

Investigating contact allergy to CS spray

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Patch testing remains integral to the confirmation of contact allergy, even when the history of exposure is suggestive. This is especially important in occupationally related dermatoses, where doubt must be eliminated because of a possible need for a change in working practice or to allow legal recourse. In some situations, obtaining materials for patch testing may be difficult, owing to their classification as prohibited or restricted. Examples include classified drugs, such as cannabis and LSD, and chemicals used for military applications. Such substances may be obtained for patch testing, in small quantities, with a licence or authorization from the appropriate government department. An example where the ability to acquire a prohibited substance has directly benefited the patient is described below.

2-Chlorobenzalmalononitrile (CS) (CAS 2698-41-1) (Fig. 1), which is used as incapacitating spray, has been widely adopted by UK police forces since its introduction in 1995. Skin irritation and contact allergy to CS is a well-described, although rarely observed, phenomenon. CS is required to be carried by all police officers in some forces, and exposure occurs during mandatory training and active duty.

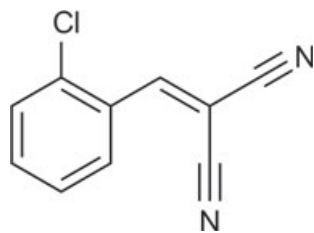


Fig. 1. Chemical structure of CS 2-chlorobenzalmalononitrile (CS).

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Case Report

A typical case is illustrated by a 35-year-old policeman who was initially exposed during his police training. After the second or third exposure, during the course of active duty, he developed an eczematous eruption affecting exposed sites, 12–24 hr after exposure. Subsequent exposures, for as little as 3–4 seconds each time, caused more severe cutaneous effects.

This patient was seen locally and referred to two specialist centres for investigation, but patch testing could not be carried out, owing to difficulties in obtaining CS. Under UK firearm law, CS incapacitant sprays are classed as prohibited weapons, making it unlawful for a member of the public to possess such an item. Our CS was obtained from a government laboratory, and special handling procedures were used in modifying it for patch testing.

Diagnostic patch tests using Finn Chambers® with Scanpor® tape produced graded reactions when CS [diluted in 4-methyl-2-pentanone (methyl isobutyl ketone; CAS 180-10-1)] was tested at dilutions from 0.01% to 0.0001% (Table 1). At the 2-day reading, the patient showed a + reaction (palpable erythema) to 0.001% (10 ppm) CS. A 4-day reading did not add further information. The dilutions of CS tested were in keeping with those used during a series previously reported (1).

Discussion

A confident diagnosis, via patch testing, is essential in such cases, as officers in the patient's and other forces

Table 1. Patch test results with 2-chlorobenzalmalononitrile (CS) diluted in 4-methyl-2-pentanone

Concentration of CS (%)	Day 2 reading	Day 4 reading
0.01	+	++
0.001	+	+
0.0001	–	–

are required to carry CS routinely. Consequently, our patient is unable to work 'on the beat', leading to a disability in employment. Recently, some police forces

have been moving away from CS to alternatives such as pelargonic acid vanillylamide (CAS 2444-46-4), which is more potent than CS as a lachrymatory agent.

Reference

- 1 Watson K, Rycroft R J G. Unintended cutaneous reactions to CS spray. *Contact Dermatitis* 2005; **53**: 9–13.