white blood cell activity and increase the number of T-helper cells these cells coordinate the immune response, resulting in the production of antibodies and ridding the body of the infectious agent. Following are the drugs that are having anti-viral, haemostatic, anti-oxidant, anti-parasitic, anti-viral, anti-inflammatory, anti-pyretic, etc. properties which may be beneficial for the patients:

1. Bhumyamlaki (Phyllanthus niruri):- It mainly contains lignans, (eg., phyllanthine, hypophyllanthin, astragalin) alkaloids, and bioflavonoids(eg., quercetin). It is having anti-bacterial, anti-viral, anti-inflammatory, anti-hepatotoxic, choleretic, anti-oxidant properties. It disrupt hepatitis virus polymerase activity, mRNA transcription and replication supports its role as antiviral agent.

2. Nimba (Azadirachta indica):- It contains protomelicains, limonoids, nimbin, Salalin, azadirachtin, nimbidin. It is anti-inflammatory, antipyretic, antibacterial, antiviral, anti-malarial, antifungal immunomodulatory properties.

3. Chirayata (Swertia chirayita):- It contains amarogentin, amaroserin beta-sitosterol-3beta-D-glucoside, swertiamarin, terpenoids, 1-hydroxy-3,7,8-trimethoxyxanthone. It is anti-bacterial, anti-inflammatory, anti-oxidant, anti-parasitic, anti-viral, hepatoprotective, bile flow stimulant.

4. Tulsi (Ocimum sanctum):- It contains tannins, flavonoids, and an essential oil. Traces of zinc, magnesium and sodium have been found with vitamin A and C. It contains eugenol, methyl eugenol, alpha and beta caryophyllene, carvacrol, ursolic acid. Anti-inflammatotary, anti-bacterial, anti-fungal, anti-viral, anti-allergic, anti-oxidant, anti-ulcer, anti-cancer, cardioprotective, immunomodulator properties.

5. Haridra (Curcuma longa):- It contains curcumin, demethoxycurcumin, bisdemethoxycurcumin, turmerone, atlantone, zingiberene. It blocks haemagglutinating activity of HIV virus particles and reduces influenza a virus’s replication. It also affects an early stage of virus infection. It is having anti-bacterial, anti-viral, anti-fungal, and anti-inflammatory, hepatoprotective properties.

6. Katuki (Picrorhiza kurroa):- It contains 2 bitter glycosides, picrorhizin and kutkin; d-manitol, vanillic acid, apocynin, 4-0xy-methoxy-acetooyhenone kukiol acetate, cathartic acid, 2 glycosides. It is anti-inflammatory anti-viral, antioxidant, antispasmodic immunomodulator, hepatoprotective and hepatoregenerative properties.

7. Kalmegh (Andrographis paniculata):- It contains andrographolide, 14-deoxy-11-oxoandrographolide, 14-deoxy-11-dehydroandrographolide, andrographine, neoandrographolide, panicoline, paniculide-A, paniculide-B, paniculide-C. It is anti-viral, anti-inflammatory, anti-pyretic,

www.iamj.in  IAMJ: Volume 3; Issue 4; April-2015
immunostimulant, hepatoprotective, anti-bacterial, anti-cancer properties. It is used as immuno stimulant in upper respiratory tract infections, HIV infection.

8. Nagarmotha (Cyperus scariosus):- It contains cyperine, pinene, cyperol, cypereone and iso cyperol and susquepenes like rotundene, cyperotundene, kubusone, sequeonal and b-selinene. It is anti-inflammatory, anti-bacterial,anti viral ,hepatoprotective ,anti ulcer,anti diarrhoeal

9. Pitpapada (Fumaria indica):-It contains protopine alkaloids namely rutin and protopine,flavonoids,glycosides,tannins,saponins,steroids and triterpenoids. It is an anthelminthic,antidyspectic,antiperiodic,diuretic chologogue,sedative,and diaphoretic,blood purifier and haematostatic.

10. Ashwagandha (Withania somnifera):-It contains alkaloids and steroidal lactones namely tropine,cuscohygrine,withafarin A. It is anti-inflammatory, immunomodulator,anti-bacterial,increases W.B.C’s count.

11. Amalaki (Emblica officinalis):-It contains gallic acid,ellagic acid ,chebulinic acid,citric acid,emblicanin A,amblicanin B,quercetin,glutamic acid ,proline, aspartic acid, vitamin C. It is anti-viral, anti-inflammatory, anti-pyretic, immunostimulant, hepatoprotective, anti-bacterial properties, anti oxidant, nephroprotective, diuretic , laxative, cardio protective hypolipidemic.

12. Guduchi (Tinospora cordifolia):-It contains berberine columbin,palmarin,tinosporon,tinosporic acid,tinosporol. It is anti oxidant,anti inflammatory , diuretic, immuno modulator, analgesic , anti pyretic, anti bacterial, anti cancer, antidiabetic, antitoxic ,anti HIV-properties.

13. Punarnava (Boerhavia diffusa):-It contains punarnavoside, lunamarine ,beta sitosterol,alpha - 2-sitosterol,palmic acid,archid acid,ursolic acid,punarnavosie,boeravinone A,B,C,D,E and F.repenone ,repenol. It is anti inflammatory, hepato protective, nephro protective , cardio protective, expectorant, emetic , laxative and anti oxidant , anthelmintic.

14. Bilva (Aegle marmelos):-It contain marmelosin,marmele,marmesin,marmesinin,tannic acid,umbelliferone,isoimoeratorin,isopimpell in. It is anti-viral, anti-inflammatory,antioxidant hepatoprotective, anti-bacterial , antidiarrhoeal , antidiabetic.

15. Rakta chandan (Pterocarpus santalinus):- It contains santalol and sandal oil. It is haemostatic,antipyretic,cardioprotective,anti tussive,mucolytic,anthelmintic anti inflammatory,anti bacterial,diuretic.


17. Chitraka (Plumbago zeylanica):-It contains chitranone, plumbagin, 3-chloroplumbagin, drosorone, elliptinone, zeylanone, zeylinone, plumbagic acid, B-sitosterol. It is anti-inflammatory, anti-viral, anti-bacterial, anti-fungal, anti-diarrheal, hepatoprotective, anti-oxidant, cardioprotective and neuroprotective properties.
18. Vasa (Adhatoda vasica):- It contains vasicine, 2-hydroxy-glucosyloxychalcone, vasicol, vasicinol, vasicinone, lignoceric, linoleic acid, and oleic acids. It is a bronchial antiseptic, bronchodilator, and expectorant, anti spasmodic, anthelmintic, anti-histaminic, increase platelet count in blood, antidiarrhoeal, sedative and anti-inflammatory. It provides significant protection against histamine induced bronchospasm. It also reduces the elasticity and viscosity of tracheal mucus.17,18,19

19. Dalchini (Cinnamomum zeylanicum):- It contains cinnamonaldehyde, benzaldehyde, methyl amyl ketone, phellandrene, pinene, cymene, carophyllene. It is antiviral, anti-oxidant, anti-inflammatory, anti-tubercular, bronchodialator, mucolytic, expectorant, anti spasmodic, anti-bacterial, anti-pyretic.17,18,19

20. Ela (Elettaria cardamomum):- It contains mainly essential oil having alpha-terpineol 45%, myrcene 27%, limonene 8%, menthone 6%, beta-phellandrene 3%, 1,8-cineol 2%, heptanes 2%, borneol, camphene, ascaridole, sitosterol. It is antiviral, anti-inflammatory, anti-bacterial, anti-pyretic, diuretic, bronchodilator, expotarant, cardiotonic, analgesic, anti-ulser.17,18,19

21. Mulethi (Glycyrrhiza glabra):- It contains glycyrrhizin, anethole, glabrene, glabridin, glycyrrhizic acid, glycyrrhizinate, liquiritin, isoliquiritin, chalcones. It is antiviral, anti-inflammotory, anti-cancer, hepatoprotective, cardioprotective, anti-ulser, expotarant, mucolytic.17,18,19

22. Sugandabala (Pavonia adoreta):- It contains beta-sitosterol, palmitic, stearic, linoleic, alfa-pinene acid, pavonene. It is anti-bacterial, anti-protozoal, anti-spasmodic, diuretic, astringent, diaphoretic, carminative, anthelmintic, anti-pyretic.17,18,19

CONCLUSION
Raktashthivi sannipat jwara can be resembled with Ebola hemmoragic fever, as the signs and symptoms seen in both the conditions are same. Ayurvedic medicine against measure disease is a bio friendly alternative. Its compounds are well known for safe and have least side effects the present study was reviewed to find out the better alternative medicine for the EHF. Efforts are under way to develop a vaccine; however none yet exists. Medicinal plants having rasayana property, immune modulatory activity, and anti-viral activity may prevent the adverse effect of the disease. However, these medicinal plants need further research to find out the specific compound for treating this kind of viral disease because it has high potential activity than chemical based compounds.

REFERENCE
5. Centers for Disease Control. Management of Patients with suspected Viral Haemorragical Fever. Morbidity and
Mortality weekly report.1998;37(Suppl 3):1-16

6. Dal- 
gard,D.,Jy.Baumgardner,C.W.Armstro 
gng,S.R.Jenkins,C.D.Wooland,G.B.Mill 
er,Jr.,P.B.Jahrling,T.G.Ksiazek,E.D.Jo 
hnson,and C.J.Peters. Ebola virus infec-

7. Dal-
gard,D.W.,R.J.Hardy,S.l.Pearson,G.J.P 
ucak,R.V.Quander,P.M.Jack,C.J.Peters 
And P.B.Jahrling .Combined Simian 
Haemorrhagic Fever and Ebola virus in-
fec tion in Cynomolgus Mon-
keys. Lab.Anim.Sci. 1992; Apr: 
42(2):152-157.

8. Leela k. VaidyakeeyaSubhashita sa-
hitya.3rd edition.Mysore(India):Vidyut 
Prakashana ;2004. p.5

9. Leela k. VaidyakeeyaSubhashita sa-
hitya.3rd edition.Mysore(India):Vidyut 
Prakashana ;2004. p.6

10. Acharya JT.Charak samhita with 
Ayurveda Dipika Commentary of 
Chakrapani Dutta. Reprint ed. Varana-
si (India):Chaukhambha Oreint-
alia;2007. p.228

11. Acharya JT. Shusruta Samhita with 
Nibandha sangraha Commentary of 
Dalhana. Reprint ed. Varanasi (India): 
Chaukambha sanskrita Sansthan; 
2009. p.364

12. Acharya JT.Charak samhita with 
Ayurveda Dipika Commentary of 
Chakrapani Dutta. Reprint ed. Varana-
si (India):Chaukhambha Oreint-
alia;2007. p.405

13. 13 Acharya JT.Charak samhita with 
Ayurveda Dipika Commentary of 
Chakrapani Dutta . Reprint ed. Varana-
si (India):Chaukhambha Oreint-
alia;2007. p.429

14. Acharya JT.Charak samhita with 
Ayurveda Dipika Commentary of 
Chakrapani Dutta . Reprint ed. Varana-
si (India):Chaukhambha Oreint-
alia;2007. p.222

P.102

16. Acharya JT.Charak samhita with 
Ayurveda Dipika Commentary of 
Chakrapani Dutta . Reprint ed. Varana-
si (India):Chaukhambha Oreint-
alia;2007. p.403

17. http://www.motherherbs.com

CORRESPONDING AUTHOR
Dr. Sharma Raman
P.G. Scholar, JIAR, Jammu, India
Email: ramansharmars1995@gmail.com

Source of support: Nil
Conflict of interest: None Declared