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Briefing note for Emergency Departments – management of suspected Novichok poisonings (July 2018)

Background

The following observations are intended to guide Emergency Departments by updating them on a number of issues that have become apparent through the experience of receiving, assessing and managing cases of Novichok nerve agent poisoning in the Salisbury area recently.

Important contact number

Assistance on managing such incidents should be obtained quickly through the national ECOSA (Emergency Coordinated Scientific Advice System) and the clinical management of individual patients supported by NPIS (National Poisons Information Service).

ECOSA: **0300 3033 493**

NPIS: **0344 892 0111**

The recommended overarching source of guidance on CBRN incidents is the recently issued PHE handbook Chemical, biological, radiological and nuclear incidents: clinical management and health protection

Detailed notes about management of specific poisons are available from NPIS on Toxbase.

Time of onset & symptomatology

Patients with Novichok poisoning present within hours of exposure, typically less than 6 hours; however any illness occurring within 12 hours after potentially linked to contact with suspect materials / contaminated locations should be investigated

The symptoms exhibited by the cases seen to date have been typical of organophosphate poisoning:

CVS/RS

- Breathing impaired due to secretions ++
- Sinus bradycardia
- hypotension

CNS/Peripheral Nervous System

- Painful dim vision[1]
- Muscle weakness / fasiculation
- Convulsions / coma
- Involuntary defecation

Therapeutic challenge

- Good response to high dose atropine (increased heart rate and blood pressure) is highly suggestive of nerve agent poisoning

The most important differential diagnosis is suspected opiate overdose, and a trial of naloxone should be given initially. Colleagues should be mindful that to exclude the possibility of fentanyl contamination rapidly escalating doses of naloxone are required to exclude mixed heroin / fentanyl overdosage.

NALOXONE: may be given IV / IM / IO

Adults and children aged 12 years or over: initial dose of 400 micrograms (0.4mg), if no response after 60 seconds, give a further 800 micrograms (0.8mg), if still no response after another 60 seconds, give another 800 micrograms (0.8mg); if still no response (after a total of 2 mg), give a further 2mg dose. Large doses (4mg) may be required in a seriously poisoned patient.

Children (under 12 years of age): initial dose of 100 micrograms/kg (0.1mg/kg) up to a maximum of 2mg, if there is no response after 60 seconds give another 100micrograms/kg (0.1mg/kg) and repeat until a satisfactory response has been obtained or a maximum of 2mg has been given.

[1] Miosis was present in all cases seen due to Novichok agents – however, experience with other nerve agents mydriasis may be present where nicotinic effects predominates, and therefore the best clinical summary is that painful blurred vision is the best descriptor of potential clinical presentations with either miosis or mydriasis being present.

If there is a failure to respond to naloxone then give atropine and seek specialist help with further management:

ATROPINE: may be given IV / IM / IO

Adults and children aged 12 years or over: 4.0 - 4.2 milligrams (8 x 500 / 7 x 600 microgram ampoules).

Children (under 12 years of age): 50 to 75 microgram/kg in a child.

Doses repeated every five minutes until secretions are minimal and the patient is 'atropinised' (lungs are clear, heart rate is greater than 80/min, and blood pressure is adequate).

Note: as the pupils may remain constricted / dilated for several days due to direct nerve agent exposure, pupil size should not be used as an end point for atropinisation.

Safety of staff

When treating symptomatic patient's suspected of Novichok poisoning standard NHS PPE (gowns, visors and two pairs of nitrile gloves) is adequate[2].

It is not necessary to invoke lock down procedures in this situation.

Assessment and care of these patients should ideally take place in a single person room where clothing and clinical waste can be secured safely for later disposal.

Primary decontamination of a patient is achieved by removal and double bagging of their clothing.

When time allows decontamination using a careful wash of the patient's skin using soap / detergent and water is desirable using standard NHS PPE (gowns, visors and two pairs of nitrile gloves).

Cleaning of clinical areas

All NHS hospitals in the UK, have fittings and furnishings that resist contamination (including mattresses) and may be readily cleaned to a high standard; where possible disposable materials should be used.

[2] NOTE: other traditional nerve-agents will have higher volatility and other precautions need to be taken to protect staff; including decontamination using removal of external layer of clothing before admission to the ED.

Guidance on decontamination and sterilisation of re-usable clinical equipment in the intensive care area has developed to ensure that there was no risk of cross-contamination where the use of single-use equipment is not feasible (see appendix A).

In clinical areas where assessment and care of people who have been affected by Novichok agents has taken place:

- The routine cleaning protocols, methods and materials already in use will be sufficient to give a high standard of assurance that these clinical areas remain fit to use, and are safe for staff, patients and members of the public
- There is no need to dispose of any furnishings
- There is no need to undertake any re-assurance environmental sampling
- Following completion of clinical care normal terminal decontamination should be undertaken and consideration given to including an additional step of a wipe down of hard surfaces using a 1:1 dilution of standard 5% hypochlorite (bleach) solution, not mixed with any other chemicals or cleaning agents, taking account of appropriate safety precautions
- In all cases it is recommended that specialist advice should be sought from PHE Emergency Response Department on the need and actual process to be followed

Cholinesterase testing

Cholinesterase testing is a useful adjunct to diagnosis of symptomatic patients and the monitoring of the recovery of established cases of nerve agent poisoning.

Cholinesterase testing has no value in the assessment of asymptomatic patients or as a screening tool (see appendix B).

Authorship

This note has been prepared by Dr Nick Gent PHE and Dr Bob Winter NHSE.

It is based on advice from Dr Christine Blanshard (Medical Director Salisbury NHS Foundation Trust).

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Appendix (A): Practice note: safety and management of reusable equipment in patients suffering from nerve agent poisoning (Salisbury Incident)

Introduction

Advice has been requested on the safety of re-use of the following equipment:

1) Transfer trolley
2) ECG equipment
3) EEG equipment
4) Infusion pumps
5) Ventilators (ICU / MRI / transfer equipment)
6) Surgical equipment (non-disposable)

Assumptions

- The transfer trolley is prepared as normal with the usual surface coverings
- Items (2)-(4) are attached to the patient with disposable connectors / catheters
- The ventilators are using disposable circuits and filters
- The surgical equipment is subject to normal CSSD cleaning and decontamination processes before re-use

Notes

In assessing risk of exposing a subsequent patient to risk we have noted that:

Ventilation equipment is already designed to offer a high level of protection between patient re-use for control of infection.

Given the anticipated low levels of surface contamination, transfer amounts will be very small and wipes containing surfactants (e.g. Clinell Universal Wipes) or chlorhexidine (e.g. PDI Super Sani Cloth Plus Wipes are sufficient. A terminal clean would be best performed with an Actichlor solution in its usual dilution.

The free chemical agent is not expected to be present in significant quantities in blood or sputum. It is possible low levels of active metabolites are present.

Normal CSSD practices should be sufficient to clear free active agent and metabolites. If this includes a detergent-based dishwashing stage (with heat) and/or a direct steam- instrument contact sterilisation full inactivation would be expected. The ordinary personal protection systems in use should be adhered too.

Advice

All of the items listed in (1)-(6) above may be safely re-used without risk to staff or patients should notes above be adhered too.

Appendix (B): Cholinesterase testing practice note

Purpose

Cholinesterase testing for nerve agent / organophosphate exposure is available from a number of PHE laboratories, DSTL, and some NHS hospitals.

This brief note explains how and when it may be appropriately used.

Background

Cholinesterases are bound by organophosphate (nerve) agents causing a malfunction of acetylcholine mediated nerve transmission.

Exposure to nerve agents decreases the level of cholinesterases detectable in whole blood specimens.

The normal levels of cholinesterases in the blood are not well defined (as routine testing for cholinesterases is only ordinarily undertaken in certain occupational groups).

Further, it is known that cholinesterase levels vary throughout the day, over weeks, and in response to certain medicines.

Advice

As a result of the known issues of lack of a reliable normal range estimate; cholinesterase testing may only be considered to be wholly suitable for differential diagnostic purposes where significant exposure to a nerve agent may have occurred and confirmation that the symptoms present are probably due to that exposure.

Cholinesterase testing is also probably of therapeutic use in monitoring response to treatment, especially judging the safety of withdrawal of antidotes.

Cholinesterase testing is not suitable for use as a screening tool to judge exposure to low- doses of a nerve agent, and cannot be used for re-assurance that such exposures have not occurred. It should not, therefore, be used in the absence of any characteristic symptoms of nerve agent poisoning.

Please seek advice early.

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