NERVE AGENTS

GUIDELINES FOR ACTION IN THE EVENT OF A DELIBERATE RELEASE

Key points

- The nerve agents are a group of particularly toxic chemical warfare agents. They are chemically related to organophosphorus insecticides. The principal agents in this group are tabun (GA), soman (GD), sarin (GB), GF and VX.
- Nerve agents may be absorbed by inhalation, ingestion or through the skin.
- Protective clothing and full respiratory protection must be worn in contaminated areas or when handling casualties contaminated with liquid agent. Off-gassing of volatile nerve agents from casualties may be sufficient to cause symptoms. Casualties should be transported in such a way that emergency personnel do not become contaminated, or exposed to fumes.
- Nerve agents inhibit the enzyme acetylcholinesterase, thus resulting in an accumulation of acetylcholine which may produce the following:
    - Muscarinic (parasympathetic effects)
        - Copious secretions (salivation, bronchorrhoea, rhinorrhoea, lachrimation, sweating), bronchospasm, bradycardia, abdominal cramps, diarrhoea, constricted pupils (miosis).
    - Nicotinic (motor and post-ganglionic sympathetic)
        - muscle fasciculation, weakness, respiratory paralysis, tachycardia, hypertension.
    - Central Nervous System:
        - Emotional lability, confusion, ataxia, convulsions, coma and central respiratory depression.
- **Death is usually due to respiratory arrest.**

- Three types of antidote are of use in the treatment of nerve agent poisoning and have a synergistic effect:

    - **ATROPINE;** antagonises the effects of acetylcholine at muscarinic receptors. It is particularly effective in decreasing secretions and treating bradycardia.

    - **OXIMES** ; reactivate inhibited enzyme, thereby decreasing the amount of excess acetylcholine

    - **DIAZEPAM;** CNS protection.

- ***Admission criteria***

- **Mild symptoms:** such as headache, nausea; small pupils, visual difficulties and painful eyes; running nose, eyes and excess salivation; mild muscle weakness and agitation

    - Observe for 2 hours; If symptoms improve or the patient has not deteriorated within 2 hours then casualties should be discharged with information on criteria to seek further medical advice.

- **Moderate symptoms:** such as dizziness, disorientation and confusion; sneezing, coughing and wheezing; marked drooling and excess phlegm production; vomiting and diarrhoea; marked weakness, difficulty in breathing

    - Should be kept in an area where they may be observed); medical staff must observ for deterioration in medical condition and be prepared to move patients to the severe symptom group if necessary; administer antidotes as appropriate; if symptoms improve or patient has not deteriorated within 24 hours then casualties should be discharged with information on criteria to seek further medical advice.

- **Severe symptoms:** such as respiratory difficulty, convulsions and ventricular arrhythmias

    - Admit casualties to ITU or equivalent wards; administer antidotes; supplemental oxygen should be administered, excess secretions may require removal by suction; ventilate if necessary; monitor red blood cell cholinesterase daily until symptoms improve; it is vital to treat the symptoms and not be lead by the cholinesterase concentration