(anion gap >12–16 mmol/L), plasma lactate levels (>1 mmol/L), decreased arterial pH (often severe), relatively normal PaO_2 and SaO_2 saturation with elevated peripheral venous pO_2 (>40 mmHg) or SaO_2 saturation (>70%).

Arsenic ingestion produces a "garlic-like" breath odor that is easy to recognize. Cyanide produces a "musty" or "bitter almonds" breath odor that many persons cannot recognize. The cause of death in acute arsenic poisoning most often is hypovolemia from "third-spacing" of fluids and gastro-intestinal bleeding with hypotension and cardiovascular collapse. Administration of potent vasodilating amyl and sodium nitrite cyanide antidotes may be dangerous especially in this setting. Chelators are used to treat acute arsenic poisoning, but survival is determined mainly by supportive measures (volume repletion, transfusion). Late sequellae of arsenic poisoning include peripheral polyneuropathy and bone marrow depression with anemia, leukopenia, and pancytopenia, while a Parkinsonian-like condition is the major sequella of severe acute cyanide poisoning. Pancytopenia in the survivors from the Wakayama event led to the diagnosis of arsenic poisoning.

References:

1. Hall AH: Arsenic and arsine. In: *Clinical Management of Poisoning and Drug Overdose,* Haddad LM, Shannon MW, Winchester JF (Eds), 3rd ed. WB Saunders Company, Philadelphia, PA, 1998, pp 784–789.
2. Hall AH, Remake BH: Cyanide and related compounds, In: *Clinical Management of Poisoning and Drug Overdose,* Hatted LM, Shannon MW, Winchester JF (Eds), 3rd ed., WB Saunders Company, Philadelphia, PA, 1998, pp 899–905.
3. Hall AH: Systemic asphyxiants, In: *Irwin & Rippe's Intensive Care Medicine,* Irwin RS *et al* (Eds), 4th ed. Lippincott-Raven Publishers, Philadelphia, PA, 1999, pp 1797–1806.

Keywords: arsenic; cyanide; laboratory studies; poisoning; signs, clinical

PN6-2

Detection and Identification of Unknown Poisonous Substances: A Poisons Centre Perspective

Per Kulling, MD
Swedish Poisons Information Centre, Stockholm, Sweden

In accidents or terrorist actions involving possible poisonous substances, the toxic agent might be difficult to identify. When facing such a situation of poisoning, it is important to define the most appropriate strategy to undertake. Apart from technical examinations performed by the police and other agencies, the medical professionals must take action to guarantee treatment of victims in the best manner.

In unclear cases of poisoning, careful observation and documentation of the clinical signs and symptoms should gear further activities. Could these signs and symptoms be connected to a specific toxic exposure?

For most poisonings, symptomatic treatment alone is sufficient to manage the poisoned patient to full recovery. However, in a certain of poisonings, specific treatment with antidotes might be of crucial importance. In order not to miss important treatment possibilities, it is mandatory to identify or exclude those exposures and poisonings where specific treatment is possible.

Substances that should be included among chemical exposures for which antidote treatment may be important are listed below. In this context, poisonings by pharmaceuticals are not included, because they are less likely to be involved in these situations.

aniline	copper	lead	nitriles
arsenic	crimidine	lewisite	nitites
barium	cyanides	mercury	nitrobensen
bromate	ethylene glycol	methanol	organophosphates
carbamate	fluorides	mustard gas	phenol
chlorate	hydrofluoric acid	nerve gases	phosphorus, white

Keywords: antidotes; chemicals; detection; diagnosis; identification; pharmaceuticals; poisoning; substances; toxicity; treatment

PN6-3

Intoxication with Arsenic Mixed in Curry in Wakayama

Masahiro Shinozaki, MD
Department of Critical Care Medicine, Wakayama Medical College, Wakayama City, Japan

Sixty-seven patients were poisoned with arsenic and four of them died after ingestion of curry and rice in which someone mixed arsenic at a self governing summer festival last year (1998) in Wakayama, Japan. However, it required one week to detect the precise substance that caused poisoning. The purpose of this presentation is to describe the Japanese system for detection of and information about poisonous substances obtained from patient material that resulted from this incident of arsenic intoxication.

The 67 patients ingested the curry and rice at about at 18:00 hours on 25 July 1998. They were taken to 13 hospitals; six were taken to the Wakayama Medical College Hospital at 20:30 hours. Their main symptoms were nausea, vomiting, abdominal pain, and headache. After emergency treatment, serum ChE and urine paraquat levels were measured because there remained doubt about the nature of the poison responsible for the intoxication. Serum ChE was normal and qualitative tests of the urine for paraquat also was negative. The doctor notified the police that he was suspicious that these cases were related to poisoning, and asked for help to detect the presence of a toxic substance in vomit. The police reported the following day at six o'clock that cyanide was detected in the vomit. About half of the victims then were treated with sodium thiosulfate. After one week, the police published that arsenic was detected from patient material. Since one week already had passed since the poisoning, the patients were not treated using BAL that is an antidote for arsenic. Urine arsenic concentration reached normal levels in almost every patient within two months of the incident.

The symptoms and the laboratory data during acute phase of poisoning were not specific for arsenic intoxication, except for the changes in the electrocardiogram (ECG): long Q-T interval and negative T-wave. Thus, the diagnosis of arsenic intoxication requires detection of the arsenic directly from patient materials.

Almost none of the hospitals have equipment to detect poisons. There is the Japan Information Center, but there is not a public or a commercial poison analysis institute in Japan. Police agencies can examine poisons for solving crime, but the information may not be available in time to treat the patient because the information may be qualitative analysis data.

After the episode described in this report, the Wakayama City, the Institute of Public Health, the Center of Wakayama Prefecture Institute of Public Health and the Environmental Pollution, and the Critical Care Medical Center in Japanese Red Cross in Wakayama Medical Center will have an ICP-MS, a HPLC-MS, and a fluorescence X-ray spectrometer, respectively. These institutes are situated in different places and are closed at night except for the Japanese Red-Cross Wakayama Medical Center.

There is a need to unify these instruments and to establish a poison analysis center to be practically available for determining the treatment required for victims of poisoning.

Keywords: analysis; arsenic; detection; diagnosis; electrocardiogram; intoxication; Japan Information Center; mass spectrometers; poisoning; Red Cross

PN6-4

An Emergency Network for the Treatment of a Mass Poisoning Plot by the Japan Poison Information Center

Toshiharu Yoshioka, MD, PhD; Yohko Endoh, PhD; Hisashi Ikeuchi, MD, PhD; Takeshi Shimazu, MD, PhD
Department of Emergency Medicine, Osaka Prefectural General Hospital, and the Japan Poison Information Center, Osaka City, Japan

The risk management against the crime using poisonous substances has been revised after the crime using an arsenic acid substance in Wakayama Prefecture, because the delay of identification of the poisonous substance led to a loss of time in the provision of proper treatments. Thus, the Japan Poison Information Center (JPIC) has developed two databases (DB) that should be helpful for this type of disaster.

The two databases (DB) are the diagnosis-supporting DB and the registry DB of poison specialists. In this presentation, we will focus on the diagnostic database that will help identifying the causative substances from clinical symptoms and signs and laboratory data. The role of these DBs in the risk management of cases of poisoning also will be discussed.

The JPIC diagnostic database has enrolled approximately 100 poisonous substances, and will help identify the causative substances when such substances are used. The substances were selected based on the: 1) extent of systemic toxicity; 2) previous use in crime records from the past; and 3) availability of effective antidotes. Gaseous inhalation poisons and local corrosives are not included in this database in order to increase the accuracy of the identification. Clinical symptoms and signs finally were classified into 122 basic items, and laboratory data were grouped into 40 categories. To make the identification more accurate, it is important to collect clinical information serially from the onset, because the condition of the patients might change drastically during the acute phase.

The poison specialists registered in the database consist of professionals from clinical medicine, laboratory medicine, pathology, pharmacology, legal medicine, analytical chemistry, and so on. The database classifies them by their professional specialization for chemical substances and their respective areas of research. This will support interactive estimation of the cause by enabling bi-directional information exchange between the clinicians on the scene and the specialists in areas distant from the scene.

Once such an incident of mass poisoning plot occurs, based on clinical information from the physicians actually treating the patients, the JPIC will estimate a couple of probable causative substances from the diagnostic database. Then, the JPIC will consult with the registered specialist and will proceed with chemical analysis for the suspected substance. Prior to the arsenic poisoning in Wakayama Prefecture, there was no definite rule as to where the analysis should be made. Now, tertiary emergency medical centers, the Criminal Investigation Laboratory of Prefectural police headquarters, and the Research Institute of Public Health in local governments are equipped with analytical capabilities.

It must be made clear as to who takes control of the entire system, how to obtain all the information including clinical conditions and samples, and how to give medical information on the substance to local hospital(s). Practical procedures to cope with the mass intoxication incidents should be discussed including specialized coordinating system for chemical disaster.

Keywords: agents; analysis; arsenic; chemicals; data bases; detection; diagnosis; disaster; hospitals; identification; information; Japan Poison Information Center; mass casualties; poisons; poisoning; specialists; treatment

PN6-5

Detection and Identification of Unknown Poisonous Substances from Patient Material: The Experience of the Chemical Incident Response Service, London

Dr. Virginia Murray, MBBS, FFOM,[1]
Dr. Brian Widdop, PhD, C.Chem.FRSC[2]
1. Director, Chemical Incident Response Service
2. Director, Medical Toxicology Laboratory
Medical Toxicology Unit, Guy's and St Thomas' Hospital Trust, London, UK

Introduction: The Medical Toxicology Unit started in 1963, and currently provides the following services:

1) National Poisons Information Service, London (receives approximately 200,000 emergency case enquiries per year from medical professionals);
2) Medical Toxicology Laboratory (largest hospital-based analytical toxicology laboratory in the UK);