

Conclusion: SM is an incapacitating chemical warfare agent with several devastating long-term effects on human health. SM-induced respiratory complications tend to progress over the years. While spirometry is a valuable diagnostic tool for evaluation of pulmonary impairment during regular follow-ups, ABG and HRCT are more objective and should be considered for evaluation of the severity and for diagnosis of the respiratory complications. **Keywords:** complications; effects; evaluation; follow up; respiratory; sulfur mustard (SM)

Prehosp Disast Med 2005;20(2):s93-s94

A Modification of the JUMPStart Triage Algorithm Used for a Large American City

A. Cooper;¹ G. Foltin;² M. Tunik;² B. Kaufman;³ G. Asaeda;³ D. Gonzalez;³ J. Clair³

1. Columbia University/Harlem Hospital, New York, New York USA
2. New York University/Bellevue Hospital, New York, New York USA
3. Fire Department, City of New York, New York, New York USA

The JUMPStart Triage Algorithm (JTA) for children substitutes bag-valve-mask ventilation (BVM) for airway repositioning as used in the Simple Triage and Rapid Treatment Algorithm (START) paradigm for adults. However, the BVM will not be feasible in a hot zone or even in the triage and staging area (TSA) of a casualty-collection point (CCP), if resuscitation equipment is not readily available.

A modification of the JTA was developed for children <5 years of age that may be necessary operationally under field conditions when a BVM is not readily available. The following principles guided development of this pediatric triage algorithm: (1) it must embrace all hazards; (2) it must be part of the existing triage process for the general population; (3) it must be able to be incorporated easily and quickly into the existing municipal disaster triage process; and (4) the JTA cannot be used as it currently exists, due to the lack of resuscitation equipment in the hot zone, but the START paradigm must remain the foundation for pediatric triage.

Based on these principles, the following approach has been developed for pediatric triage. All pediatric patients must be transferred from the hot zone to a decontamination area prior to definitive triage at a TSA within the CCP. Only dead or moribund patients will remain in the hot zone. Pediatric patients able to walk are tagged as "Green". Pediatric patients unable to walk are initially tagged as "Red" if breathing occurs spontaneously or upon airway repositioning, but are initially tagged as "Black" if breathing is absent. Patients initially tagged as "Red" remain so if their respiratory rate remains <20 or >40 cycles per minute (bpm), but are definitively tagged as "Yellow" if their respiratory rate is >20 and <40 cpm, pulse is palpable, and movement is present and purposeful. Children definitively tagged as "Red" or "Yellow", then, receive expedited off-site transport. However, definitive "Black" tagging and forensic transport cannot occur until a child initially tagged as "Black" has failed to respond to two rescue breaths via BVM administered as soon as possible after transfer to the TSA.

Conclusion: It is speculated that this paradigm will be effective in saving children's lives under field conditions in mass-casualty events.

Keywords: children; JUMPStart Triage Algorithm; mass-casualty event; triage

Prehosp Disast Med 2005;20(2):s94

Mass Toxicological Incidents (MTIs)—Are Local Procedures Necessary?

P. Gula;¹ J. Nitecki;¹ W. Hladki;² L. Brongel;²

B. Kozanecka-Muzyk³

1. State Fire, Krakow, Poland
2. Emergency Medicine and Multiple Trauma Department, Medical College Jagiellonian University, Poland
3. Rydygiera Hospital, Krakow, Poland

With a population of >1 million, Krakow is a major town in Poland. The Krakow area has a high risk for chemical events related to the chemical industry and hazardous material transport. During the last two years, there were three major chemical incidents, of which the largest involved 37 patients. Based on international experience, local emergency procedures were developed. These are based on the cooperation of numerous institutions, including State Fire and Rescue Service, Rescue Coordination Center, Regional Toxicological Information Center, Krakow's emergency medical services, and hospital emergency departments.

Procedures include detection, on-site rescue procedures including decontamination if needed, transportation, and hospital treatment. The important part of the system is cautious training, including drills and the evaluations of this training. The authors will present algorithms for mass-toxicological incidents and the way they adapted to local response system, and their follow-up after implementing the plan in drills and chemical incidents.

Keywords: chemical; emergency; planning; Poland; preparedness; procedures

Prehosp Disast Med 2005;20(2):s94

Assessment of Psychosocial Impacts of a Chemical Weapons Attack on Civilian Population of Sardasht, Iran

S. Khateri;¹ M. Soroush²

1. Janbazan Medical and Engineering Research Center (JMERC), Janbazan (Veterans) Organization, Director, Chemical Warfare (CW) Victims Research Unit, Iran
2. Janbazan Medical and Engineering Research Center (JMERC), Iran

Introduction: Individuals sustaining wartime injuries that survive the experience nevertheless may develop serious long-term health problems as a result. Previous studies of this phenomenon, which focused primarily on the effects of trauma due to conventional armament, have documented various clinically defined categories of chronic disorders in battle-injured personnel. However, a similar body of medical literature has not been developed as extensively for persons affected by nuclear, biological or chemical (NBC) weapons. In particular, there have been few in-depth analyses of long-term psychosocial effects among civilian victims of NBC attacks. However, the increasing probability of

military or terrorist use of such agents and the employment of chemical weapons against Iran by the regime of Saddam Hussein during the Iran-Iraq war of the 1980s makes it imperative that both short- and long-term physical and psychological consequences resulting from exposure to NBC agents be evaluated and used as the basis for therapy.

Exposure to chemical warfare (CW) agents may result in substantial short and/or long-lasting effects, including behavioral and psychological disorders in exposed individuals. In recent years, CW agents have been employed against unprotected civilians in military conflicts and terrorist attacks. One of the most tragic uses of chemical weapons against civilians was the chemical bombardment of the city of Sardasht in northwestern Iran in June 1987. An estimated 4,500 people—more than a third of the city's population—were exposed to the toxic chemical, a significant proportion of whom are still chronically ill.

Method: A representative cross-section of 400 individuals, 69% male and 31% female, was selected from among residents of Sardasht, who were confirmed to have been exposed to a mustard agent as a result of the chemical attack of June 1987. Each participant was administered a standardized questionnaire that addressed individual experiences at the time of exposure to the agent and life experiences following the attack.

Results: Results of this study reveal that: (1) long-term psychological and social effects of a chemical weapon, military or terrorist attack may be worse than the acute effects of such an attack; (2) women are more vulnerable than men to both short- and long-term psychosocial effects of the attack; and (3) survivors who were under 19 years of age at the time of the attack suffer more significant long-term psychological effects than those over 19 years of age.

Conclusion: This study illustrates patterns of psychosocial effects among the mustard gas exposed civilian population of Sardasht. This study may be of use in designing both civil defense and medical management strategies in case of future chemical attacks on unprotected civilian populations (such as psychological intervention for victims and survivors). It also may assist in the prevention and mitigation of the psychosocial impact of these agents.

Keywords: agents; biological; chemical; civilians; effects; long-term; nerve; nuclear; psychosocial; short-term; terrorists; weapons

Prehosp Disast Med 2005;20(2):s94-s95

Minimizing Health Effects of Nuclear, Biological, and Chemical Hazards in Large-Scale Disasters

V. Koscheyev

University of Minnesota, USA

Society has had limited experience in dealing with terrorist acts involving hazardous nuclear, biological, and chemical (NBC) substances in the form of weapons or derivatives such as dirty bombs, microbial toxins, or dry, liquid contaminants. In countries outside the United States, there is

active progress at the federal government level to restructure disaster management; however, more specific and detailed efforts are required in regard to medical responsibilities in large and small communities. The local level is where possibly exposed people, sometimes in large numbers, will be dealt with even though there might not be a clearly established toxic factor and diagnosis. The NBC Hazards Task Force gathering with representatives from the world disaster community is an appropriate venue to work through and delineate responsibility for specific problems, such as: (1) preventing mass casualties and minimizing health consequences to the affected population; (2) dealing with issues centering on rapid evaluation of the toxin and other aggressive factors such as swift triage; and (3) developing potential strategies/solutions involving immediate implementation of highly effective countermeasures. In time, these goals can be accomplished with the help of the scientific knowledge and practical experience of specialists and the centers they are associated with, which have already been involved in responding to different types of disasters during the last several decades.

It is crucial to bring together an international pool of laboratories that worked covertly during the Cold War. A great deal of extremely useful knowledge for developing highly effective early responses for diagnosis and prevention still has not reached local professionals. For example, Russia's experience with natural epidemics, and the successes, difficulties, and lessons learned in evaluating field pathogens and associated medical management is unique and still valid for consideration by the international medical community. Moreover, to enhance medical management effectiveness in any type of disaster, unified methodological approaches are necessary. International guidelines must be developed in detail and in close collaboration with teams providing NBC factor estimation, from both a qualitative and quantitative perspective.

Establishing biosecurity and protection standards for different population sizes is the next serious step toward protecting the international community from terrorists' acquisition of nuclides, dangerous pathogens, and chemicals. Each country must possess and distribute to local populations standard diagnostic kits for a range of NBC agents and combinations of these agents, as well as antidotes and protective equipment. The number of kits distributed would vary according to population size. This presentation also examines additional problems associated with minimizing the health effects of NBC agents through the example of Chernobyl and other disasters, and the role of the NBC task force in influencing disaster medical organizations around the world to increase the effectiveness of health management to the same high level in both urban and rural communities.

Keywords: agents; disasters; events; nuclear, biological, chemical (NBC); preparedness

Prehosp Disast Med 2005;20(2):s95