



## AN ACUPUNCTURE-ASSOCIATED OUTBREAK OF HEPATITIS B IN JERUSALEM

P.E. SLATER \*<sup>1</sup>, P. BEN-ISHAI \*\* A. LEVENTHAL \*\*, D. ZAHGER \*\*\*,  
A. BASHARY \*\*, A. MOSES \*\*\*, C. COSTIN \*, D. SHOVAL \*\*\*\*

*\* Department of Epidemiology, Israel Ministry of Health, Jerusalem*

*\*\* Jerusalem District Health Office*

*\*\*\* Department of Medicine, Hadassah University Hospital on Mount Scopus, Jerusalem*

*\*\*\*\* Liver Unit, Department of Medicine A,  
Hadassah University Hospital, Ein Kerem, Jerusalem*

**Key words:** Hepatitis B - Acupuncture - Outbreak.

Two clusters of between five and eleven cases of hepatitis B associated with acupuncture treatment by a physician occurred in Jerusalem in late 1986. The origin of the outbreak is believed to have been an Ethiopian immigrant surgical patient, a known HBsAg carrier, who infected an operating room nurse during a surgical procedure. This is the first recorded instance of transmission of HBV from an Ethiopian immigrant to the local Israeli population. We reiterate the need for the enforcement of correct sterilization techniques in all skin-piercing settings, a step which in many countries will require the licensing of a variety of occupations not presently covered by health regulations.

### THE OUTBREAK AND EPIDEMIOLOGIC INVESTIGATION

On January 3, 1987 the Jerusalem District Health Office (DHO) received a report of a case of hepatitis B in « R », a 59-year-old woman who had undergone acupuncture treatment at a physician's office on several occasions in September and October, 1986. R had first become ill on December 20, 1986. The physician-acupuncturist was contacted and informed investigators that another patient of his, « F », was reported ill with hepatitis B on December 25, 1986. This 80-year-old woman had first become ill on December 18.

A visit to the physician's office revealed an immaculate patient care area. A dry-heat late model sterilizer was noted, which was in working order and which registered 200°C on its own thermostat gauge, when tested by two of the authors (P.B. and A.B.). A review of the clinic records revealed that an average of 20-30 acupuncture patients were treated each day. The physician stated that between 3 and 12 reusable acupuncture needles were used on each patient and that a needle could be used at least 10 times before having to be discarded because of dullness.

According to the physician, needles were always taken from a « clean » tray and, after

<sup>1</sup> Corresponding author.

use, were returned to a « dirty » tray. The total number of needles available for use in the clinic was not noted, but the physician stated that he needed to sterilize needles at least one time during the course of the usual work day, in addition to sterilizing all used needles at the end of the day's work. According to the physician, needles were always sterilized for 80 minutes at 200°C.

The physician provided investigators with a listing of his acupuncture patients for the period September-October, 1986. The two patients, R and F, were found to have had three acupuncture treatment dates in common, September 10, 14 and October 8, 1986.

The DHO investigation to discover the source of the outbreak centered around the physician and the 25 acupuncture patients treated by him on at least one of these three dates. Patients were contacted by either telephone or mail and were requested to submit to blood tests at the District Health Office. The physician himself was tested and found to be negative for anti-HBc and HBsAg.

When contacted by the DHO, one acupuncture patient, « T », a 44-year old woman, reported that she had been ill at home since November 30 and had been diagnosed as having hepatitis B on January 15, 1987. This patient had had acupuncture treatment on August 6, 10 and 13 and on September 2 and 14. She was HBsAg- positive anti-HBc IgM-positive and negative for HBeAg and anti-HBe.

A local newspaper report of the outbreak in April brought forward a fourth patient, « N », a 36-year-old woman who had had acupuncture treatment at the same clinic on August 6 and 12 and September 11 and 16. She had become ill with hepatitis B on November 30. When examined in May, 1987, this woman was found to be positive for HBsAg and total anti-HBc and negative for HBeAg and anti-HBe IgM.

Patient T revealed to investigators the existence of a fifth acupuncture patient, « S », a 26-year-old woman, who had received acupuncture treatment on August 6, 7, 10, 12 and 13 and had become ill with hepatitis B in October; she had no September treatment dates. S was an operating room nurse who had been cut by a scalpel on January 20, 1986 during an operation on a 12-year-old boy, an immigrant to Israel from Ethiopia and a known carrier of HBsAg and HBeAg. The nurse had received hepatitis B immunoglobulin (HBIG), 0.06 ml/kg body weight, 24 hours after exposure and a second injection of HBIG two months later. In early October, 1986 she experienced arthralgia, myalgia, malaise and loss of

appetite, followed by the appearance of jaundice, and a blood test revealed HBsAg on October 26.

Five September patients, in addition to those already described, were found to be anti-HBc-positive, but HBsAg-negative, anti-HBc IgM-negative and HBeAg-negative. Fifteen additional patients treated only in August were examined by DHO investigators. No others were HBsAg-positive, but one was found to be anti-HBc-positive but anti-HBc IgM-negative.

Although alternative scenarios are possible, the most likely sequence of HBV transmission was that the nurse, S, towards the end of her prolonged (8.5-month) incubation period, transmitted the hepatitis B virus, via improperly sterilized acupuncture needles, to co-patient N on August 12, 1986 and to co-patient T on August 13, 1986 (the first cluster). Patient T then transmitted the virus to co-patients R and F on September 14 (the second cluster). HBsAg is demonstrable in the blood of acutely infected persons as early as eight weeks before clinical illness is apparent (5), and each apparent transmission occurred about eight weeks before the onset of symptoms in the hypothesized source case.

Some, if not all of the six persons found to have anti-HBc and no other HBV markers, may also have been involved in the outbreak, since the 18% prevalence (6/34) of anti-HBc in this group of predominantly Ashkenazic Jews was much higher than in the general Ashkenazic population of Israel (7).

Aside from nurse S, whose incubation period was markedly prolonged because of HBIG treatment, the apparent incubation periods (between exposure and first symptoms) in those patients known to have had clinical hepatitis B disease ranged from 94 to 110 days. Table 1 summarizes the laboratory findings.

DHO investigators concluded that the spread of HBV was most likely due to the use of improperly sterilized or unsterilized acupuncture needles. This impression was strengthened by anecdotal patient reports of used needles being mixed with clean needles in a single tray and taken from one patient treatment cubicle to another. The pattern of repeated lapses in sterilization technique, resulting in two known clusters of cases, led the District Health Officer (A.L.) to initiate administrative proceedings to suspend the medical license of the physician involved.

TABLE 1. — Laboratory Findings in Acupuncture-Associated Hepatitis B Patients.

Patient Sex-Age	Hypothesized Exposure	Hepatitis Symptoms	Incubation Period (Days)	Hepatitis B Markers				
				HBsAg	Anti-HBc Total	Anti-HBc IgM	Anti HBe	HBeAg
S F26	20 Jan 86	1 Oct 86	253	+	+	+	+	—
N F36	12 Aug 86	30 Nov 86	110	+	+	—	—	+
T F44	13 Aug 86	15 Nov 86	94	+	+	+	—	—
F F80	14 Sep 86	15 Dec 86	95	+	+	+	+	—
R F59	14 Sep 86	20 Dec 86	97	+	+	+	—	+

### DISCUSSION

Hepatitis B is a disease of global distribution and is associated with the development of chronic liver disease and hepatic cancer (1, 6). The hepatitis B virus has recently been characterized as « second only to tobacco as a world-wide cause of cancer » (11). While syringe-and-needle transmission is well-documented in Western societies and is a phenomenon of enormous public health concern, the number of reported outbreaks related to other skin-piercing procedures is still small. Acupuncture-related outbreaks of hepatitis B have been reported only rarely.

Thirty-six patients treated at the acupuncture clinic of a non-physician practitioner in Birmingham, England developed hepatitis B over an 8-month period in 1977 (4). In 1980, six acupuncture patients treated at a chiropractic-acupuncture clinic in Orange County, Florida developed hepatitis B over a period of four months (12, 14). Thirty-five persons were infected with hepatitis B virus as a result of acupuncture treatment in Rhode Island in 1984 (10). The current outbreak is the first in the acupuncture practice of a physician to be reported in the English language medical literature, and demonstrates that the hepatitis B virus does not respect medical qualification *per se*.

Furthermore, our report is the first suggestion of transmission of hepatitis B virus from an Ethiopian immigrant to the established Israeli population, and it is unfortunate that HBsAg titers in our series were not sufficiently high to allow us to confirm this hypothesis by HBsAg subtyping. Since 1981, some 12,000 Ethiopian Jews have immigrated to Israel, representing the migration of a total African sub-population to a Middle Eastern country. The immigrants brought with them a variety of infectious and parasitic diseases, many long since eradicated from Israel (9, 2), presenting a major challenge to the Israeli public health and medical community.

An early group of 357 male and female immigrants from Ethiopia were studied with respect to hepatitis B markers (3). Three-fourths of those tested carried one or more hepatitis B markers, and 98% of immigrants over age 40 had been infected by the time of their arrival in Israel. The HBsAg carrier rate varied with age; it was 16% in persons aged 1-30 years. Among those HBsAg-positive, 36% were HBeAg-positive. The prevalence of HBV markers in the Ethiopian immigrants to Israel is similar to their prevalence in other Ethiopian populations (8), and it appears that the new arrivals represent a major new reservoir of HB virus in Israel. In a campaign to halt the vertical transmission of the virus in this immigrant population, the Israel Ministry of Health has undertaken to test all pregnant Ethiopian women for the presence of HBsAg and to immunize infants of carrier mothers at birth.

The current outbreak should serve as an additional reminder to the public health profession of the importance of strict and scrupulous sterilization technique among all persons carrying out skin-piercing procedures of any kind, whether medical or otherwise. An excellent guide to the technique of sterilizing medical and cosmetic equipment has been published (13). One impediment to the enforcement of accepted sterilization technique in many countries, including Israel, is that practitioners of a variety of occupations which involve skin-piercing (e.g., tattooists, electrologists, jewelers who pierce ears) do not have to be licensed. The lack of licensure requirement allows these practitioners to operate without supervision and subjects clients and customers to risks of which they are not forewarned.

### Acknowledgements

We wish to thank Dr. Anne-Marie Courouce, of the Centre National de Transfusion Sanguine Institut, Paris, for her advice and assistance.

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