



OUTBREAK OF VIRAL HEPATITIS IN MOUNTAINOUS TERRAIN

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ABSTRACT

Introduction The study comprises of over 3000 cases of faeco orally transmitted Viral hepatitis in a small town in a hilly state which occurred from May 2009 to Jul 2009. **Materials and Methods** The study design used was a cross section descriptive study. Personal liaison was made with all possible agencies; and reliable data was obtained. The record of bacteriological examination of water for coliforms was reviewed. Blue print of water supply and sewage was also studied in detail, besides door to door survey in several areas of the town. **Results** During the period Jun to Oct 2009 approximately 3600 cases of Viral Hepatitis occurred in the town. Population of the town was approximately 60000. This gives an approximate incidence of 60 per 1000 or 6%. Bacteriological reports of water samples taken from several small mountain streams and rivulets were unsatisfactory. Only about 5% to 10% of the town population had access to sanitary latrine and septic tank method of sewage disposal. **Discussion** Previous research has revealed an attack rate of Viral Hepatitis E between 1.9% to 17%. 1,15 In the present study, we observed an attack rate of 6%. **Recommendations** We strongly recommend that health education of all be carried out on prevention and control of water borne diseases. **Conclusion:** The workers depict how despite safe drinking water being supplied by the Jal Sansthan, a massive outbreak of Viral Hepatitis occurred, primarily due to lack of awareness among the local population.

KEYWORDS : Viral Hepatitis , Outbreak, Mountainous terrain

Introduction

In 1983, Balayan et al reported the first direct evidence for the existence of additional waterborne hepatitis agent. 1 Half of all outbreaks of acute liver disease in endemic areas are on account of HEV infection. 2 – 12

Hepatitis E has a major global impact. It is estimated that one-third of the world population has been exposed to the agent. 2.2 million cases of hepatitis E occur in India alone as per estimates. Besides, 20 million cases of incident HEV infections were estimated to occur in nine endemic zones causing an estimated 3.4 million cases, 70 000 deaths and 3000 stillbirths in 2005. 7,13,14

We present here faeco orally transmitted Viral Hepatitis in a small town in a hilly state of India. The study comprises of over 3000 cases of viral hepatitis which occurred from May 2009 to Jul 2009. Methods of detailed epidemiological investigation of the outbreak and relevant findings are discussed in the study. Our objective is to describe clinico epidemiological aspects of this outbreak in the mountains.

Background

(a) Geographical Location

The study area is a beautiful valley located at an altitude of approximately 5000 ft. The terrain is mountainous and there are numerous small mountain streams, rivulets, nallas and ponds as natural sources of water. These sources are a direct connection between the anal canal of the people upstream with the mouth of the people downstream.

(b) Climatic Condition

Winters are severe and last from November to February. In the earlier days weather was pleasant for the remaining months of the year. However, with global warming, day time temperature touches a maximum of approximately 33 C in the pre monsoon months of April to June. Mean maximum and minimum temp and Relative Humidity of the town during the months of Apr, May and Jun 2009 is given in Table 1.

Table 1: Mean Maximum and Minimum temp and Relative Humidity of the town during the months of Apr, May and Jun 2009

S No:	Month	Mean Maximum temperature (C)	Mean Minimum Temperature (C)	Mean Relative Humidity (%)
1	Apr 2009	23.8	11.4	76.8
2	May 2009	24.6	11.0	83.03
3	Jun 2009	31.9	15.06	71.16

(C) Demographic status

Details of demographic status of the local population of the town are not known. However, the local population are basically hill tribes and they have cultural practice/tradition of drinking water only from natural streams, rivulets, nallas and ponds even when safe drinking water is supplied by the civic administration.

(d) The following health services are available in the town:

(i) 120 bedded Government Hospital having one specialist each of basic specialities viz, Medicine, Surgery, Gynaecology Anaesthesiology, Radiology and Pathology in addition to a Chief Medical Superintendent.

(ii) Number of private practitioners, including General practitioners, Specialists, Private Nursing Homes, Private Hospitals; and practitioners of various other systems of medicine such as Ayurveda and Homeopathy as well as quacks.

(iii) Jal Sansthan, which is responsible for supplying water to the urban areas and peripheries of the district.

(iv) Chief Medical Officer who is responsible for maintaining

and compiling all data related to morbidity due to communicable diseases and forwarding it to the State Capital.

(v) Daily check of free chlorine both at source and at consumer end is carried out and record thereof is being maintained by staff of Jal Sansthan. Samples for physical, chemical and bacteriological examination of water are collected by the staff from Head Office once every month during their routine visit.

(e) In the month of May 2009 there was a massive power failure in the entire state for nearly fifteen days, from 10 May 2009 to about 25 May 2009. It was enquired from Jal Sansthan; and it was intimated that they were getting electricity from the State Electricity Board and were able to provide adequate quantity of safe drinking water to the dependent population during this period.

Materials and Methods

The study design used was a cross section descriptive study. The study was carried out from May 2009 to Jul 2009 in a small town in a hilly state of India. We obtained detailed information about each case, viz, date of onset of symptoms, date of admission, movement history during the incubation period, personal hygiene and other relevant data. The workers also carried out active case finding by surveys during the period of the outbreak.

Personal liaison was made with Chief Medical Superintendent, Government Hospital, several reputed private practitioners of the town, Deputy CMO of the district, Engineer of the Jal Sansthan and Medical officers of the military and paramilitary agencies in the near vicinity. Reliable data was obtained by detailed discussion. All the agencies confirmed occurrence of epidemics of Viral Hepatitis every year, with a substantial rise in incidence this year. However, exact data for the previous years was not available due to exigencies of the present outbreak.

Epidemiological Investigation

A detailed sanitary survey to detect the likely sources of water contamination and to assess the sewage disposal methods was carried out. The record of bacteriological examination of water for coliforms was also reviewed. Blue print of water supply and sewage was also obtained from the concerned department and studied in detail, besides thorough survey of the area on ground, including door to door survey in several areas of the town.

Prospective surveillance was carried out on a daily basis as fresh cases were still being reported. The same continued till such time the epidemic was controlled and fresh cases stopped occurring.

Results

Details of the data obtained from above sources is discussed in the subsequent paragraphs. During the period Jun to Oct 2009 approximately 120 cases of Viral Hepatitis were admitted in the Government Hospital. Besides out of a total OPD workload of 400 to 600 cases per day approximately 10% i.e., 40 to 60 cases were of Viral Hepatitis which were being treated on OPD basis during the months of Jun and Jul 2009. This works out to a total of approximately 2000 cases in the months of Jun and Jul 2009, attended to in the Government Hospital. Population of the town is was approximately 60000.

Each private practitioner was seeing about five to six fresh cases of Viral Hepatitis every day. Thus about twenty to thirty fresh cases of Viral Hepatitis were being seen by the private practitioners every day. This works out to a total of approximately 1000 cases in the months of Jun and Jul 2009,

attended to by various private practitioners of Pithoragarh. Thus a total of 60 to 80 fresh cases were being reported every day from the town including cases reporting to the Government hospital and those seen by private practitioners. This gives a total of at least 3000 cases in the months of Jun and Jul 2009.

Subsequent to Jul 2009 approximately 600 cases of Viral Hepatitis were reported from the Government Hospital; and from various private practitioners of the town, including both indoor and outdoor cases. Thus, total approximately 3600 cases of Viral Hepatitis had occurred in the town out of a population of approximately 60000. This gives an approximate incidence of 60 per 1000 or 6%.

Epidemiological findings :

The present outbreak of Viral Hepatitis was surprisingly not preceded by unusual rise in incidence of Diarrhoea/Dysentery/Typhoid/Cholera amongst the study population as ascertained from discussion with various civil/private agencies; and also on cross checking from their records.

Within a short span of about five months from May to October 2009, approximately 3600 cases of viral hepatitis were reported from the town having a population of about 60000. This works out to an incidence of 60 per 1000. The incidence in the military population was much lower at 19 per 100, while in the paramilitary population it was 251 per 1000. In the military and paramilitary establishments also, daily check of free chlorine both at source and at consumer end was being carried out and record thereof was being maintained. Samples for bacteriological examination of water were also collected regularly and all reports during the period prior to the onset of the outbreak were satisfactory. The military and paramilitary establishments have adequate sanitary facilities for their troops. However, most of the troops are local; and they also follow the practice of from natural streams, rivulets, nallas and ponds even when safe drinking water is supplied by the civic administration. This led to the high incidence of Viral hepatitis in the military and paramilitary establishments also. The average incidence of Viral Hepatitis in the military and paramilitary establishments for the years 2006 to 2008 was 1.86 per 1000 and 2.3 per 1000 respectively.

No obvious crossing of water supply and sewage pipeline or leaking water or sewage pipeline was observed despite detailed epidemiological investigation by the team. Record of daily check of free chlorine both at source and at consumer end which was maintained by staff of Jal Sansthan was also found to be satisfactory. Bacteriological examination reports of water samples collected from source and consumer end prior to the period of the outbreak were also satisfactory. Further detailed epidemiological investigation revealed that source of infection was water from various natural sources such as small mountain streams and rivulets, as bacteriological reports of water samples taken from several of these sources was unsatisfactory.

Besides, the local population are basically hill tribes and they have cultural practice/tradition of drinking water only from natural streams, rivulets, nallas and ponds even when safe drinking water is supplied by the civic administration. This was confirmed and verified by door to door visit in several areas of the town.

Out of the total urban population approximately 60000 of the town only about 5% to 10% i.e., 3000 to 6000 had access to sanitary latrine and septic tank method of sewage disposal. Rest of the population engages in open air defaecation. In the month of May 2009 there was heavy rain for about 15 days. Due to the heavy rain the faecal matter of the local population

was washed down into the numerous streams, nullas, rivulets and ponds.

Out of approximately 3600 cases, the workers could obtain data pertaining to serological confirmation in respect of around 500 cases which were due to Viral hepatitis E. Since epidemics of Viral hepatitis E are more common in the present times, the workers presume that this outbreak also was due to viral hepatitis E, since it was humanly impossible to confirm every case to be due to Viral Hepatitis A or E.

Discussion

Viral hepatitis E is known to occur sporadically in developed countries; and is generally traced to travel to an endemic area. In the United states, less than a dozen cases in the United States have been found which do not have an association with travel to endemic areas. 15,16,17

Kao Q et al reported a total of 3490 cases of hepatitis E in Hangzhou from 2004 to 2011, and 3 deaths. The average annual incidence rate was 5.79/100000.18

Outbreaks of Viral Hepatitis E are commonly due to massive contamination of water supply systems. The disease commonly affects young adults in the age group of 15-40 years.15 Viral Hepatitis E outbreaks are usually short lasting and unimodal. Previous research has revealed an attack rate of Viral Hepatitis E between 1.9% to 17%. 1,15 In the present study, we observed an attack rate of 6%.

Indonesia, Myanmar, Vietnam, Japan, China Bangladesh, Pakistan, Nepal, Iraq, Uzbekistan; and India are the twelve countries which have reported Viral hepatitis E outbreaks in the past. 16

Singh PMP et al reported an outbreak of 36 cases of Viral hepatitis E in a military training centre in a large metropolis; and another outbreak of 88 cases in a large metropolis.19,20

A massive outbreak occurred in New Delhi in 1955-1956 with more than 29000 suspected cases of Viral Hepatitis; and an attack rate of 2.05%. This was the first outbreak to be retrospectively identified as being due to Hepatitis E virus. An outbreak of Viral Hepatitis E was reported in Kanpur. In a short span of few months from December 1990 – April 1991, about 79 000 suspected cases were reported, giving an attack rate of 3.76%. This was the largest outbreak reported in India. 23915 suspected cases of Viral Hepatitis were reported from Nellore in South India. Within twenty years from 1075 to 1994 twenty one outbreaks due to Viral hepatitis were reported in India from 1975 to 1994. Out of these twenty one outbreaks, 13 (62%) reported more than a thousand suspected cases. Approximately 240 suspected cases were reported from Lalkuan in Nainital District, Uttarakhand. The attack rate ranged from 0.34% to 8.61%. The only three outbreaks in India that reported attack rate of more than 10% are Saharanpur, 1992–1993 (14%); Nainital district, Uttarakhand, July 2005 ;and Baramulla district, Kashmir, 2007–2008 (21.6%).21

Limitations

The limitation of this study was that out of approximately 3600 cases of Viral hepatitis E in the present outbreak, data pertaining to serological confirmation could be obtained in respect of about 500 cases.

Since, it was a massive outbreak; and samples of water taken for bacteriological examination from several small mountain streams and rivulets were reported to be unsatisfactory, it was not feasible to pinpoint the index case.

Recommendations

We strongly recommend that health education of all be

carried out on prevention and control of water borne diseases in general, with particular emphasis on Viral hepatitis. The public should be encouraged to consume safe drinking water supplied by Jal Sansthan, rather than from the mountain streams and rivulets, which exposed them to the risk of infection. The habit of open air defaecation should be discouraged; and adequate sanitary facilities should be provided to the public.

Maintaining surveillance for all water and food borne diseases such as, acute diarrhea, dysentery, typhoid fever, viral hepatitis and cholera etc by the medical authorities is also the need of the hour. Daily check for free chlorine at source as well as at the consumer ends must form a part of surveillance. Any absence of free chlorine should be taken as indication of faecal contamination unless proved otherwise; and should be investigated thoroughly and immediately. Bacteriological examination of water for coliform counts from source as well as from various consumer ends must also be carried out periodically.

Conclusion: The workers depict how despite safe drinking water being supplied by the Jal Sansthan, a massive outbreak of Viral Hepatitis occurred, primarily due to lack of awareness among the local population. Our study thus highlights the necessity of intensive health education campaigns by all authorities concerned in the country to prevent morbidity and mortality due to water borne diseases. This outbreak is unique in the sense that it had several sources; and it lasted for a period of a few months.

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