
Outbreak of Hepatitis B Associated With Acupuncture

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In the period February to May 1980, acute hepatitis B occurred in six patients who had received acupuncture at a chiropractic clinic. Of persons attending the clinic (October 1979 to April 1980), hepatitis B occurred more frequently among those who had received acupuncture (6 of 103) than among those who had not (0 of 408; $P < .0001$). Hepatitis patients had received acupuncture during two exposure periods: November 27-28, 1979, and February 19-20, 1980. During these periods the clinic reused acupuncture needles after immersing them overnight in a 1:750 solution of benzalkonium chloride. The sequence of acupuncture sessions suggests that hepatitis B virus remained infectious on the acupuncture needles for 20 to 27 hours despite this procedure. It is recommended that only either disposable needles or reusable needles that have been physically cleaned and autoclaved after each use be used in acupuncture procedures.

Syringe-and-needle transmission of hepatitis B is well documented.¹ Few reports, however, document outbreaks of hepatitis B related to other percutaneous needle procedures such as tattooing,² ear piercing,³ and acupuncture. Outbreaks of hepatitis B associated with acupuncture have been reported previously in Europe: in West Germany⁴ three patients of one physician developed hepatitis B apparently through repetitive use of the same needles for insertion, in Great Britain⁵ 34 patients attending an acupuncture clinic developed hepati-

tis B through the use of hollow syringe needles that were not always cleaned between patients, and in Belgium⁶ a cluster of six patients developed hepatitis B through the use of needles that were inadequately sterilized. Additionally, in 1984 an outbreak of hepatitis B related to acupuncture, apparently also through the use of inadequately sterilized needles, has been investigated in Rhode Island (George P. Kent, MD, personal communication, April 1985).

BACKGROUND

In the period February to May 1980, a Florida county health unit received reports of four cases of hepatitis B among persons who had recently received acupuncture at a local chiropractic clinic. On May 30, 1980, the county health unit requested that the Florida state epidemiology office assist in an investigation.

The chiropractic clinic opened on October 10, 1978, and was staffed by two chiropractic practitioners and a receptionist. In January 1979 both

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chiropractic practitioners began offering acupuncture therapy using traditional solid metal acupuncture needles. A single acupuncture treatment session involved inserting 5 to 15 needles, which were removed 15 to 20 minutes later. Blood specimens for laboratory tests were obtained using disposable needles and syringes. Names of persons attending the clinic were listed in a roster by date of first clinic visit. Date and type of treatment were recorded in a separate chart for each person.

METHODS

Cases were identified by comparing names on the clinic roster with names of cases of hepatitis reported during the period January 1979 to June 1980 from the surrounding four counties served by the clinic, and by interviewing clinic patients with symptoms suggestive of hepatitis and reviewing their medical records. On June 5, 1980, serum specimens were obtained from these ill patients and from persons who had had acupuncture during periods when transmission of hepatitis B probably had occurred. All serum specimens were tested by the Division of Hepatitis and Viral Enteritis, Center for Infectious Diseases, Centers for Disease Control in Phoenix, Arizona. Serum specimens from the two chiropractic practitioners were tested at a private laboratory in early June 1980. All serologic testing used commercially available radioimmunoassay reagents (Abbott Laboratories, North Chicago) except for hepatitis B virus subtyping, which was done by rheophoresis. Also reviewed were all clinic charts for times of acupuncture sessions, and the clinic procedures for disinfection of acupuncture needles were examined.

A case of acute hepatitis B associated with the clinic was defined as illness in a person who had attended the clinic and who had had symptoms compatible with acute hepatitis B (anorexia plus at least four of the following symptoms: fever, excessive fatigue, dark urine, nausea, vomiting, malaise, rash, myalgia, and pruritis) and a positive serologic test for hepatitis B surface antigen (HBsAg).

RESULTS

Six clinic patients with acute hepatitis B were identified (including the four initially reported).

While symptomatic, all six hepatitis patients had serum aspartate aminotransferase (serum glutamic oxaloacetic transaminase [SGOT]) levels greater than ten times the upper limit of laboratory normal. During the convalescent phase of illness (specimens obtained June 5, 1980), each patient had antibody to HBsAg or to hepatitis B core antigen. Three hepatitis patients were hospitalized, and all recovered from their acute illness. The median age of the patients was 58 years (range 38 to 71 years). Five patients were female.

During the six months before onset, no patient had any known potential exposures to hepatitis B virus (as listed in the CDC hepatitis case report form) except acupuncture. A review of the clinic records revealed that 511 persons had attended the clinic from October 1978 through April 1980. Of these, 103 had received acupuncture, many more than once. Hepatitis B was reported more frequently among those who had had acupuncture (6 of 103) than among those who had not (0 of 408) ($P < .0001$, Fisher's exact test).

Onset of illness occurred in two clusters: three between February 14 and March 1, 1980 (cluster 1), and three between April 20 and May 23, 1980 (cluster 2). Considering the dates of acupuncture sessions for each case, the most likely exposure period for cluster 1 was November 27 to 28, 1979 (exposure period 1), and for cluster 2 was February 19 to 20, 1980 (exposure period 2) (Figure 1). Apparent incubation periods ranged from 61 to 95 days.

Table 1 gives the time sequence of acupuncture sessions for exposure period 2 (Monday, February 18, to Wednesday, February 20, 1980). Patient 3 had acupuncture only four and five days after he had become ill and presumably infectious with hepatitis B. Patient 6 had acupuncture after patient 3 only on Wednesday at 10 AM, 20 hours after patient 3's last acupuncture session (Tuesday 1:50 PM). With overnight immersion of acupuncture needles after each use, needles from patient 3's Monday session could have been used on persons having acupuncture on Tuesday (elapsed time for patient 4, 27 hours; for patient 5, 22 hours).

In addition to the six hepatitis patients, four other persons had had acupuncture at the clinic during these two exposure periods. Two persons who had had acupuncture during the first exposure period could not be located. The other two had had acupuncture during both exposure periods but remained

TABLE 1. SEQUENCE OF ACUPUNCTURE SESSIONS FOR PERSONS ATTENDING FLORIDA CHIROPRACTIC CLINIC DURING PROBABLE TIME OF HEPATITIS B TRANSMISSION (EXPOSURE PERIOD 2) FEBRUARY 1980

Time of Acupuncture	Patient (by patient number) ill with Hepatitis B	Persons Not ill with Hepatitis
February 18, Monday		
9:50 AM	6	
1:00 PM	3*	
3:00 PM	4	
February 19, Tuesday		
9:00 AM		A**
11:00 AM	5	
1:00 PM		B***
1:50 PM	3*	
4:20 PM	4	
February 20, Wednesday		
10:00 AM	6	
10:20 AM	5	

**Patient 3 at this time was ill and presumably infectious with hepatitis B*
***Person A had antibody to hepatitis B core antigen (anti-HBc) June 5, 1980*
****Person B had no markers for hepatitis B virus infection June 5, 1980*

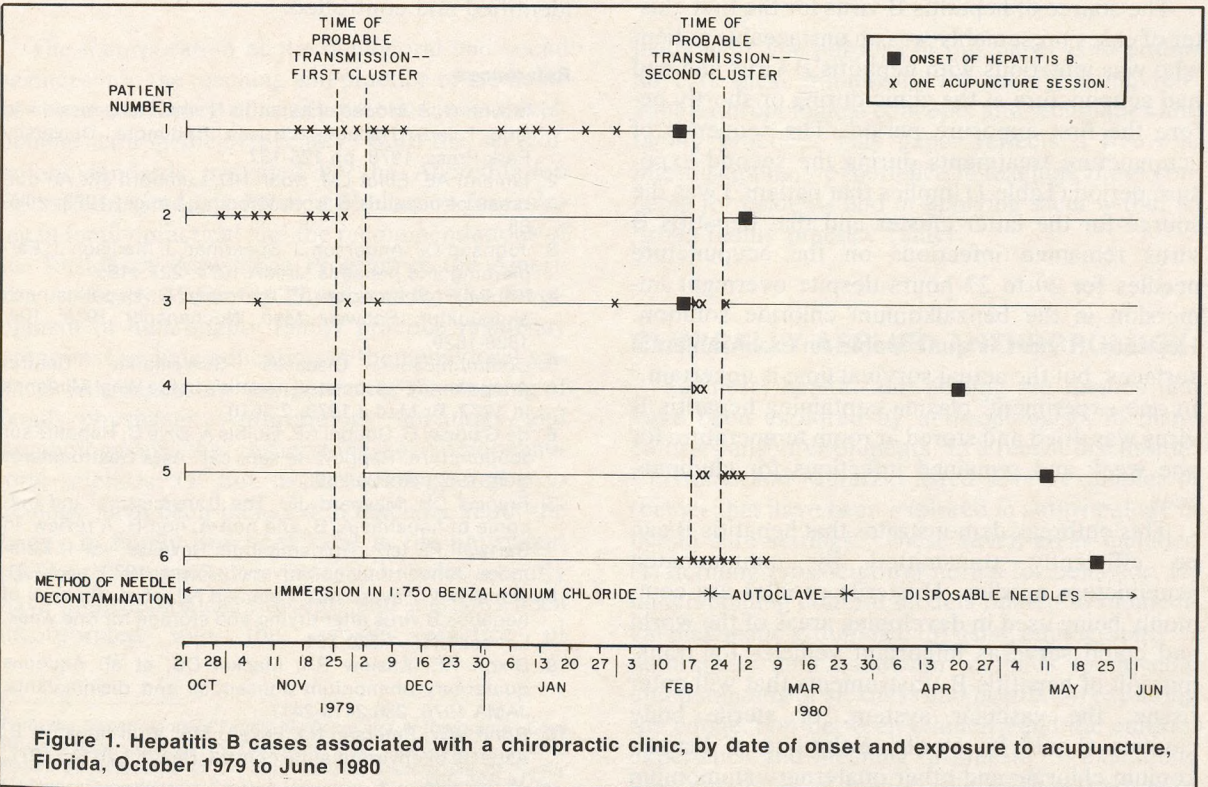


Figure 1. Hepatitis B cases associated with a chiropractic clinic, by date of onset and exposure to acupuncture, Florida, October 1979 to June 1980

asymptomatic. When serum specimens from the latter two were tested, one had no marker of hepatitis B virus infection; the second contained only antibody to hepatitis B core antigen (indicating recent hepatitis B virus infection). Serum specimens from the two chiropractic practitioners were tested only for hepatitis B surface antigen and both were negative. Hepatitis B virus subtyping was possible on specimens from patients 2 and 5, that is, one from each exposure period; both had subtype *adv*.

During the period January to February 1979 and October 1979 to February 22, 1980 (includes both exposure periods) (Figure 1), acupuncture needles were disinfected after each acupuncture session by immersing them overnight in a 1:750 solution of benzalkonium chloride. Acupuncture needles were autoclaved during all other time periods until March 28, 1980, after which disposable acupuncture needles were used. No additional cases of hepatitis B associated with acupuncture were reported to the county health unit during 1980.

DISCUSSION

The source of hepatitis B virus for the first cluster of cases presumably was an untraceable patient who was infectious with hepatitis B virus and had had acupuncture at the clinic during or shortly before the first exposure period. The sequence of acupuncture treatments during the second exposure period (Table 1) implies that patient 3 was the source for the latter cluster and that hepatitis B virus remained infectious on the acupuncture needles for 20 to 27 hours despite overnight immersion in the benzalkonium chloride solution. Hepatitis B virus is quite stable on environmental surfaces, but the actual survival time is uncertain.⁷ In one experiment⁸ plasma containing hepatitis B virus was dried and stored at room temperature for one week and remained infectious for chimpanzees.

This outbreak demonstrates that hepatitis B can be efficiently transmitted by contaminated acupuncture needles. Unsterile needles are commonly being used in developing areas of the world and could serve as important vehicles for transmission of hepatitis B. Instruments that will enter tissue, the vascular system, or sterile body cavities should be sterile. Solutions of benzalkonium chloride and other quaternary ammonium

compounds are low-level disinfectants and should never be used when the intent of a procedure is sterilization.⁹ (Sterilization refers to a process that removes or destroys all microorganisms. Disinfection refers to a process that reduces the number of or eliminates most recognized pathogens but not necessarily all pathogens or the more resistant microbe forms such as bacterial spores.)

For all types of contamination involving heat-stable equipment, the simplest and most effective method of sterilization is autoclaving (sterilization by steam under pressure) after thorough physical cleaning.¹⁰ Boiling in water for 30 minutes (after cleaning) would also sterilize but is a less satisfactory method because of the difficulty in keeping items sterile during drying, handling, and wrapping. Because of the availability of commercial equipment and standard procedures, autoclaving is superior for quality control of sterilization.

Practitioners of acupuncture should use disposable needles or reusable needles that have been physically cleaned and autoclaved after each use. Furthermore, physicians should promptly report cases of hepatitis to their local health departments so that cases can be investigated and outbreaks identified and controlled.

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