Urinalysis of Body Packers in Japan

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Abstract
Urinalysis was performed on nine body packers/smugglers who were referred to the emergency room of a hospital near the New Tokyo International Airport between September 1994 and February 1996. This analysis had rarely been used on suspected body packers in Japan. Only one of the nine body packers was a female. Foreign bodies were detected in the gastrointestinal tracts of the body packers by plain x-ray photography or computerized tomography, and the suspected drugs were cocaine (five cases), heroin (two cases), opiate (one case), and marijuana (one case). The results of urinalysis and confessions of the smugglers corresponded well for the latter three drugs (four cases). In two of the suspicious cocaine cases, opiates were detected along with cocaine by urinalysis, and the metabolites were confirmed by gas chromatography–mass spectrometry. The urinary screening tests of another two suspicious cocaine cases were negative. Opiates (morphine and codeine), but no cocaine metabolites, were detected in the urine of the subject who confessed to smuggling in cocaine only. It may be inferred from these results that urinalysis upon admission to the hospital for the management of body packers in Japan is beneficial to both the patient (body packer) and the physician in preventing the disastrous outcome of drug intoxication. It can also be concluded that there is a need for the prompt establishment of a protocol that includes urinalysis on body packers at the airport in Japan.

Introduction
The smuggling of illicit drugs, either by swallowing or inserting them into the intestinal tract or the vaginal canal or both, has been reported very frequently in the United States and in European countries (1–9). However, little attention has been paid to detection of the drugs in the body fluids of these body packers.

Several fatal cases have resulted from so-called “body packer syndrome”, which is caused by acute drug intoxication after leakage or rupture of the packet inside the smuggler’s body (4). There has been little detailed research about body packers in Japan, and very few reports have been about “accidental” drug intoxication until now.

In the time period between September 1994 and February 1996, 16 body packers were apprehended at the New Tokyo International Airport suspicion of smuggling illicit drugs. Nine of them were referred to the emergency room of a hospital because of possible drug intoxication and were subjected to the drug analysis. The results of the analyses of body fluid and urinalyses of the nine body packers are reported in this paper.

Materials and Methods
EMIT™ kits and Triage™ were purchased from Syva (San Jose, CA) and from Biosite (San Diego, CA), respectively. Cocaine, codeine, and morphine were obtained from Takeda Pharmaceutical (Osaka, Japan). Scopolamine was purchased from Sigma Chemical (St. Louis, MO). N,O-bis(Trimethylsilyl)trifluoroacetamide (BSTFA) with 1% trimethylchlorosilane was purchased from Pierce Chemical (Rockford, IL), and pentafluoropropionic acid anhydride (PFP) and hexafluoroisopropanol (HFIP) were obtained from Wako Chemical (Tokyo, Japan). Benzoylecgonine, ecgoninemethylester, 6-acetylmorphine (6-AM), morphine-d3, and tetrahydrocannabinol carboxylic acid-d3 (THCCOOH) were provided by Dr. Nakahara of National Institute of Health Sciences (Tokyo, Japan). All other chemicals of analytical grade were obtained from Wako Chemical. Bond Elut Certify was purchased from Varian Sample Products (Harbor City, CA).

Apparatus
Gas chromatography–mass spectrometry (GC–MS) analysis was carried out in the selected ion monitoring mode with an HP 5890 series II GC (Hewlett Packard, Palo Alto, CA) equipped with a HP 7673 automatic injector and interfaced to an HP 5971 mass selective detector (MSD). The column was an Ultra-2 fused-silica capillary (25 m x 0.22 mm) with 0.33-µm film thickness (Hewlett Packard), and helium was used as a carrier gas. The

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<table>
<thead>
<tr>
<th>Case no.</th>
<th>Gender</th>
<th>Confessed drugs</th>
<th>Urinalysis screening</th>
<th>GC-MS confirmation (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>male</td>
<td>Cannabinoids (5 pieces)</td>
<td>Triage THC (+), EMIT THC (+)</td>
<td>Tetrahydrocannabinol</td>
</tr>
<tr>
<td>2</td>
<td>male</td>
<td>None</td>
<td>Triage OPI (+), BZO (+), EMIT OPI (+), BZO (+)</td>
<td>Benzodiazepines Oxazepam Opiates Free Total (hydrolysis) 6-AM 17.4 ND Morphine 2150.8 8455.1 Codeine 208.6 1349.6</td>
</tr>
<tr>
<td>3</td>
<td>male</td>
<td>Cocaine (96 pieces)</td>
<td>Triage COC (+), OPI (+), EMIT COC (+), OPI (+)</td>
<td>Cocaine 443.4 Benzoylcegonine 4164.4 Ecgoninemethylester 3209.9 Opiates Free Total (hydrolysis) 6-AM ND ND Morphine 229.4 9487.9 Codeine 19.2 101.1</td>
</tr>
<tr>
<td>4</td>
<td>female</td>
<td>Cocaine (80 pieces)</td>
<td>Triage OPI (+), EMIT OPI (+)</td>
<td>Opiates Free Total (hydrolysis) 6-AM ND ND Morphine 138.2 2796.8 Codeine ND 385.9</td>
</tr>
<tr>
<td>5</td>
<td>male</td>
<td>Cocaine (80 pieces)</td>
<td>Triage COC (+), OPI (+), EMIT COC (+), OPI (+)</td>
<td>Cocaine ND Benzoylcgonine 268.1 Ecgoninemethylester 572.4 Opiates Free Total (hydrolysis) 6-AM ND ND Morphine ND 473.4 Codeine ND 136.0</td>
</tr>
<tr>
<td>6</td>
<td>male</td>
<td>Cocaine (80 pieces)</td>
<td>Triage (-), EMIT (-)</td>
<td>6-AM ND ND Morphine ND 473.4 Codeine ND 808.1</td>
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<td>Cocaine (74 pieces)</td>
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<td>6-AM ND ND Morphine ND 473.4 Codeine ND 808.1</td>
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<td>8</td>
<td>male</td>
<td>Heroin (127 pieces)</td>
<td>Triage OPI (+), EMIT OPI (+)</td>
<td>Opiates Free Total (hydrolysis) 6-AM ND ND Morphine ND 2206.1 Codeine 162.0 462.0</td>
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<td>9</td>
<td>male</td>
<td>Opiates (104 pieces)</td>
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<td>Opiates Free Total (hydrolysis) 6-AM ND ND Morphine 1566.5 2206.1 Codeine 162.0 462.0</td>
</tr>
</tbody>
</table>

*Abbreviations: THC, tetrahydrocannabinol; OPI, opiates; BZO, benzodiazepines; 6-AM, 6-acetylmorphine; COC, cocaine.*
injection temperature was 250°C, and the transfer line temperature was 280°C. The oven temperature was maintained at 100°C for 1 min and then increased at a programed rate of 20°C/min and held at 300°C for 10 min. Ions monitored were as follows: 318, 439, and 344 for benzoylecgonine; 82, 182, and 303 for cocaine; 182, 314, and 345 for eegoninmethylester; 94, 138, and 449 for scopolamine; 371, 343, and 313 for codeine; 429, 414, and 401 and morphine; 432, 417, and 404 for morphine-d3; 399, 340, and 287 for 6-AM; 371, 473, and 488 for THCCOOH; and 374, 476, and 491 for THCCOOH-d3.

Sample collection
The suspected drug smugglers, apprehended by the customs officers at the New Tokyo International Airport, were referred to the emergency room of Hokuso Hospital of Nippon Medical School for medical examination. The physical condition of all subjects when they were admitted to the hospital was essentially normal with no signs of drug intoxication. Urine samples were collected on admission and tested for drugs or major drug metabolites using EMIT and Triage. The results were confirmed using GC-MS.

Confirmation methods using GC–MS
Cocaine. An aliquot of scopolamine (500 ng) as internal standard (IS) and 2 mL of 0.1M phosphate buffer (pH 6) were added to 2 mL of urine. After shaking, the specimen was applied to Bond Elut Certify pre-activated with 2 mL of methanol and 2 mL of water. The column was successively washed with 2 mL of water, 0.1M acetate, and 2 mL of water. After vacuum drying for 5 min, the column was rinsed with 2 mL of methanol and dried again for 5 min. The drugs were eluted with 3 mL of methanol/methylenechloride/ammonium hydroxide (10:40:1) and evaporated under a nitrogen stream.

The residue was derivatized with 100 μL of PFP and 50 μL of HFIP at 60°C for 20 min. After evaporation under a nitrogen stream, the residue was dissolved in 50 μL of ethyl acetate/BSTFA (2:1) and injected into GC–MS.

Free opiates. An aliquot of morphine-d3 (200 ng), as the IS, and 4 mL of 0.2M phosphate buffer (pH 6) were added to 2 mL of urine and mixed vigorously. The specimen was applied to a pre-activated Bond Elut Certify. The column was washed with 3 mL of water and vacuum-dried for 5 min. After the column was rinsed with 3 mL of methanol and dried for 5 min, the drugs were eluted with 3 mL of methylenechloride/isopropanol/ammonium hydroxide (40:10:1). The eluate was evaporated under a nitrogen stream and the residue was derivatized with 100 μL of BSTFA/pyridine (1:1) at 80°C for 20 min. The reaction solution was injected into GC–MS.

Total opiates. Concentrated HCl (1.5 mL) was added to 2 mL of urine, and the specimen was hydrolyzed at 100°C for 15 min. The reaction mixture was brought to room temperature and adjusted to pH 6. Opiates were then extracted with the same method as described previously.

THCCOOH. KOH (0.5 mL, 10N) was added to 5 mL of urine, and the specimen was hydrolyzed at 50°C for 15 min. The reaction mixture was cooled to room temperature, adjusted to pH 4, and was applied to the pre-activated Bond Elut Certify with an aliquot of THCCOOH-d3 (200 ng) as the IS. The column was rinsed with 9 mL of 50 mM phosphate buffer and 3 mL of 50 mM phosphate buffer/methanol (8:2), successively. After vacuum evaporation for 5 min, the drugs were eluted with 2 mL of ethyl acetate/methanol/acetic acid (90:10:1). The eluate was dried under a nitrogen stream, and then the residue was derivatized with 50 μL of BSTFA at 90°C for 20 min.

Results
 Urinalysis was performed in nine cases of the sixteen body packers who were referred to the emergency room for medical examination during the period between September in 1994 and February in 1996. The detailed cases are described and the urinalysis data are shown in Table I.

Case 1
A 28-year-old man with a forged passport was apprehended by customs officers. He confessed that he had been transporting marijuana hidden in his body, and five bundles of columnar packets were detected in his rectum by x-ray photography (X-P) and computerized tomography (CT). The content of the packets was later found to be the resin of marijuana wrapped tightly with household plastic food-wrapping. Each packet was 30 x 30 x 80 mm and had a weight of approximately 85 g (Figure 1). Although he showed no signs of marijuana intoxication, tetrahydrocannabinol was detected in his urine, but THCCOOH was not. Elimination of all packets from the man’s body took 2 days in the hospital.

Case 2
A 45-year-old man was apprehended on suspicion of drug smuggling. Many spherical foreign bodies were detected in his
gastrointestinal tract by X-P or CT. The man apparently had not evacuated his bowels for 4 days in the hospital despite medication with laxatives. However, only one foreign body was detected by X-P on the 4th day of admission. No foreign bodies were found in his bowels by the 5th day of admission. The man may have discarded the packages in a toilet with fecal matter without an officer noticing. Afterwards, the man firmly denied being a body packer, and he was finally acquitted because of lack of evidence. Analysis of the man’s urine was performed after his discharge, and 6-AM, morphine, and codeine were detected.

Cases 3–7

Four men and one woman confessed to legal officers that they were hiding cocaine in their bodies. The reason for their surrender was the sudden death of one of their group during the flight, presumably a result of cocaine poisoning. They were immediately referred to the hospital. They were in normal physical condition upon admission and had no signs of drug intoxication or abuse. Many pieces of packages were detected in their gastrointestinal tracts by X-P and CT. The packages were wrapped in a rubberlike material with an additional layer of wax, and they were found to contain cocaine when submitted to a drug spot test by the officers. Opiates were not found in the packages; however, they were detected in the urine of three of the smugglers (cases 3–5). Although they denied ingestion of other drugs, urinalysis indicated that they had ingested opiates as a constipating agent. In the other two cases (cases 6 and 7), the urinary screening test for the illicit drugs was negative.

Case 8

A 34-year-old man confessed to hiding heroin in his body. The packets were detected by CT but not clearly by X-P. The content was found to be opiates by a spot test. Codeine was detected in his urine, but morphine and 6-AM were not.

Case 9

A 48-year-old man confessed to smuggling opiates. Many foreign bodies were found by X-P. They were found to be opiates by a spot test. Morphine and codeine were found in his urine.

Discussion

The reason why no THCCOOH was detected even though tetrahydrocannabinol was detected in the urine of the body packer in case 1 is unknown. Meatherall and Warren (9) showed that THCCOOH was detected in the urine of all body packers/smugglers who took the packages orally. In case 1, the package was hidden in the rectum. Babul and Darket (10) reported that rectal administration of morphine would result in a lower serum content of morphine metabolites than oral administration. A similar mechanism may be indicated in case 1, or the marijuana resins may not be easily metabolized in the rectum.

The importance of rapid drug testing of body packers’ body fluid is indicated by case 2. If urinalysis had been performed as soon as the body packer was admitted to the hospital, the person might not have been released so easily from hospital, and the officers would have been able to prevent his acquittal with the appropriate evidence available.

Gherardi et al. (1,5) found that there was a close link between the presence of drugs in the urine and drugs hidden in the body; however, the situation described in the present paper was different. The cases in the present report are categorized into three groups: group 1, negative urinalysis results (Cases 6 and 7); group 2, positive urinalysis results (Cases 1, 8, and 9); and group 3, discrepancies between the urinalysis data and the actual content of the drug packages (Cases 3, 4, and 5).

The group 1 category probably resulted from the packets not being ruptured or the drugs not leaking into the body of the smuggler. If the suspected body packers fall into group 1, no treatment for drug intoxication is needed and prompt legal action should be taken against them. In group 2, it can be inferred that there are broken packets and drug leakage in the body and/or the self abuse of the drug by the smuggler. It was concluded that the drugs leaked from the packets because the body packer, reported in this paper, had shown no clinical signs of addiction or of drug withdrawal.

Opiates, morphine and codeine, were detected in group 3 and confirmed by GC–MS in the urine of cocaine smugglers, even though the smugglers had neither confessed to the use of opiates nor showed apparent signs of use. Although it has been reported that smugglers sometimes ingest diphenoxylate hydrochloride with atropine (“Lomotil”) as a constipating agent (1), there were no reports, until now, of a smuggler who was not a drug addict but who had ingested the opiates as a constipating agent.

Conclusion

It can be concluded from the results that urinalysis on body packers contributes to the investigation of illicit drug smuggling and that it is beneficial to both the patient (body packer) and the physician to prevent the disastrous outcome of drug intoxication. It can also be concluded that there is a need for the prompt establishment of a protocol that includes urinalysis upon admission to hospital for the management of body-packer suspects in Japan.

Acknowledgment

The authors wish to thank Dr. N. Nakazawa of the Department of Pathology of Nippon Medical School for his advice.

References


Manuscript received May 23, 1997; revision received July 24, 1997.