AN OUTBREAK OF HEPATITIS ATTRIBUTABLE TO INOCULATION WITH CONTAMINATED GAMMA GLOBULIN

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A few years ago hepatitis struck the well-to-do town of Praia Brava ("Wild Beach") in southern Brazil. This article reports the results of an ensuing epidemiologic investigation—results which showed the source of many of these hepatitis cases to have been contaminated gamma globulin administered to Praia Brava residents as a preventive measure.

Background

An epidemic hepatitis outbreak struck the residents of the small community of Praia Brava, Brazil, in 1974. The community, located near the site of a nuclear power plant being built for the company Furnas-Centrais Eléctricas, S.A., is 206 km away from the city of Rio de Janeiro and 50 km from the small city of Angra dos Reis in Rio de Janeiro State.

Praia Brava had been founded two years before, in 1972, when the first residents arrived to begin construction of the plant. At the time of the epidemic the resident population was 1,616. Most of the residents were upper- and mid-level technical staff members and their families (including some from other countries) who had been hired to help assemble the plant. All the dwellings in the community were comfortable masonry structures, some quite luxurious by local standards. Water supplied to the community was piped from nearby streams, subjected to rapid filtration under pressure, and disinfected with chlorine. The homes were connected to a sewer system, and the sewage was adequately treated. Trash was collected daily, incinerated, and buried.

Most of the food consumed at Praia Brava came from supermarkets in Angra dos Reis. Many Praia Brava residents went to nearby towns (Angra dos Reis, Barra Mansa, Resende, Parati), or even Rio de Janeiro and São Paulo, on weekends. The community had a health center (operated by the company building the plant) which provided important preventive health services as well as medical care.

The actual plant site was 4 km away from Praia Brava. Most of the laborers and some technicians working at the site—a total of 1,900 people—were housed in the immediate vicinity of the construction site and ate at restaurants in that area. The water they drank was of good quality, but it came from a different source and received separate treatment from that supplied to Praia Brava. There was a health center at the site. The people living near the site often went to the Praia Brava area, especially at the end of the working day, so that the two populations were in frequent contact. It thus seemed strange that hepatitis cases should have occurred only among the residents of Praia Brava.

Methods

Epidemiologic Classification

All hepatitis cases were subjected to exhaustive investigation. Information on all
factors pertaining to transmission of the disease was recorded on cards. This information, together with data passed along by the medical staff of the Praia Brava Health Center, provided a basis for formulating various hypotheses to offer possible explanations for the outbreak.

For purposes of the investigation, patients were only considered to have had hepatitis if they came to the local medical center with complaints suggesting hepatitis, and if they were classified in one of the following groups after clinical and laboratory examinations:

1) Patients with jaundice, choluria, and painful hepatomegaly, combined with a history of anorexia and asthenia during the week preceding onset of jaundice.

2) Patients without jaundice but with painful hepatomegaly, anorexia, and asthenia, together with a serum glutamic-pyruvic transaminase level above 100 units and a positive reaction to hepatitis B antigen.

**Epidemiologic Survey**

To help test the various theories formulated to account for the outbreak, a sample survey was conducted in Praia Brava. For each hepatitis patient included, six or seven other people (members of the patient's family or other residents of the community) were selected as controls. These controls were chosen with the assistance of a nurse and two nursing auxiliaries who knew the population well. Whenever possible, at least two people with the same occupation and in the same sex and age group as the hepatitis case were included in the sample. This procedure, adopted partly because of the small amount of time available, was designed so as to obtain control groups reasonably comparable to the hepatitis cases surveyed, especially in terms of exposure to risk factors. A form containing questions related to possible explanations of the outbreak was then completed for every person (both hepatitis patients and controls) included in the survey. In addition, blood was taken from each of these subjects for laboratory examination.

**Laboratory Examinations**

The serum glutamic-pyruvic transaminase level of each specimen was determined by the Cabaud-Wroblewski method (15) (in which 45 units is considered the highest normal level), and counterimmunoelectrophoresis (16) was used to test for hepatitis B antigens and antibodies. Specimens from the hepatitis cases were tested for direct and indirect bilirubins using the technique of Malloy and Evelyn (9). All these examinations were performed by a commercial laboratory (Laboratorios Médicos Dr. Sergio Franco Ltda.) in the city of Rio de Janeiro.

Material suspected of being a source of infection was sent by the Ministry of Health to reference laboratories of the World Health Organization, where it was tested for the presence of hepatitis B antigen (HB Ag).

**Results**

A total of 22 hepatitis cases was recorded. These are listed in Table 1 in chronological order, by date of onset of illness. Only two cases (9.1 per cent) were without jaundice. All the cases appeared to belong in the category “benign acute hepatitis” in terms of the classification recommended by Fraga Filho, De Paola, and Toledo (6). However, the examinations of the patients were basically clinical, and this could have led to some underestimation of the seriousness of the disease. Only one case—the primary case—was treated in a hospital, more as a precautionary safety measure than on account of the seriousness of the illness. Most of the patients, who ranged in age from 4 to 36 years, came from upper socioeconomic strata.
Table 1. Known hepatitis cases in Praia Brava, 1974-1975, by date of onset.a

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Patient's initials</th>
<th>Age (years)</th>
<th>Occupation</th>
<th>Jaundice</th>
<th>Date of onset</th>
<th>Glutamic-pyruvic transaminase</th>
<th>Total bilirubinemia</th>
<th>Test for HB Ag</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L.M.</td>
<td>36</td>
<td>Technician</td>
<td>Yes</td>
<td>6/26/74</td>
<td>40</td>
<td>-</td>
<td>Negative</td>
</tr>
<tr>
<td>2</td>
<td>E.B.S.</td>
<td>4</td>
<td>Child</td>
<td>Yes</td>
<td>7/8/74</td>
<td>510</td>
<td>-</td>
<td>Not tested</td>
</tr>
<tr>
<td>3</td>
<td>G.B.S.</td>
<td>6</td>
<td>Child</td>
<td>Yes</td>
<td>7/8/74</td>
<td>390</td>
<td>1.3</td>
<td>Not tested</td>
</tr>
<tr>
<td>4</td>
<td>A.P.M.</td>
<td>5</td>
<td>Child</td>
<td>Yes</td>
<td>7/25/74</td>
<td>380</td>
<td>6.0</td>
<td>Positive</td>
</tr>
<tr>
<td>5</td>
<td>M.S.P.</td>
<td>4</td>
<td>Child</td>
<td>Yes</td>
<td>7/25/74</td>
<td>-</td>
<td>-</td>
<td>Negative</td>
</tr>
<tr>
<td>6</td>
<td>N.N.</td>
<td>12</td>
<td>Student</td>
<td>Yes</td>
<td>10/17/74</td>
<td>-</td>
<td>-</td>
<td>Not tested</td>
</tr>
<tr>
<td>7</td>
<td>A.A.</td>
<td>10</td>
<td>Student</td>
<td>Yes</td>
<td>10/21/74</td>
<td>1,750</td>
<td>7.1</td>
<td>Positive</td>
</tr>
<tr>
<td>8</td>
<td>G.C.F.M.</td>
<td>18</td>
<td>Student</td>
<td>Yes</td>
<td>10/23/74</td>
<td>2,400</td>
<td>12.4</td>
<td>Positive</td>
</tr>
<tr>
<td>9</td>
<td>E.R.A.</td>
<td>5</td>
<td>Student</td>
<td>No</td>
<td>10/25/74</td>
<td>1,400</td>
<td>0.6</td>
<td>Positive</td>
</tr>
<tr>
<td>10</td>
<td>R.S.</td>
<td>32</td>
<td>Carpenter</td>
<td>Yes</td>
<td>11/2/74</td>
<td>200</td>
<td>2.7</td>
<td>Negative</td>
</tr>
<tr>
<td>11</td>
<td>O.M.G.E.W.</td>
<td>26</td>
<td>Housewife</td>
<td>Yes</td>
<td>11/8/74</td>
<td>1,800</td>
<td>5.2</td>
<td>Negative</td>
</tr>
<tr>
<td>12</td>
<td>B.N.G.A.</td>
<td>34</td>
<td>Housewife</td>
<td>Yes</td>
<td>11/18/74</td>
<td>2,100</td>
<td>3.3</td>
<td>Negative</td>
</tr>
<tr>
<td>13</td>
<td>R.M.N.</td>
<td>32</td>
<td>Domestic servant</td>
<td>Yes</td>
<td>11/18/74</td>
<td>300</td>
<td>17.0</td>
<td>Positive</td>
</tr>
<tr>
<td>14</td>
<td>A.C.S.</td>
<td>32</td>
<td>Domestic servant</td>
<td>Yes</td>
<td>11/20/74</td>
<td>145</td>
<td>7.0</td>
<td>Negative</td>
</tr>
<tr>
<td>15</td>
<td>N.A.</td>
<td>25</td>
<td>Servant</td>
<td>Yes</td>
<td>11/24/74</td>
<td>-</td>
<td>4.0</td>
<td>Negative</td>
</tr>
<tr>
<td>16</td>
<td>S.C.S.</td>
<td>32</td>
<td>Engineer</td>
<td>Yes</td>
<td>12/4/74</td>
<td>1,400</td>
<td>7.5</td>
<td>Negative</td>
</tr>
<tr>
<td>17</td>
<td>E.P.R.</td>
<td>32</td>
<td>Engineer</td>
<td>Yes</td>
<td>12/6/74</td>
<td>2,200</td>
<td>9.0</td>
<td>Negative</td>
</tr>
<tr>
<td>18</td>
<td>J.A.C.</td>
<td>34</td>
<td>Housewife</td>
<td>Yes</td>
<td>12/6/74</td>
<td>2,800</td>
<td>17.0</td>
<td>Positive</td>
</tr>
<tr>
<td>19</td>
<td>C.S.B.</td>
<td>23</td>
<td>Housewife</td>
<td>Yes</td>
<td>12/8/74</td>
<td>1,100</td>
<td>7.0</td>
<td>Negative</td>
</tr>
<tr>
<td>20</td>
<td>A.M.W.J.</td>
<td>8</td>
<td>Student</td>
<td>No</td>
<td>12/12/74b</td>
<td>160</td>
<td>-</td>
<td>Positive</td>
</tr>
<tr>
<td>21</td>
<td>W.B.</td>
<td>30</td>
<td>Clerk</td>
<td>Yes</td>
<td>1/2/75</td>
<td>125</td>
<td>-</td>
<td>Not tested</td>
</tr>
<tr>
<td>22</td>
<td>A.C.A.</td>
<td>14</td>
<td>Student</td>
<td>Yes</td>
<td>2/15/75</td>
<td>1,685</td>
<td>-</td>
<td>Not tested</td>
</tr>
</tbody>
</table>

Date of onset of choluria or of jaundice, or b the date on which a blood sample was taken.

As Table 1 shows, bilirubinemia was not detected in seven cases. This was because nearly all these patients were convalescent or completely recovered at the time of examination.

Figure 1 shows the distribution of hepatitis cases and asymptomatic HB Ag carriers according to their places of residence in Praia Brava. It will be noted that, despite some clustering, the hepatitis cases were distributed throughout the community.

At three particular residences two cases occurred. Investigation revealed, however, that only one of those three pairs of cases could have involved interpersonal transmission. In this one instance the two patients were married and there was a reasonable correlation between time of onset of the two cases and the incubation period of hepatitis. The other two pairs of patients were siblings; but since there was little time between onset of one illness and the other in each pair of cases, there was little likelihood of interpersonal transmission being involved. All three patients residing on "Praia Brava Hill" (see Figure 1) were people native to the region who slept at home but spent a large part of the day in the nearby residential community of Praia Brava. One of the three was a man who did small plumbing and carpentry jobs, and the other two were women who worked as domestic servants. All three used many of the services of the residential Praia Brava community, including preventive and other health services. No cases of hepatitis were reported among natives of the region who were not connected in some way with the
Figure 1. A map of the town of Praia Brava showing the residences of hepatitis patients and of asymptomatic subjects seropositive for HB Ag.
residential community of Praia Brava, nor was any other case discovered during visits to homes on Praia Brava Hill.

Regarding the 20 people included in the survey who were asymptomatic but positive for HB Ag, 7 (35 per cent) were associated by residence with hepatitis cases, and 8 others (40 per cent) not associated with hepatitis cases were associated by residence with someone else positive for HB Ag. Therefore, 15 (75 per cent) of all those considered to have had subclinical infections were associated with active cases or with other subclinical infections.

**Chronological Case Distribution**

Figure 2 shows the chronological distribution of the recorded hepatitis cases by week of onset. As is evident, the epidemic consisted of two distinct stages. First a small group of 5 cases occurred in June-July, and then a larger group of 17 cases began in mid-October. The time interval between the two groups of cases is suggestive of the incubation period of the disease. This case distribution led us to postulate some causal association by which the first 5 cases, or a factor associated with them, were responsible for the subsequent 17 cases.

It was also enlightening to find, from the HB Ag testing, that 6 out of 14 cases occurring in the second phase of the epidemic were positive for HB Ag. Furthermore, the 8 negative patients in this group had been ill for over two weeks before serum was collected, and so their disease had progressed to a point where there was little likelihood of detecting HB Ag. Likewise, it was not expected that HB Ag would be found in sera from the first 5 cases, even if these cases were hepatitis B, because by the time of our study these patients had recovered completely and returned to work. The apparent reason for a positive finding in one case was that the person tested was either an asymptomatic carrier or the carrier of a chronic form of the disease.

Overall, the HB Ag test results, combined with current knowledge of the disease, made it appear very likely that the second phase of the epidemic was caused by hepatitis B.

**The Source of Infection**

**Epidemiologic survey data.** Based on the data from the epidemiologic survey and the information furnished by local physicians,
it was hypothesized that the epidemic could have any of the following sources:

1) Water from a contaminated public supply system
2) Consumption of contaminated vegetables
3) Bathing at contaminated ocean beaches
4) Disease transmission during visits to nearby cities or towns
5) Inoculation with contaminated gamma globulin.

Water treatment measures had been intensified since the epidemic, and bathing at the local ocean beaches had been prohibited.

The results of the forementioned sample survey, designed to test hypotheses two through five, are shown in Table 2. As may be observed, the proportions of people engaged in ocean bathing and visits to nearby cities or towns were slightly higher in the control group, while the opposite was true regarding consumption of contaminated vegetables; nevertheless, these small differences could be fortuitous. In contrast, the very high percentage of hepatitis patients receiving gamma globulin, as compared with control group recipients, would be very hard to explain away as fortuitous. In fact, the difference remains significant even if it is considered that the three “indeterminate” hepatitis patients—who may or may not have received gamma globulin—did not in fact receive it. Accordingly, the only risk factor that the survey showed to be significantly associated with the second stage of the outbreak was inoculation with gamma globulin.

A survey such as that described cannot rule out transmission by some universally consumed substance such as public water. However, the possible role of water can be assessed in other ways. It is relevant, for example, that there was not one single case of hepatitis among the 1,900 workers and technicians who lived near the construction site but who frequently visited the residential Praia Brava community at the end of the working day. One would also expect a high proportion of children to be stricken by a waterborne hepatitis epidemic, a pattern that did not emerge in the second stage of the outbreak. Furthermore, there is still no proof to date that hepatitis B can in fact be transmitted by water.

*Attack rates.* The Praia Brava medical station kept very careful records of its

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**Table 2. Sample survey results, showing exposure of hepatitis patients and control subjects to four of the most likely sources of infection (Praia Brava, 1974-1975).**

<table>
<thead>
<tr>
<th>Groups studied</th>
<th>Inoculation with gamma globulin</th>
<th>Ocean bathing</th>
<th>Travel</th>
<th>Consumption of vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Unknown</td>
<td>Total</td>
</tr>
<tr>
<td>Hepatitis patients</td>
<td>13</td>
<td>52.9</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Control subjects</td>
<td>57</td>
<td>58.3</td>
<td>50</td>
<td>107</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>51</td>
<td>3</td>
<td>124</td>
</tr>
</tbody>
</table>

\[ap = <0.05.\]
\[bp = >0.05.\]
work. There was a roster of the people inoculated with gamma globulin, which made it possible to evaluate the risk of such inoculation. Not everyone in the community received gamma globulin, nor did inoculation depend on exposure to some particular risk. Rather, it was merely announced that the health center was “giving injections to prevent hepatitis,” whereupon people came to the center to be inoculated of their own volition. It was interesting that people with relatively high socioeconomic status—such as high-level technicians and their families—predominated among those inoculated. Hepatitis attack rates in the inoculated and uninoculated portions of the Praia Brava population are shown in Table 3. These figures only include cases occurring in the second stage of the epidemic (17 cases in all), because only these second stage cases could have been caused by the gamma globulin—which was administered during the first phase of the outbreak.

The stage-2 hepatitis patients listed include only those whose gamma globulin inoculation status was definitely known. In three cases it was uncertain whether gamma globulin had been received. However, even if it is assumed that the three people involved had not been inoculated, the difference between the attack rates in the inoculated and uninoculated populations would still be highly significant ($t = 3.91522$). The degree of association was very high; given the attack rates shown in Table 3, the relative risk$^5$ was 27.24 and the attributable risk$^6$ 23.98. In addition, it is important to note that no injections of gamma globulin were received by any of the 1,900 people housed adjacent to the construction site; for despite considerable contact between these people and the Praia Brava residents, not a single case of hepatitis occurred in the population residing near the construction site.

Incubation periods, counted from the time of inoculation with gamma globulin to the onset of choluria, averaged 109 days; the shortest and longest incubation periods were 77 and 189 days.

**Examination of gamma globulin.** The suspect gamma globulin was first examined in several Rio de Janeiro laboratories employing the most widely used techniques for the investigation of HB Ag, principally counterimmunoelectrophoresis. No HB Ag was detected with these techniques. Subsequently, somewhat more sensitive radioimmunoassay techniques employed at reference laboratories of the World Health

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$^5$ Obtained by dividing attack rate in exposed population by rate in unexposed population.

$^6$ Difference between attack rates in exposed and unexposed population.

### Table 3. Hepatitis cases in the second phase of the 1974-1975 epidemic associated with gamma globulin inoculation: Comparison of attack rates in inoculated and uninoculated Praia Brava residents.

<table>
<thead>
<tr>
<th>Exposure to gamma globulin</th>
<th>No. of people</th>
<th>Cases of hepatitis in second phase of epidemic</th>
<th>Attack rates per 1,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inoculated</td>
<td>522</td>
<td>13</td>
<td>24.90$^a$</td>
</tr>
<tr>
<td>Uninoculated</td>
<td>1,094</td>
<td>1</td>
<td>0.914$^a$</td>
</tr>
<tr>
<td>Total</td>
<td>1,616</td>
<td>14</td>
<td>8.66</td>
</tr>
</tbody>
</table>

$^a p < 0.05$. 
Organization succeeded in detecting HB Ag in 6 of 11 batches of gamma globulin examined. Three variants of the basic radioimmunoassay technique determined that this antigen was present in the gamma globulin in the form of an immune complex.

Comments

The main question raised by these results is as follows: To what extent can it be said that the gamma globulin was actually responsible for the second phase of this hepatitis outbreak? In this context, it is highly significant that all the injections were administered with disposable syringes. The period when these inoculations were given was from 31 July to 7 August 1974, during and shortly after onset of the first five cases of hepatitis. Those five cases are critical to this analysis, since they could conceivably have triggered the other cases. However, the epidemiologic data point to a clear division between the two stages of the outbreak.

Of the first five cases, four occurred in children and only one in an adult. The latter, the first known case, afflicted a mid-level technician who traveled very frequently, particularly to São Paulo. Of the four children, two were brothers who fell sick at practically the same time—early in the first week of their return to Praia Brava following 40 days of vacation in the city of Rio de Janeiro, where it is highly probable that they were infected by a common source. The third child to fall sick was the son of a Praia Brava physician who frequently spent weekends in Rio de Janeiro. The fourth child to become ill did so approximately three weeks after the two brothers who had vacationed in Rio. Later investigation showed that this child could have contracted the disease through personal contact with the brothers. This hypothesis becomes highly plausible if we assume that the disease responsible for the first stage of the outbreak was hepatitis A—an assumption well in keeping with the data obtained from the investigation.

In the second stage of the outbreak, however, the cases occurred predominantly in well-to-do adults who had not had any contact with the first five cases. The high proportion of sera positive for HB Ag showed conclusively that the infection was type B hepatitis. All the sera that tested negatively for hepatitis B antigen were obtained over 15 days after the onset of illness. As reported first by Prince (13) and later confirmed in humans by Krugman and Giles (8), such delay is long enough to make a finding of HB Ag improbable.

Overall, the investigation showed a clear association between the gamma globulin injections and the second stage of the outbreak. This association became very obvious when second stage attack rates among the inoculated and uninoculated portions of the population were compared, and the finding of HB Ag in samples of the same gamma globulin at WHO reference laboratories (17) strongly supported the observed association. The latter finding, however, was not necessarily critical for purposes of demonstrating the existence of this association. Barker et al. (1) have demonstrated that plasma and thrombin contaminated with hepatitis virus, even when diluted to a point where they are no longer positive for HB Ag in a sensitive test such as the complement fixation test, are still capable of producing hepatitis in human volunteers.

A report of a hepatitis outbreak at an institution in the city of Rio de Janeiro was also consistent with the association we had observed. As Morgado (12) has confirmed, the only reasonable explanation for this outbreak of 35 hepatitis B cases was inoculation through exposure to gamma globulin from a common source. In addition, Mendonça et al. (11) affirmed in 1975 that at least one case of hepatitis they studied could be attributed to gamma globulin inoculation, and Ben-
sabath (2) observed an outbreak of hepatitis in Belém (Pará State) that was likewise attributed to gamma globulin inoculation. Finally, in 1974 and 1975 the lay press reported sporadic cases of hepatitis in various Brazilian cities that started three to five months after gamma globulin from a common source was administered to prevent infectious disease. These sporadic cases ceased after sale of the gamma globulin in question was prohibited.

Few references in the literature incriminate gamma globulin as a vehicle for hepatitis transmission. Cockburn et al. (4) did make a thorough investigation of a hepatitis case indicating that the only plausible explanation found was injection of gamma globulin about three months before the onset of illness. Janeway et al. (7), evaluating the effectiveness of gamma globulin in measles prevention, observed as a complication a case of hepatitis starting about three months after injection of gamma globulin; but the authors were not convinced of the association. Finally, a note in the British Medical Journal (5) has set forth the possibility that gamma globulin may transmit hepatitis virus.

At this point the notion that gamma globulin simply does not transmit hepatitis should be regarded with reservation. The crucial point, it would seem, is the way in which the gamma globulin is prepared. Zuckerman et al. (18), Berg et al. (3), Schroeder and Mozen (14), and Maycock (10), through careful studies on the presence of HB Ag in plasmatic proteins, have made it very clear that gamma globulin is entirely free of HB Ag after it is subjected to a rigorous process of fractionation and treatment with chemical agents such as alcohol, diethyl ether, ammonium sulfate, and DEAE-Sephadex, etc. However, the label accompanying the gamma globulin incriminated in the present study stated merely that the product was obtained from a pool of 10,000 blood donors—failing to indicate the process used in its preparation.

In view of the hepatitis cases that arose in Praia Brava following inoculation of a defined population with this product, and in view of the later WHO laboratory findings, we have concluded that the product must have been contaminated with hepatitis virus. Because of certain circumstances surrounding the Praia Brava outbreak—notably the fact that gamma globulin was injected with disposable syringes and that part of the population was inoculated while the remainder was not—that outbreak and our later investigation assume the general features of an unplanned experimental study on human beings.

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SUMMARY

In the period June 1974-February 1975 a hepatitis outbreak occurred in Praia Brava, a village built to house technical personnel involved in setting up a nuclear power station. The village is located 206 km from Rio de Janeiro.

A total of 22 hepatitis cases (two without jaundice) were reported among the 1,616 residents of Praia Brava. Five cases occurred in the first month of the outbreak. This initial phase was followed by an 11-week period when no cases were reported, and by another period—between 15 October 1974 and 15 February 1975—when an additional 17 cases occurred.

Gamma globulin, administered as a preventive measure at the local health center (using disposable syringes), was found to be the cause of the second stage of the outbreak. This fact was first demonstrated by a sample survey of known cases and control subjects, and was later confirmed by examining specimens of the center’s gamma globulin at WHO reference laboratories. Six out of 11 gamma globulin specimens examined at these facilities tested positively for hepatitis B antigen. On the basis of these findings—and of related contemporaneous events elsewhere in Brazil—it was concluded that the gamma globulin employed must have been contaminated with hepatitis B virus.

REFERENCES

(2) Bensabath, C. Personal communication.