



Difficulties in Verifying the Use of Chemical Weapons and the Implications: Some Brief Case Studies

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As long as a worldwide ban on chemical warfare has not been obtained, physicians treating casualties from armed conflicts will be confronted from time to time with alleged chemical warfare casualties. The ability to *disprove* allegations accurately is crucial to furthering international understanding and collaboration, whereas the ability to *confirm* allegations accurately should lead to international reactions against the use of chemical agents and the strengthening of international regulations. In addition, accurate assessment is in the interest of the patient because it leads to appropriate treatment. Criteria for the accurate and reliable confirmation of the use of chemical weapons are presented, and several recent allegations of their use are discussed. It is concluded that, among these recent incidents, full proof of the use of chemical weapons is available only for the Iran-Iraq conflict. [PSRQ 1991;1:201-206]

Chemical arms control negotiations address primarily problems of identification of potential chemical warfare agents or their chemical pre-

cursors, trade regulations concerning these substances, and verification of their production, manufacturing, and stockpiling. Physicians should be concerned with an additional aspect—the verification of allegations of use of chemical weapons in an international or national conflict. As long as there is no worldwide ban on chemical weapons (and probably even after there is one), physicians treating casualties from international or national armed conflicts will be confronted from time to time with casualties of alleged chemical weapons use. The ability to confirm allegations accurately is of impor-

0051-2438/1991/0104-0201\$03.00/0

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This material was presented at the Chemical and Biological Weapons Workshop in the Fifth IPPNW European Symposium, "Health and Security 2000: New Thinking in Europe," Coventry, United Kingdom, September 15, 1990.

tance in determining appropriate patient care and in shaping international response. The ability to disprove allegations accurately is also important, in that political mistrust can be reduced and international understanding and collaboration enhanced.

CHEMICAL ARMS CONTROL AND MUTUAL CONFIDENCE BUILDING

On February 6, 1918, the International Committee of the Red Cross, reacting to the use of chemical weapons by both sides on the Western Front, stated that the use of chemical weapons was a criminal form of conducting war because of the terrible suffering these gases caused—suffering that when seen incited more emotion than that when witnessing the most cruel wounds (quoted by Sandoz, round table on "Doctors and the use of chemical weapons," Monaco, April 27–29, 1989). Although this assessment may be debated by those who have observed the suffering inflicted by modern conventional weapons, there continue to be other good reasons why a ban on chemical weapons should be given priority.

To begin with, the ongoing discussions of a total ban on chemical weapons make sense as an intermediate step toward further disarmament and the solution of national and international conflicts by peaceful means. Chemical arms control negotiations, as this intermediate step, have the advantage that they discuss a relatively well-defined warfare agent, with limited military efficiency, against which there exists irrational fear of the unknown and invisible. Therefore, agreement is less difficult to obtain.

Furthermore, it is important to remember that the industrialized world, with its continual search for improved chemical and industrial processes and new substances, will always remain able to produce the known chemical warfare agents and will inevitably discover new toxic agents potentially useful as chemical weapons. Study of the toxicity of new substances remains necessary to protect the workers at the workplace or other people accidentally exposed to these agents. There is always the danger that this information acquired for peaceful purposes might invite a bellicose power to develop old and new chemicals as warfare agents. Recent examples of such development as described herein, notwithstanding the existing 1925 protocol and ongoing chemical disarmament talks, can easily be found.

Therefore, chemical weapons will remain with us unless a total ban based on international agreement, with accepted verification of production, manufacturing, and stockpiling, is imposed and maintained by the international community.

In the meantime, war remains a way to settle national and international disputes, and, as long as there is no ban on the use of chemical weapons, there is the risk that the losing side will use any means to alter the outcome, including chemical agents. While fighting is taking place, there is frequently pressure from outside to move both parties to the conference table. These peace talks, like any peace talks, depend heavily on the difficult process of mutual confidence building among the parties directly involved and also among those pressing from outside. The same confidence building is also the basis of any disarmament talks. Any allegation of chemical warfare will undermine this confidence building and, therefore, will be a serious threat to the peace talks in particular and to arms control talks in general. Thus, it is crucial to confirm or disprove all allegations of the use of chemical weapons. The best way to do this is to establish internationally accepted criteria for making these judgments and to apply them in all instances where the use of chemical weapons is alleged. If the allegation proves to be true, it is a reality we have to live with, but, if it is not true, it is helpful to the peace and disarmament processes to dispose of the charges. It is a particularly reprehensible act for any person or country for political ends knowingly to make untrue claims that chemical weapons have been used.

CRITERIA FOR JUDGMENT

Criteria for the proper investigation of the allegation of the use of chemical weapons include the following:

1. A thorough clinical examination of the alleged casualties, including analysis of biological samples, should be performed at or near the site of the alleged attack and again after transfer to a clinical center;
2. Other possible causes of symptoms and signs should be investigated and ruled out;
3. An independent team of experts with knowledge of all aspects of classical and chemical warfare should inspect the local site and gather

physical evidence (ammunition allegedly used and environmental samples);

4. An analysis of this evidence and confirmation of results should be performed by more than one reliable laboratory; and
5. Intelligence information regarding the possible use of unconventional warfare should be gathered and evaluated

In active conflict conditions, there will undoubtedly be difficulty in fulfilling these conditions. Independent teams may not be granted prompt and complete access to either battle sites or patients; intelligence information, even if obtained, can rarely be verified conclusively. Despite the difficulties that will inevitably arise, investigators should strive to fulfill these criteria to ensure the credibility of their findings. Scientists, including physicians, should consider carefully the evidence available, and the internal consistency of the overall picture should be weighed against possible incompleteness.

EXAMPLES AND DISCUSSION OF SOME RECENT ALLEGATIONS

Yellow Rain in Southeast Asia and Afghanistan

On September 13, 1981, the U.S. officially accused the U.S.S.R. of having provided allies of the U.S.S.R. in Southeast Asia and Afghanistan with biological toxins (mycotoxins) (Toxins produced by microorganisms can be classified as biological warfare agents. However, with regard to their storage, dispersion, and effects, they closely resemble chemical warfare agents. In the context of this discussion, they are treated as chemical agents.) These mycotoxins were alleged to have been used in the conflicts in Laos, Cambodia, and Afghanistan [1] and to have produced a large number of victims. In addition, the allegations stated that the poisoning of people had been preceded by the appearance of yellow stains on the environmental foliage, a phenomenon that became widely known as "yellow rain." As a result of these charges, "yellow rain" became synonymous with mycotoxin biological warfare, and, according to some, detection of yellow stains indicated direct proof of the use of biological weapons.

Because this allegation had serious negative consequences for the ongoing biological disarmament talks [2], several scientists undertook a careful analysis of the "yellow rain" allegation. Seeley et al. [3]

demonstrated that the yellow stains were bee feces dispersed during en masse cleansing flights and that this natural phenomenon, already known to Darwin in the nineteenth century and to most beekeepers, had nothing to do with the environmental dispersion of chemical agents or toxins. Their findings, once widely publicized, made it scientifically unsound to link the observation of "yellow rain" to a charge of biological warfare.

However, it is important to note that Seeley et al. [3] also clearly stated that these findings did not prove that mycotoxins had not been dispersed. Therefore, they and others continued to evaluate all the evidence presented regarding the history and symptomatology of the alleged victims and results of the laboratory analysis of the environmental and biological samples. The general conclusion of these studies is that the scientific evidence for the use of mycotoxins as alleged in Southeast Asia and Afghanistan is unsatisfactory and cannot be used as a solid base for the official accusations [4,5].

Iran-Iraq Conflict

The broad-scale use of mustard gas, a vesicant, and tabun, a nerve agent, in the Iran-Iraq conflict by Iraq between 1984 and 1988 has been fully established. The evidence, presented in three U.N. Security Council Reports [6a,6b,6c], is consistent and covers all aspects of verification of alleged use: 1) A large number of patients who presented with symptomatology compatible with the agents eventually detected were observed by official U.N. teams both at the site and in several Iranian and European hospitals; 2) Inspection and sampling at different places and times on the battlefield were performed by the official U.N. teams; 3) Identification of these toxic agents in two independent reliable laboratories was consistently obtained; 4) Intelligence information revealed the capacity to produce and use the agents detected.

The verification of this allegation indicates that chemical weapons, even if forbidden by an international convention, are a threat. Furthermore, because of a range of geopolitical considerations, this instance shows that even firm proof, internationally accepted, is no guarantee that there will be international punitive measures directed against the user.

In the last years of the Iran-Iraq conflict, the Iraqis were accused of using chemical agents against their Kurdish population. The most widely known epi-

sode took place on March 16, 1988, at Halabja, where there were hundreds, and possibly thousands, of victims. The scene at Halabja indicated the use of at least two agents, a rapidly acting systemic poison and mustard gas, the clinical symptomatology of some of the casualties being compatible with mustard gas exposure [7]. That Iraq possessed mustard gas and nerve agents, and had used them on the battlefield, had already been established (see above). Confirmation of the presence of mustard gas came from the Chemical Defence Establishment, Porton, U.K., which detected traces of mustard and related compounds in soil samples from Iraqi Kurdistan [8]. Later, the use of sarin at Halabja was detected by Iranian and German scientists by finding hydroxysarin [9]. The detected presence of sarin, which at high concentrations is a rapidly acting systemic poison and is not persistent, can explain the rapid killing. Intelligence information further indicates that Iraq did not use cyanide gas in the war [10]. This and other information was sufficient to convince the government of the U.K. to conclude that chemical weapons had been used by Iraq against their Kurdish population [8].

Angola

Allegations of the use of chemical weapons in Angola were first made in 1984 and continued to be advanced until recently. These allegations have not been put to rest one way or the other because the evidence on which to base a judgment does not meet the criteria stated earlier.

At least five different kinds of chemical agents were alleged to have been used consecutively in different years, tabun, sarin, and an "unknown agent" from 1986 to 1988 [11,12], "complex cyanides" in 1989 [13], and phosphine in 1990 [14]. The allegations, if true, assume a sophisticated logistic chain, great tactical experience, and a complex system to protect the user. However, at no time has there been presented an unambiguous sampling of physical evidence directly related to the alleged victims and their symptomatology or verified identification of the substances involved. Furthermore, the substances actually detected by laboratory analysis—cyanide and phosphine—are also produced in small quantities on detonation of conventional weapons or during generation of smoke.

The number of alleged victims is low for chemical warfare, and at least three groups of patients with

distinct symptoms can be discerned: two patients with blindness reported in 1986 [11], a group of two men, four women, and ten children described in 1989 who either were without complaints (nine cases) or claimed mild unspecific symptoms (seven cases) at the time of examination one month after the alleged attack [13], and a group of about 100 men (10 described in detail) with spastic paraplegia reported over several years [12–14]. However, none of these distinct symptomatology can be related directly to any of the alleged agents mentioned.

The group that most requires explanation is the group of men with spastic paraplegia. A report written in 1990 [14] alleges that all these patients had been exposed to chemical weapons. However, this statement contradicts the original report [12] in which four of the six patients, described in 1988, were said not to have been in contact with any special weapon. Alternative causes have not been ruled out; these include food poisoning, viral diseases known to produce spastic paraplegia in tropical regions, intoxications from other sources, fire, smoke, or chemical contaminants such as triorthocresyl phosphate (TOCP). There is some evidence that TOCP, originating from illuminating devices, was present on the battlefield (J. Maierhofer, Ottoburn, Germany, personal communication, July 6, 1990).

The evidence presented in support of the allegations of the use of chemical weapons in Angola is scientifically unsound. It is possible that the whole story, whether intentionally or through lack of expertise in the field, has been kept alive for political reasons.

Tbilisi, Georgia

On April 9, 1989, Soviet Army and Interior Ministry troops suppressing a demonstration in Tbilisi, Georgia, U.S.S.R., caused severe intoxications and deaths among the population, allegedly by using "chemical warfare agents." An official statement said that the tear gases chloroacetophenone (CN) and orthochloro-benzylidene malononitrile (CS) had been used. U.S. physicians from Physicians for Human Rights and French and Belgian physicians from Médecins sans Frontières reported that chloropicrin, a tear and vomiting agent, had been detected in a spent canister said to have been recovered from the site of the demonstration. Chloropicrin was once widely used as chemical-defense training agent in

both the U.S.S.R. and the U.S. Much of the symptomatology reported among victims in Tbilisi was compatible with exposure to high concentrations of these agents [15]. Another, larger group of patients, predominantly adolescent girls, presented to Tbilisi medical authorities in late May 1989 and were determined by these two groups of physicians to be suffering from mass hysteria [16].

It is the general feeling that exposure to high concentrations of these agents is the correct explanation for the April incident in Tbilisi and that the exposure resulted from the improper use of chemical riot control agents against a population that did not know how to protect itself. This incident should draw our attention to the small margin of safety for chemical agents when used to enforce law and order. Whether riot control agents fall under the provisions of current chemical disarmament talks remains a difficult question. Acceptance of challenge inspection from outside, at the occasion of the use of these agents in an internal civil conflict, might restrain national authorities from using them without proper precautions.

Southern Sudan

In January 1989, rebel forces in southern Sudan charged that intervening Libyan forces had used chemical weapons against them during the previous six months, and a West German Association, the Gesellschaft für bedrohte Völker, announced that, on January 5, 1989, 1,200 people had succumbed to poison gas, apparently mustard gas, near Nasir in Upper Nile province [8]. This information is incomplete and questionable, in that mustard gas is to a large extent an incapacitating agent producing numerous casualties with extensive skin lesions and only a limited number of deaths. As of May 1, 1991, there has been no further information, so this allegation cannot be considered established, let alone verified.

Romania

In December 1989, a toxicologist accompanying a team of physicians from Médecins sans Frontières visited the city of Sibiu, Romania, and claimed that traces of organophosphate nerve agents had been detected in drinking water and that prompt treatment of poisoned patients had prevented a large number of casualties. The toxicologist accused the Securitate forces of having deliberately poisoned the

city water supply [10,17]. However, no evidence regarding the analysis of the water or examination of the alleged patients was presented. Médecins sans Frontières distanced itself from these allegations, and the organization did not mention the allegation in its final press report. Again, this allegation cannot be confirmed.

Kosovo, Yugoslavia

Several accusations were repeatedly voiced in 1990 that Serbian authorities had tried to poison a large number of Albanians in the province of Kosovo, Yugoslavia. Most of the victims were school children. As of May 1, 1991, no hard evidence has been brought forward. According to a physician visiting Kosovo with a group from the International Helsinki Federation for Human Rights, the symptoms of the children suggested mass hysteria [10].

CONCLUSION

A chemical disarmament convention is an important step per se and is also an important intermediate step toward further disarmament. A crucial element in these international conventions is the slow process of mutual confidence building. Several recent allegations of the use of chemical weapons and the credibility of these allegations in light of the suggested criteria to establish credibility have been discussed. By accusing wrongly one of the parties as noncompliant to the already existing 1925 convention, these allegations undermine the understanding already attained in peace talks and prolong further negotiations. Physicians confronted with alleged chemical weapons casualties should employ the criteria described above before lending clinical support to these grave charges. ■

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