

BATTLESOCK — THE CHEMICAL DIMENSION

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SUMMARY: The emphasis in discussions of the impact of chemical warfare (CW) on our military forces has usually been on the lethal or severely disabling effects. Unless personnel have had sufficient and repeated practice in the use of defensive equipment and techniques, the greatest part of the effect may be from partial decrement of performance in all the troops rather than from severe incapacity in those directly injured by the agents.

The use of chemicals to disable or reduce the effectiveness of an enemy is not a new concept. During the Peloponnesian Wars in ancient Greece, pots of boiling pitch and sulphur were placed upwind of besieged cities so that the noxious fumes would overcome the resistance of the defenders within the cities. Later, the so-called Greek fire was used which on contact with water would ignite and set ships on fire. In a sense, gunpowder is a use of chemicals in warfare, but the term chemical warfare (CW) is usually restricted to the use of lethal or disabling gases and vapours which began in World War I (WWI) with the use of chlorine by the German Army. Some countries include the use of riot control agents ("tear gas") under the heading of chemical warfare. If one accepts the position (the United States of America does not), then CW began with the French Army's earlier use of tear gas against German soldiers in trenches in WWI. When the Germans first used chlorine against the Allies, it was fortunate for the Allies that the German General Staff had not realized how great the impact of chemical weapons on unprepared troops would be. Consequently they were unprepared to exploit fully the break produced in the lines and what could have been a disastrous outcome for the Allies was averted.

Eventually both sides in World War II (WWII) used chemical weapons and as defences improved, more toxic chemicals were introduced. As respiratory protection became adequate to protect against inhalant poisons, skin irritants and vesicants were introduced, necessitating the use of protective suits and gloves.

World War I was not the end of CW as many people believed would be the case. Italy used CW against Ethiopian troops in the 1930's, Japan used CW in China both before and during WWII. More recently Egypt used chemicals in Yemen and there are well substantiated reports in the news media of recent use in Cambodia and Laos and of present use by the Russians in Afghanistan.

The emphasis in medical discussions of the effect of CW has usually been on the lethal or near lethal damage produced. Properly so, because WWI history shows that proper management of gas casualties in the British Army reduced fatalities from 17% in 1916 to 2.6% in 1918 despite the fact that more toxic gases were being used. However, there is another effect which needs more emphasis than it has so far received. In addition to the physically injured who are removed from the battle as a result of CW, there are also the psychologically injured who are effectively lost

or at least suffer a major decrement in performance. This latter group constitutes a major problem both for the line commanders and for the medical services. Indeed it is a two-fold problem for the medical services since they will have to treat the severe psychological casualties from the combat and combat support units and will also experience some such casualties in their own number.

Casualties will begin to appear even before real exposure once there is a serious threat perceived of the use of CW by the enemy and some will continue to occur even after the real exposure has passed. Furthermore, problems will occur not only from the effects of the chemical agents but also from antidotes and protective equipment used against them.

Since, inevitably, some individuals who have had little or no exposure to the chemical agents will use nerve agent antidote unnecessarily, it is important to know that the side effects of the antidotes may be temporarily disabling. All antidotes contain large doses of atropine and can produce signs of atropinism with mental confusion, loss of recent memory, inappropriate behaviour etc. This may be aggravated by the common inclusion of a centrally active anticholinergic drug such as benactyzine. In addition to the immediate problems, the effect of the antidote may confuse the diagnosis of chemical agent poisoning and result in the soldier being needlessly put into medical treatment and evacuation channels. Furthermore commonly used therapeutic drugs like chlorpromazine may not only add to the adverse effects of atropine, but also increase the toxicity of low doses of the CW agent itself.

The wearing of full protective kit results in many annoyances as well as producing some more serious decrements in performance. Once the soldier is in full kit, unlike the "Young Lady from Natchez" his response to "itchez" cannot be "scratchez". Anyone who has ever scrubbed for surgery knows that one immediately becomes aware of several itchy spots, an eye that wants rubbing, an incipient sneeze, etcetera. If the soldier is sweating heavily, whether from heat or fear, there is no way to keep it from running down into his eyes. Irritation equals distraction and distraction equals decrement of performance. Decrement results not only in a job done slowly or poorly, but in a marked increase in accidental injuries.

People under stress frequently seek relief by oral stimulation, by smoking or eating. Neither is possible while wearing a protective mask. Drinking is only possible with a very few mask designs and then only from a suitably designed canteen. Even with all the proper equipment it is a difficult thing to accomplish without practice. Furthermore, experience shows that people drinking water from a fountain or through a straw drink a much smaller amount than from a glass. Thus it is unlikely that sufficient water will be drunk to maintain an adequate level of hydration. Water loss will be increased over normal amounts since the added weight of clothing, increased respiratory effort necessary to breathe through the filters, and the inability to lose heat by radiation or convection will result in increased sweating. It is well known that even slight degrees of dehydration produce a decrement in alertness and other mental functions.

Until one has done it for a sufficient time to be acclimatized to it, the increased respiratory effort needed to breathe through a filter is another source of annoyance. Also, since difficulty in breathing is one of the early signs of nerve agent poisoning, anxiety reactions may be produced in unaccustomed soldiers.

Perhaps the most serious source of decrement in effectiveness of troops inexperienced in the wearing of protective equipment is the interference of such equipment with normal socialization and communication. At times of stress we seek reassurance and reinforcement from our friends and colleagues. The soldier in battle, especially when he is unused to battle, will frequently seek contact with his peers and will scan their faces and especially those of his superiors to ascertain the gravity of the situation by their expressions. Soldiers will huddle and use body contact such as a hand on the shoulder, share food or cigarettes, all as a means of reinforcement. The situation is drastically altered when everyone is in full protective kit. Suddenly everyone is a shapeless blob with no visible distinguishing marks. Facial recognition of someone wearing a protective mask is difficult even close up and nearly impossible at any distance. It is even more difficult to assess the expression on his face. Thus the considerable amount of non-verbal communication expressed facially in times of stress is lost. If the lighting is adequate and the distance short, eye contact is possible but it is in a much altered context and thus less expressive of normalcy. Voice recognition is difficult without practice. Volume, clarity and timbre are greatly affected by the mechanical transmission through the "voice emitter" of the protective mask. All of these interferences with normal mechanisms of reassurance will increase the sense of isolation of the soldier and heighten his anxiety.

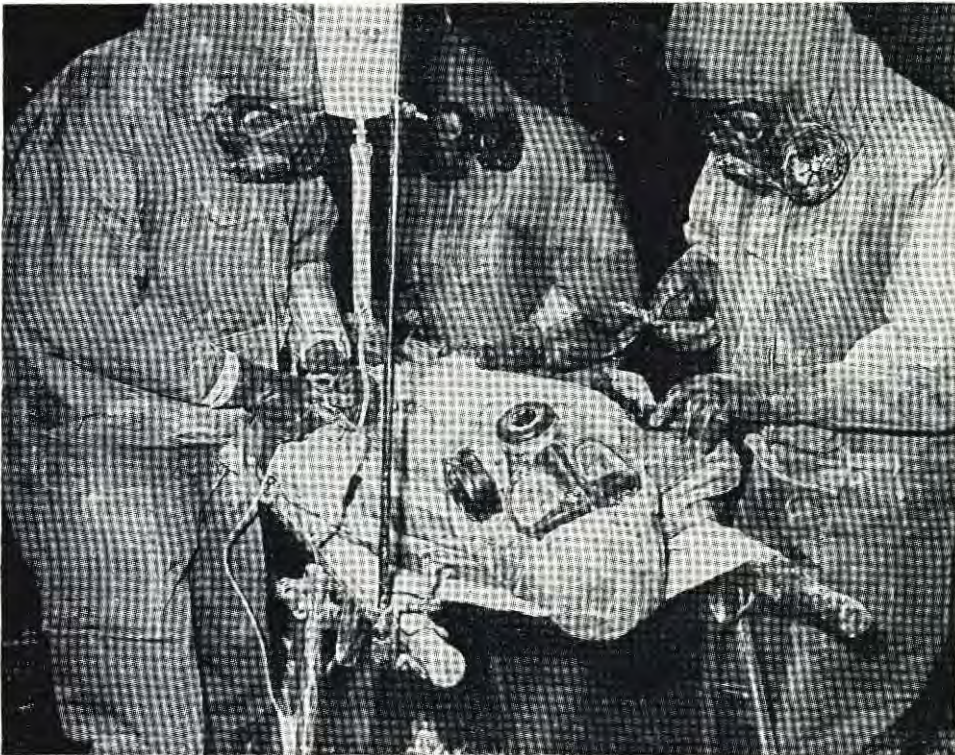


Fig. 1. Surgery in a chemical environment.

On leaving a contaminated zone it will be necessary to be decontaminated. Although not directly within the scope of this paper, it should be noted that the time lost in decontamination and the "lock time" for entering a collective protection shelter are both decrements in performance.

Decontamination will be done by the individual himself with some assistance from others. Decontamination squads provide a socially useful employment for the obsessive compulsives of the world. Unless decontamination is complete, then the clean area rapidly becomes dirty. This knowledge will produce distrust and anxiety about the thoroughness of decontamination by others leading to unnecessary repetition of procedures and some dissension. Another major problem in clean areas, especially in collective protection shelters, will be the citadel sitters and squatters. Those who are in the safe area whether they have a right to be there or not, will be extremely loath to go back into the cold, cruel, contaminated world, and will develop increasingly firm attachment to the reasons alleged to justify remaining there.

Most of the psychologic effects of the chemical agents are not specific to the individual agents but apply equally to all and are based on fear of death, fear of after effects etc. They are heightened over those due to conventional weapons by the "strangeness" of chemical weapons, by the invisibility, inaudibility and, in some instances, undetectability of their presence. The title of a training film "No Place To Hide" expresses the reason for much of the anxiety. There are some specific problems from the so-called nerve gases. Accumulated experience from laboratory accidents and from industrial exposures to organophosphate insecticides demonstrate a variety of psychological problems.

From the combat standpoint, possibly the greatest impact will be from sleep disturbances. These include not only chronic insomnia but severe dream disturbance, sufficient to produce fear of sleeping. Since sleep is already a rare and precious commodity in combat, any further loss will greatly augment the psychological effects of sleep deprivation. On an acute basis, it is known that loss of recent memory and alteration of judgement capacity occur. One can expect that a variety of other problems would be identified if a larger group were to be exposed. Since these aspects of chemical warfare defence are not generally appreciated, it is important for medical staff officers to understand them and to see that commanders are adequately informed. Otherwise it may well be that the greatest effect of a CW attack may be from easily preventable losses. Training is the key and it must be used by all echelons.