Postmortem Findings of the Victims of the Jonestown Tragedy


ABSTRACT: The procedures for processing and identifying the victims of the Jonestown, Guyana tragedy is outlined. Autopsies were performed on seven of the victims, and the antemortem and postmortem findings are presented. Problems encountered in the interpretation of the autopsy findings are noted.

KEYWORDS: pathology and biology, human identification, decomposition, Guyana, cyanide, intoxication, formaldehyde

On Saturday, 18 Nov. 1978, over 900 people died in Jonestown, Guyana. The circumstances surrounding this incident were thoroughly reported by the news media [1,2]. On Thursday, 22 Nov., the first bodies arrived at Dover Air Force Base, Dover, Delaware. On Monday, 27 Nov., a team of pathologists, dentists, and technicians began examining the bodies in the mortuary on the base (Fig. 1). As the bodies arrived by U.S. Air Force planes from Guyana, they were stored in refrigerated trucks. Upon being transferred to the mortuary, the bodies were removed from the metal transfer cases, weighed, and put on gurneys. They were then examined by a team consisting of one pathologist and two graves registration technicians (Fig. 2). Two members of the team examined the body, personal effects, and clothing, and the third recorded the results on a chart. The clothing was described, paying special attention to any identifying marks, and was then removed from the body. Many articles of clothing had names written on them as laundry marks, but it soon became apparent that there was much interchange of clothing, as some articles had more than one name on them. Any personal effects were described and placed in plastic bags. The bodies were examined for evidence of injury, surgical scars, and any other identifying marks. The length of the body, the estimated age, and the race, color, hair color, sex, and weight were recorded.

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433
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After this examination, the FBI disaster team took fingerprints (and footprints from infants). Even though the majority of the bodies were badly decomposed, adequate fingerprints were obtained from most bodies. Photographs of each body were then taken. The dentists examined each body, and dental X-rays were obtained. Photographs were taken of...
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any personal effects that were thought to be useful for identification, and the bodies were then taken to be embalmed. Each body had been given a number by the recovery teams in Guyana, and the status of each body (identified by its number) was recorded on a large board. Total body X-rays were not taken of every body, but a portable X-ray machine was available for use in selected cases. For example, one body had a cast on its leg, so the leg was X-rayed. This phase of the identification process was completed on Saturday, 3 Dec.

At the early stages of the body examinations, State Department officials were told that autopsies should be performed on a statistically significant number of the bodies. It was the opinion of the attorneys at the State Department that there was no authority to perform autopsies; therefore, all the bodies were embalmed with no expectation of later performing autopsies. Some time later, after much discussion, it was decided to try to get permission from the families to perform autopsies on all the bodies with traumatic injuries and on a few with no such injuries. This permission was obtained, and on 15 Dec, 1978, seven autopsies were performed by four forensic pathologists from the Armed Forces Institute of Pathology and a civilian consultant.

Autopsy Findings

On examining the teeth of the victims, it was discovered that some of the teeth were pink. This phenomenon was originally thought to be caused by cyanide intoxication, but on later evaluation, it was determined to be caused by postmortem decomposition. Kirkham et al. [3] found that the breakdown of red blood cells in the pulp chamber of teeth diffused hemoglobin and serum proteins into the dentine, creating the pink color.

Because the bodies that were to be autopsied had been embalmed, they had to be washed extensively to remove the embalming powder that had been sprinkled on their surface (Fig. 5). Total body X-rays were taken of all seven bodies to be autopsied, but no radiologic findings were identified other than the findings noted on anatomic dissection. All of the bodies showed evidence of marked postmortem decomposition.

Of the seven bodies that were autopsied, only two had traumatic injuries sufficient enough to result in death. Body B013 had a hard cortical gunshot wound (Fig. 6) of the left temple area, with the exit (Fig. 7) at the right temple. The entrance wound exhibited the typical spheroid tearing with internal beveling of the skull beneath this area, and there was external beveling of the skull on the exit side, showing without question that the bullet traveled from left to right. The brain was extremely soft, and no missile track was identified within the brain substance. No powder residue was identified in the area of the entrance wound—not on the skin surface, in the subcutaneous tissue, or on the external surface of the skull. Washing of the hands for powder residue was considered but was not done because the embalming...
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ing and other extensive handling of the body after death would have made the results difficult to interpret.

The second victim (A001) of a gunshot wound had a large deforming wound (Fig. 8) in the right temple area. The exit wound (Fig. 9) was in the left temple with separation of the wound edges. The wound edges in the entrance and exit areas were approximated with suture material to reconstruct better the wound (Fig. 10). Examination of the skull after removal of the scalp revealed large defects both in the entrance and exit areas. There was some beveling at the edge of the left temple wound that identified it as the exit wound. Examination of the other five bodies revealed no anatomic changes except for postmortem decomposition and evidence of embalming.

Toxicologic Studies

The drugs that were found in each of the bodies are listed in Table 1. The tissues examined were brain, liver, kidney, muscle, stomach, spleen, and lung. The brain tissue was particularly useful because it had not been extensively infiltrated with embalming fluid. Areas of muscle that had not been extensively infiltrated with embalming fluid were also saved. No blood or urine was available. The drugs were identified by ultraviolet spectrometry and gas chromatography, with confirmation by gas chromatography/mass spectrometry. Of course, all of the specimens were decomposed and heavily contaminated with embalming fluid.

The news media reported that the principle drug consumed by the victims was cyanide, and indeed cyanide was found in Bodies A001 and A006. The cyanide was determined with an ultraviolet spectrophotometer by measuring an ionic thiocyanate-cyanide complex, as described by Scoggins [4]. Both the decomposition and the embalming fluid created problems in evaluating the cyanide concentrations. A mixture of sodium or potassium cyanide and formaldehyde at room temperature undergoes condensation and hydrolysis to evolve ammonia and forms the alkali salts of glycolic acid, glycine, iminodiacetic acid, and nitrosoacetic acid [5]. It was thought that glycolic acid could possibly be used as a marker to identify that cyanide had been present in the tissues even after the cyanides had been destroyed. Glycolic acid was indeed found within the tissues of these bodies by high-pressure liquid chromatography, but glycolic acid was also found within a control sample of tissues prepared by putting decomposed tissue that was not exposed to cyanide in formaldehyde. Cyanide is also known to disappear in the postmortem state secondary to evaporation, thiosulfate formation, and cyanide combining with tissues [6]. A small amount of cyanide is also produced by postmortem decomposition [7,8]. Because of these factors it was very difficult to assess the meaning of the cyanide values found in the two bodies. The amount of cyanide that was found is listed in Table 2.
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**Cause and Manner of Death**

Bodies B013 and A001 had gunshot wounds to the head that were certainly sufficient to be the cause of death. Cyanide was also identified in the muscle of Body A001. There are several explanations for finding cyanide along with the gunshot wound to the head. One explanation is that after taking the cyanide, the person did not die as quickly as expected and either shot himself or someone else did. Another explanation is that the person did die of cyanide intoxication and someone else inflicted the wound after death. Actually, the cause of death in this instance was listed as a combination of cyanide intoxication and gunshot wound to the head.

The cause of death in the other 5 cases was listed as acute cyanide intoxication even though cyanide was actually identified in only 1 of the bodies (A006). Dr. Leslie Mootoo, the forensic pathologist who examined the bodies at the scene in Guyana, said he aspirated the stomach contents of 65 bodies at the scene and all 65 were positive with a field test for cyan-
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TABLE 2—Cyanide.

<table>
<thead>
<tr>
<th>Body</th>
<th>Tissue</th>
<th>Amount, mg/100 g</th>
</tr>
</thead>
<tbody>
<tr>
<td>A001</td>
<td>muscle</td>
<td>0.2</td>
</tr>
<tr>
<td>A002</td>
<td>brain</td>
<td>0.08</td>
</tr>
</tbody>
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TABLE 3—Example of the drug distribution in the tissues of one body (mg/100 g).

<table>
<thead>
<tr>
<th>Drug</th>
<th>Stomach</th>
<th>Lung</th>
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<th>Kidney</th>
<th>Liver</th>
<th>Brain</th>
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</thead>
<tbody>
<tr>
<td>Diphenhydramine</td>
<td>0.98</td>
<td>0.02</td>
<td>0.02</td>
<td>0.03</td>
<td>0.54</td>
<td>0.02</td>
</tr>
<tr>
<td>Promethazine</td>
<td>1.31</td>
<td>0.02</td>
<td>0.04</td>
<td>0.19</td>
<td>0.70</td>
<td>0.05</td>
</tr>
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<td>Chlorpromazine</td>
<td>40.9</td>
<td>2.22</td>
<td>0.23</td>
<td>1.05</td>
<td>3.12</td>
<td>0.13</td>
</tr>
<tr>
<td>Chlordiazepoxide</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>8.3</td>
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*NR = none reported.

Acknowledgments

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Acknowledgements

The methods used in the identification of the Jonestown bodies. (Table 4)

<table>
<thead>
<tr>
<th>Method</th>
<th>No. of Bodies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingerprints only</td>
<td>841</td>
</tr>
<tr>
<td>Fingerprints and dental records</td>
<td>190</td>
</tr>
<tr>
<td>Dental records only</td>
<td>73</td>
</tr>
<tr>
<td>Pathology (impetus)</td>
<td>1</td>
</tr>
<tr>
<td>Forensic prints</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>666</td>
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References


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