GUIDELINES FOR MEDICAL AND NURSING STAFF -

CS AEROSOL INCAPACITANT SPRAY

INTRODUCTION

Risk Management Support Unit, NHS Grampian in conjunction Grampian Police have designed the following guidelines to assist Medical and Nursing staff care for an individual and indeed the clinical environment when a patient has been exposed to CS Incapacitant Spray.

The Police will inform staff on arrival when an individual has been sprayed with CS Incapacitant. However individuals who have been exposed may present themselves to GP’s or Acute Departments within NHS Grampian. These persons should have an information sheet with them provided by Grampian Police (see section 4).

In extreme cases it may also be necessary to deploy CS Incapacitant Spray within the clinical environment. The Medical, Nursing and Police members present would perform a risk assessment first.

In cases where an individual has been taken to the care environment under the custody of the Police, it is essential that both clinical staff and the Police officers perform a joint risk assessment to determine whether or not handcuffs are to be removed. If the patient is deemed to be a high risk to him/herself, staff members or others it would be necessary to have police presence at all times.

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CS AEROSOL INCAPACITANT SPRAY

MEDICAL GUIDELINES

Health & Safety

CS has been well researched from a toxicological standpoint and whilst there are short-term effects detailed below there is no evidence of harmful long-term effects.

Composition of CS

a) CS (Chlorobenzylidene Malonitrile) - this is the actual irritant, which is a white crystalline solid dissolved in a solvent at 5% concentration.

b) Solvent (Methyisobutyl Ketone).

c) Propellant Gas (Nitrogen)

All ingredients are acceptable in respect of environmental issues and Health and Safety criteria.

Clinical Effects

When the CS solution is sprayed from the aerosol, the solvent will evaporate, leaving a fine dispersion of CS particles. These particles will affect the sensory receptors in the eyes, skin, upper respiratory and GI tracts, causing comparatively rapid but short lived disablement. The solution is propelled as a stream of spray, rather than as a mist (like deodorant or hairspray) and should be used at a distance of between 1 - 3.5 metres from the suspect.

If water (especially warm) comes into contact with the CS particles after delivery, it may lead to a further dispersal of the irritant.

The levels at which effects are noted, and these effects, are set out in the table below:

<table>
<thead>
<tr>
<th>CS Concentration in Air</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.004 mg.m⁻³</td>
<td>Just detectable - slight irritation of eyes and nose</td>
</tr>
<tr>
<td>0.5 mg.m⁻³</td>
<td>Sufficient to make by-standers hurry away</td>
</tr>
<tr>
<td>4.0 mg.m⁻³</td>
<td>Sufficient to disperse a rioting crowd</td>
</tr>
<tr>
<td>10.0 mg.m⁻³</td>
<td>Sufficient to deter trained troops</td>
</tr>
</tbody>
</table>
The clinical effects and normal average duration are detailed in the table below:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Onset Time</th>
<th>Time to Relief</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflammation of Conjunctiva</td>
<td>0-10 secs</td>
<td>25-30 mins</td>
</tr>
<tr>
<td>Pain in eyes</td>
<td>0-10 secs</td>
<td>25-30 mins</td>
</tr>
<tr>
<td>Reduced Visual Acuity</td>
<td>0-10 secs</td>
<td>25-30 mins</td>
</tr>
<tr>
<td>Excess Lachrymation</td>
<td>0-10 secs</td>
<td>15 mins</td>
</tr>
<tr>
<td>Blepharospasm</td>
<td>0-10 secs</td>
<td>25-30 mins</td>
</tr>
<tr>
<td>Rhinorrhoea</td>
<td>0-10 secs</td>
<td>25-30 mins</td>
</tr>
<tr>
<td>Burning Sensation</td>
<td>0-10 secs</td>
<td>25-30 mins</td>
</tr>
<tr>
<td>Coughing</td>
<td>0-10 secs</td>
<td>10 mins</td>
</tr>
<tr>
<td>Photophobia (10% of subjects)</td>
<td>0-10 secs</td>
<td>1 hour</td>
</tr>
<tr>
<td>Difficulty Breathing</td>
<td>0-10 secs</td>
<td>10 mins</td>
</tr>
<tr>
<td>Tightness / Pain in Chest</td>
<td>0-10 secs</td>
<td>5 mins</td>
</tr>
<tr>
<td>Irregular breathing including breath holding for short periods</td>
<td>0-10 secs</td>
<td>10 mins</td>
</tr>
<tr>
<td>Apprehension</td>
<td>0-10 secs</td>
<td></td>
</tr>
<tr>
<td>Stinging / burning sensation in skin</td>
<td>few minutes</td>
<td>15 mins</td>
</tr>
<tr>
<td>Erythema Skin</td>
<td>few minutes</td>
<td>24-48 hours</td>
</tr>
<tr>
<td>Erythema Eyelids</td>
<td>few minutes</td>
<td>1 hour</td>
</tr>
</tbody>
</table>

Management

General

In the majority of cases effects resolve spontaneously within 15-30 minutes after cessation of exposure and medical treatment is usually not required. Reassurance is essential. The most important first line treatment is removal from exposure. Medical personnel should wear gloves. Casualties should be placed in a well ventilated area, preferably where there is a free flow of air to ensure rapid dispersal of the particles. Clothing, if contaminated, should be removed and the casualty issued with alternative clothing. Clothing may be decontaminated by washing in a conventional washing machine with a normal powder or liquid. The clothing should be washed several times before wearing to ensure all the chemical is removed.

Eye

Discomfort, pain lacrimation, conjunctival erythema, periorbital oedema and spasm of the eyelids. There may also be physical injury to the eye by the pressure jet from the canister.

The subject's eyes should be forced shut thereby causing temporary incapacitation. Contact lens wearers may present with more acute symptoms. Conjunctivitis can persist for up to 24 hours.
Usually tear secretions are sufficient to remove the chemical from the eye, but where ocular effects persist, eye irrigation should be undertaken using saline or water. Ophthalmological referral is indicated for patients with severe ocular effects.

**Respiratory Tract**

Dyspnoea, tight chest, coughing, sneezing, burning sensation or increased secretions. Respirations may be irregular with periods of Apnoea. Pulmonary oedema may occur 12-24 hours later following excessive exposure. Patients with pre-existing respiratory disease (eg asthma, bronchitis) may be more at risk of severe effects.

Patients with persistent significant breathing difficulties lasting more than 15-20 minutes should be referred to hospital for assessment and observation. Humidified oxygen may provide symptomatic relief.

A simple cough linctus may help coughs. Particular consideration should be given to people with existing pulmonary or cardiac disorders and normal clinical protocols followed.

**Cardiovascular Symptom**

Anyone suffering from pre-existing cardiovascular abnormalities should be examined and monitored by a doctor and referred if necessary as hypertension can be exacerbated.

**Nose and Mouth**

Discomfort, burning sensation.

**GI Tract**

Nausea, vomiting.

**Skin**

Burning sensation with possible erythema and blistering. Skin may become painful on contact with water for up to 48 hours later.

The skin should be washed with soap and water if necessary. Further treatment is unlikely to be required. Any chemical burns should be treated as thermal burns. Topical steroids may be used for contact dermatitis.

Delayed skin irritation (onset 8-15 hours after exposure) has been observed in a significant number of cases. Symptoms gradually settle but have taken up to one week to disappear. This is thought to be related to the solvent (MIBK) in which the CS is held in the particular formulation used in the trials. Anyone sprayed should be advised to consult their GP if symptoms arise. Treatment is symptomatic.
N.B. The extent of these effects will depend on the amount of CS used and will vary between individuals.

Special care should be taken with asthmatics / bronchitics, those under the influence of alcohol, drugs, those presenting with bizarre or violent behaviour, and contact lens wearers.

Conclusion

These comments are intended as a general guideline for medical practitioners to assist in assessing and treating any diverse reactions to CS.
CARE OF THE PATIENT WHO HAS BEEN EXPOSED TO CS INCAPACITANT SPRAY

The following guidelines shall equip you to care for an individual who has been sprayed with CS Incapacitant whilst minimising the risk of cross contamination to yourself and the environment.

Remember the individual has been previously incapacitated for a reason. Ensure all risks have been assessed including the risk of violence and a safe system of work has been implemented. Environmental factors must be taken into consideration e.g. escape routes and presence of potential weapons. Act professionally and impartially, seek further support where necessary and remember your own safety is paramount. When Police are present a joint risk assessment is essential. Further advice can be sought from the Risk Management Advisor for Violence and Aggression, Risk Management Support Unit, NHS Grampian.

1. If possible take the patient directly to an area where cross contamination of CS crystals is unlikely to affect other patients/staff. The area should be well ventilated. Where there is a lack of ventilation a fan should be in place. This area should ideally be close to the entrance of the clinical area.

2. Always wear gloves to avoid cross contamination.

3. The patient may be complaining of symptoms described in the Medical Guidelines. Reassure the patient at all times. Advise them not to rub their eyes, this will enhance the effect of CS Spray. Most symptoms associated with exposure should resolve within an hour. Dry tissues/ wipes should be provided, as the patient shall be experiencing a high production of mucus.

4. Contact lens wearers should be advised to remove their lenses. Eye bathing may be required although natural tears should relieve symptoms.
5. Contaminated clothing should be removed immediately. Try to ensure minimal movement of the clothing, as particles will become dislodged. The clothing should be double bagged to avoid crystals escaping. These items of clothing should not be processed through the hospital laundry system. They should be returned to the patient to decontaminate once they have been discharged. The patient should be advised to expose their clothes to open air, to disperse the crystals then wash them separately and twice. Hospital bed linen which may be contaminated should be initially be put into a water soluble laundry bag then bagged again in a red bag.

6. The effect of CS crystals will be enhanced with moisture. The patient should be advised not to wash their face until the crystals have been dispersed. The easiest way to disperse the crystals is to have the patient stand in open air outside, stand in front of an open window or stand in front of a fan for approximately 15 minutes. Remember do not stand behind the patient if the flow of air is directed towards them. CS crystals should disperse in a well-ventilated area within 45 minutes. If the patient has to wash their face then copious amounts of tepid water should be used.

7. If at any time you feel any of the symptoms of CS Incapacitant spray, leave the area and expose yourself to open air for 15 – 20 minutes. Do not rub your eyes or wash your face if there is a possibility of having crystals on your hands or face.

8. If you suspect that you may have CS crystals on your uniform/ clothes, you should change to avoid cross contamination. Double bag your clothes until you can hang them outside (unwashed) to disperse the crystals. The clothing should then be washed separately and twice.
CARE OF THE ENVIRONMENT FOLLOWING DEPLOYMENT OF CS INCAPACITANT SPRAY

In extreme cases it may be necessary to deploy CS Spray in order to contain a situation when all other efforts have failed. CS Incapacitant Spray is a firearm, only certain members of the Police Force can legally use it. A joint risk assessment between Health Care Professionals and the Police is essential prior to deployment. Consideration must be given to other vulnerable patients.

1. Advise the Police present of any vulnerable patients – patients on ventilators, respiratory or cardiac problems.

2. Ensure all patients/ public and non-essential personnel who can be removed are.

3. Isolate the area.

4. Once the Police have gained control and the individual is secured, make every effort to ventilate the area. Open all windows to promote a through flow of air. The odour present shall be the solvent from the spray, which almost immediately evaporates and has no lasting effects. Ventilate the area for a minimum of 45 - 60 minutes this allows the CS crystals to disperse and degrade.

5. If the patient requires further medical attention and cannot be removed from the area follow the guidelines for care of the patient who has been exposed to CS Spray.

6. Residue from the CS Spray may be present on equipment or surfaces. Clean with hot soapy water or detergent. Wear gloves at all times.

7. The area should remain out of use until full decontamination has takes place.

8. Contaminated pharmacological products, dressings, foodstuffs etc should be disposed of.
9. Hospital bed linen which may be contaminated should be initially be put into a water soluble laundry bag then bagged again in a red bag.

10. If at any time you feel any of the symptoms of CS Incapacitant spray, leave the area and expose yourself to open air for 15 – 20 minutes. Do not rub your eyes or wash your face if there is a possibility of having crystals on your hands or face.

11. If you suspect that you may have CS crystals on your uniform/ clothes, you should change to avoid cross contamination. Double bag your clothes until you can hang them outside (unwashed) to disperse the crystals. The clothing should then be washed separately and twice.
INFORMATION SHEET FOR PERSONS SPRAYED WITH CS INCAPACITANT SPRAY

You have been sprayed with a 5% concentration of CS Spray in the solvent Methyl Isobutyl Ketone (MIBK) with nitrogen propellant

This may have the following effects:-

CS

♦ This causes discomfort to your eyes and a burning sensation to your skin.

♦ You may also have difficulty in breathing and tightness of the chest accompanied by coughing.

♦ Exposure to fresh air will normally result in recovery from most symptoms within 15 minutes. If symptoms persist you should consult your doctor. Take this sheet with you.

♦ Clothing may have been contaminated. To decontaminate, clothing should be hung on a washing line and exposed to fresh air allowing remaining CS particles to be blown off. The clothing should then be thoroughly washed, separately from other items, before being worn again.

MIBK

♦ This may cause your skin to go red after 6 - 8 hours and you may have flaking or blistering of the skin, which could continue for up to a week. If this happens you should consult your doctor. Take this sheet with you.

♦ Shaving or use of toiletries may make the condition more uncomfortable.