

AN OUTBREAK OF INFECTIOUS HEPATITIS IN A PRIVATE SCHOOL

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ABSTRACT

Between 15 October and 23 December 1975, a total of 22 cases of infectious hepatitis were reported from an upper class private school in the suburbs of Teheran. Careful examination revealed that one of the early cases had transmitted the disease to other children in the school during the last days of the incubation period.

INTRODUCTION

Infectious hepatitis is a viral disease of the gastro-intestinal tract of human which is characterized by abrupt onset of fever, malaise, anorexia, nausea, abdominal discomfort, and jaundice. The peak of transmission is during the later part of the incubation period which is about 32 days. Outbreaks of infectious hepatitis occurs mainly in Fall and Winter and chiefly among children and young adults. The causative organism is a highly resistant virus from the entrovirus group which can survive in a one part per million chloroform solutions, or 65°C for half an hour. The transmission route of this virus, which is called Virus A, is fecal-oral whereas another virus from the same family, Virus B, is transmitted parentally only and the disease it produces is called Serum Hepatitis. Virus B is more resistant and can survive at 60°C for four hours. Efforts for cultivation of these organisms have been unsuccessful so far but the viral particles have been isolated and characterized recently⁽¹⁾. Differential diagnosis for Infectious Hepatitis and Serum Hepatitis is basically on epidemiological findings. However,

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serological and biochemical tests have been developed recently for such purposes⁽²⁾. The latest available information about viral hepatitis could be summarized as:

- a) There are at least three distinct types of viruses which can cause hepatitis: these are called virus A, B and C⁽³⁾.
- b) There is no doubt that virus A and B can be transmitted to monkeys.
- c) Preliminary data has shown that it is possible to produce an effective vaccine against type B hepatitis⁽⁴⁾.

During the Fall of 1975, an outbreak of infectious hepatitis was reported from the Parthian School in the suburbs of Teheran. This bilingual, coeducational school which is located at the northern outskirts of the city, is housed in an old hotel and enrolls 550 students, 277 boys and 273 girls, from kindergarten to grade 9 and mostly from the well-to-do families in Teheran.

MATERIAL AND METHOD

Information about name, address, and telephone number for each case was collected and were contacted for details of the clinical findings. Although in a very few cases the clinical diagnosis was confirmed by Serum Glutamic Pyruvate Transaminase, or Serum Glutamic Oxalactic Transaminase tests (SGPT and SGOT), the diagnosis made by the physicians were considered final.

The water supply of the school is from a private deep well at the school proper and is automatically chlorinated before distribution in the plumbing system of the school. Samples of the water were taken from various parts of the school for bacteriological examination.

RESULTS

Altogether 22 cases of infectious hepatitis were observed during a two months period between 15 October and 23 December 1975. Since the total cases observed in the previous academic year at this school has been only six cases, the presence of an epidemic was confirmed. The time distribution of the cases by the date of onset is shown in Figure 1. The most frequent symptoms observed were, Jaundice (79%), nausea and vomiting (47%), and anorexia (11%). Eighty per cent of the cases were under 10 years of age, and two-thirds of them were boys (Table 1). The attack rate and the percentage of the cases per class is shown in Table 2. There are 104 other persons who are in close contact with and eat at the school (63 teachers, 30 drivers, janitors, cooks, etc., and 11 others who are actually living at the school

proper). Only one child from this group who is also attending the same kindergarten was affected. Bacteriological examination of water before chlorination showed heavy contamination with human fecal material, Most Probable Number MPN 33, but the chlorinated water had zero MPN. It should be noted that both students and employees were banned from drinking this water.

DISCUSSION

Infectious hepatitis has a world wide distribution and its epidemics show a seven yearly peak similar to that of measles⁽⁵⁾. Because the usual transmission route is fecal-oral, the most common vehicles are food and water. Personal contact is well documented, and the air-borne transmission is rarely possible⁽⁶⁻¹⁰⁾. The epidemic curves are usually typical of common source, point epidemics.

The epidemic curve in this outbreak is a mixture of three endemic and 19 epidemic cases. Using the minimum and maximum incubation periods for this disease which is 15 and 50 days respectively, it is possible to separate the epidemic cases. In other words, cases number 3 to 21 which are in one incubation period are exposed to a single source for a short period of time. The most probable date of exposure is 20 and 21 October which corresponds with the last days of the incubation period of case number 2, the index case. The following arguments could also be put forward:

1. The attack rate of 20.6% and the presence of 27.3% of all cases in class 2P, the same class as the index case are significantly higher than the rest of the school (Table 2).
2. The 9.2% attack rate and 36.4% of the cases in the same floor were class 2P is located is higher than the rest of the school.
3. The age distribution shows that 50% of all cases were between 7-9 years of age, and are the logical playmates of the 8-year old index case.
4. Although there is no reason to believe that the virus of infectious hepatitis could not be present in the water, considering the limited distribution of cases at the school, there is no indication of the water supply to have been the source of this epidemic. Same reasoning could be used to rule out the food as the source of this outbreak. Thus it is believed that the index case has infected other children during the last two days before the onset of the symptoms on 22 October. No information could be collected about the activities of 20 and 21 October, and thus it is impossible to find out the exact mechanism of transmission. However, personal contact, toys, or snacks could be responsible.

The sex distribution of cases is also very peculiar and no reason

could be found for it. Other studies have shown that there is no sex preference in infectious hepatitis at ages under 15 years⁽¹⁵⁾.

The total number of jaundice cases reported by the Ministry of Health and Welfare in 1975 for Teheran is only 127⁽¹¹⁾. This is an obvious case of under reporting. It has been said that even under advanced reporting systems only one fifth of the total cases are reported⁽⁵⁾. If it could be accepted that one tenth of the total cases are reported in Teheran, and if it is realized that only 5% of the cases show jaundice⁽¹²⁾, then it is possible to estimate the total number of cases around 25,000.

The outbreak presented here is significant, because it shows that this disease can very easily appear in an affluent society, and signifies the need for public education.

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Table 1
Age, sex, distribution of the 22 cases of infectious hepatitis
Parthian School Outbreak, Teheran, 1975

Age	Boys	Girls	Total	Percent.
4	1	-	1	4.5
5	1	1	2	9.1
6	1	1	2	9.1
7	2	-	2	9.1
8	2	4	6	27.3
9	3	-	3	13.6
10	2	-	2	9.1
11	1	2	3	13.6
12	-	-	-	—
13	-	-	-	—
14	-	1	1	4.5
Total	13	9	22	100.0

Table 2
Distribution, percent of total, and attack rate by class,
infectious hepatitis outbreak, Parthian School, Teheran, 1975

Class*	No. of students	No. of cases	Attack rate %	% of total	%
K.	78	2	2.56	10.53	9.1
Tr.	80	2	2.50	10.53	9.1
1S	28	1	3.57	5.26	4.5
1M	26	0	0	0	0
2L	30	1	3.33	5.26	4.5
2P	29	6	20.68	27.3	27.3
3I	28	1	3.57	5.26	4.5
3Kh	28	1	3.57	5.26	4.5
4S	29	1	3.44	5.26	4.5
4P	27	1	3.7	4.5	4.5
5R	27	2	7.4	10.53	9.1
5K	27	0	0	0	0
6R	26	2	7.69	10.53	9.1
6A	25	0	0	0	0
7D	18	1	5.56	5.26	4.5
7M	19	0	0	0	0
8	18	1	5.56	5.26	4.5
9	7	0	0	0	0
Total	550	22	4.00	100.0	

* K = Kindergarten, Tr. = Transition

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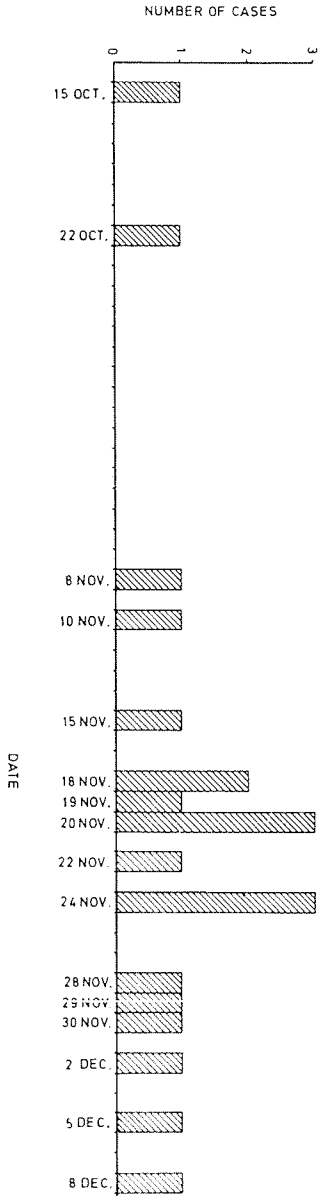


FIG. 1
DISTRIBUTION OF 22 CASES OF INFECTIOUS HEPATITIS BY DATE OF ONSET
PARTHIAN SCHOOL OUTBREAK TEHRAN 1975