

Sarin experiences in Japan: Acute toxicity and long-term effects.

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Kanto Rosai Hospital, 1-1, Kizukisumiyoshicho, Nakahara-ku, Kawasaki, 211-8510, Japan. Two terrorist attacks with the nerve agent Sarin affected citizens in Matsumoto and Tokyo, Japan in 1994 and 1995, killing 19 and injuring more the 6000. Sarin, a very potent organophosphate nerve agent, inhibits acetylcholinesterase (AChE) activity within the central, peripheral, and autonomic nervous systems. Acute and long-term Sarin effects upon humans were well documented in these two events. Sarin gas inhalation caused instantaneous death by respiratory arrest in 4 victims in Matsumoto. In Tokyo, two died in station yards and another ten victims died in hospitals within a few hours to 3 months after poisoning. Six victims with serum ChE below 20% of the lowest normal were resuscitated from cardiopulmonary arrest (CPA) or coma with generalized convulsion. Five recovered completely and one remained in vegetative state due to anoxic brain damage. EEG abnormalities persisted for up to 5 years. Miosis and copious secretions from the respiratory and GI tracts (muscarinic effects) were common in severely to slightly affected victims. Weakness and twitches of muscles (nicotinic effects) appeared in severely affected victims. Neuropathy and ataxia were observed in small number (less than 10%) of victims, which findings disappeared between 3 days and 3 months. Leukocytosis and high serum CK levels were common. Hyperglycemia, ketonuria, low serum triglyceride, hypopotassemia were observed in severely affected victims, which abnormalities were attributed to damage

of the adrenal medulla. Oximes, atropine sulphate, diazepam and ample intravenous infusion were effective treatments. Pralidoxime iodide IV reversed cholinesterase and symptoms quickly even if administered 6 h after exposure. Post Traumatic Stress Disorder (PTSD) was less than 8% after 5 years. However, psychological symptoms continue in victims of both incidents. In summary, both potent toxicity and quick recovery from critical ill conditions were prominent features. Conventional therapies proved effective in Sarin incidents in Japan.
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