Viral hepatitis in Danish children

Disappearance of an infection from its previous reservoir

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SUMMARY Two hundred and eighty-five healthy Danish children aged between 7 and 17 years were studied for hepatitis B antigen and antibodies to hepatitis A and B. A positive response to each of these infections was found in 0.7% of them. During a 5-year period 40 children were admitted to hospital with viral hepatitis, 30 of whom had hepatitis A. Eighty-three per cent of these cases of hepatitis A were secondary to adult cases, or had resulted from foreign travel. Hepatitis A is no longer endemic in Danish children, and morbidity from hepatitis B or non-A non-B is negligible.

Viral hepatitis types A and B are endemic and are mainly perpetuated through subclinical infections among children.^{1,2} Hepatitis A is found even in areas with a high standard of living where clinical cases of hepatitis are rare;^{3,4} hepatitis B infections in some countries now more often affect older children.²

A problem that remains is the occurrence of so-called non-A non-B hepatitis,⁵ the epidemiology of which is poorly understood as no serological marker is available.

In Denmark, as in most industrial countries, the notified incidence rate of viral hepatitis has steadily decreased since the second world war and is now about 20 per 100 000 population a year. At least two-thirds of such cases are in young adults.⁶ Most of these infections are acquired by drug addiction or by travelling to poor countries, leaving only a few domestic cases to be explained.

In order to find out if there was still transmission of hepatitis among children in our country, we investigated the presence of antibodies to hepatitis A and B in a series of schoolchildren, and in children in hospital with hepatitis, to study the aetiology and origin of the infection.

Material and methods

Notification rates for viral hepatitis are published annually but there are no data on aetiology.⁶

Serological investigations were performed on 285 blood samples randomly drawn from a group of healthy schoolchildren. The group consisted of 928 children (468 girls and 460 boys) chosen at random

from families taken from the register of the Copenhagen public registration office as an age-stratified test sample of persons, living in the eastern part of Copenhagen on 1 January 1976. Blood samples were taken at the schools, so that each child had been sufficiently well to attend school on the day of sampling.

The sera were tested for antibody to hepatitis A (anti-HAV) and acute phase (IgM) antibody to hepatitis A (anti-HAV IgM) by an enzyme-linked immunosorbent assay described elsewhere^{7,8} and studied for hepatitis B surface antigen and antibody (HB_sAg and anti-HB_s) by a commercial assay kit (Hepagnost, Behring Werke).

The department of infectious diseases, which receives most patients with viral hepatitis in the greater Copenhagen area, studied all the children in hospital. The discharge card for any patient in whom a final diagnosis of acute viral hepatitis had been given between 1976 and 1980 was reviewed. Any patient younger than 16 years (of whom there were 40), was evaluated according to the results of tests for anti-HAV IgM, HB_sAg, and anti-HB_s as described elsewhere.⁷ The probable origin of infection was assessed from the history taken at admission. All patients, with the exception of one, had serum transaminase values exceeding 10 times the upper normal limit; all but 5 were jaundiced.

Results

The reported incidence of viral hepatitis in Copenhagen between 1975 and 1979 is summarised in Table 1. Altogether 42% were encountered in drug

addicts and about 20% were seen in individuals returning from foreign travel.⁶ Children aged between 1 and 14 years comprised 44 (4%) of cases.

The results of the serological survey of markers for hepatitis A and B infection are shown in Table 2. A 7-year-old girl and a 15-year-old boy had antibody to HAV, while each was negative for anti-HAV IgM. One of them had had a clinical attack of hepatitis, and the other, who had been adopted from Korea, could provide little information about earlier diseases. Two boys, aged 12 and 17 years, were positive for anti-HB_s; neither had clinical evidence of hepatitis.

A clinical survey of patients in hospital is summarised in Table 3. Thirty of the 40 children had hepatitis A infection, 6 had positive reactions for

HB_s Ag, and 4 were negative for both hepatitis A and B markers.

Among patients with hepatitis A, 47% had contracted the disease abroad and a further 47% cases were secondary to adult clinical ones; only a few cases could be attributed to child contacts and unknown sources. In contrast, in only 2 patients with hepatitis B was the exposure unknown.

Discussion

The distribution of hepatitis viral agents among children with clinically overt diseases and the preponderance of hepatitis A, were similar to those reported elsewhere.⁹ Hepatitis B as well as non-A non-B cases appeared to be of minor importance among clinical cases of hepatitis in Danish children. Widespread dissemination of hepatitis B virus was not found in the serological survey. Furthermore, the study showed that clinical cases of hepatitis A in children in Copenhagen are now rare and that most cases originate from exposure in foreign countries or from adult contact. The serological survey also confirmed that subclinical transmission of the infection had not taken place to any significant extent in children born since 1961. It may now be claimed that this infection has disappeared as an endemic agent from its former natural reservoir. Support for this assumption is obtained from a number of anti-HAV surveys in groups of adults.¹⁰ A steadily decreasing rate of immunity with decreasing age has been found since the second world war. This parallels the decline in the incidence of clinical hepatitis and suggests that immunisation has decreased in recent years.

The reason for this achievement is probably the steady improvement in housing and hygiene during the last 30 years. However, it should be borne in mind that children, now highly susceptible to this infection, may rapidly disseminate hepatitis A, if exposed, at school, and that immunoglobulin prophylaxis for high risk travellers and for patients' contacts should be reinforced.

References

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Table 1 Cases of viral hepatitis in Copenhagen notified during a 5-year (1975-79) period

Age group	Males (n = 729)		Females (n = 294)	
	Total no	Incidence	Total no	Incidence
1-6	12	(15)	10	(15)
7-14	11	(12)	11	(12)
15-44	657	(123)	253	(52)
45-64	49	(16)	20	(5)

Table 2 Presence of antibodies to hepatitis A and B in 285 healthy children in Copenhagen

Age group	Anti-HAV	HB _s Ag	Anti-HB _s
7-10 (n = 95)	1	0	0
11-14 (n = 110)	0	0	1
15-17 (n = 80)	1	0	1

Table 3 Aetiological and epidemiological findings in 40 children with viral hepatitis

Hepatitis Patients	Age range (years)		Origin of infection
	1-6	7-14	
A	14 boys } 16 girls }	14	16
			Foreign travel (n = 14) Secondary to adult imported case (n = 5) Secondary to adult domestic case (n = 6) Secondary to friend (n = 1) Part of family outbreak (n = 3) Unknown (n = 1)
B	1 boy } 5 girls }	1	5
			Contract with drug addict (n = 2) Unknown (n = 4) Factor VIII transfusion (n = 1)
Non-A non-B	3 boys } 1 girl }	3	1
			Foreign travel (n = 2) Unknown (n = 1)

- ⁵ Anonymous. Non A non B hepatitis. *Br Med J* 1978; **i**: 942-4.
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Editor's comment

It is interesting to recall that 50 years ago the high incidence of 'epidemic catarrhal jaundice' in Wensleydale in Yorkshire enabled Dr William Pickles to establish convincingly that infective hepatitis was transmitted by person-to-person contact. Moreover a majority of the 250 patients whom he studied (out of a population of 5500) were children. Twenty years ago infective hepatitis was still common in British children, but it has become rare. In North America and in northern Europe most cases now occur in adults.

It is likely that the Danish findings would apply to most European countries including the UK. Notifications of infective jaundice have fallen to about 15% of what they were 10 years ago, and the decline has been most evident in schoolchildren. The changing pattern of infective jaundice is probably attributable to improved hygiene, and the better sanitation associated with modern housing and less overcrowding. This has resulted in the great fall in the incidence of hepatitis A which is usually spread by the faecal-oral route. The incidence of hepatitis B has remained much the same but is rare in children in the UK.

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