THE HANDLING OF CASUALTIES FROM CHEMICAL WEAPONS.

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The correct handling of casualties depends, firstly, on accurate knowledge of the severity, course and proper treatment of the illness which arises from any particular type of war gas; in other words, on correct diagnosis, prognosis and therapeutics—as with any other malady, and, secondly—and of more importance for the welfare of the Army as a whole—on knowledge of the tactical use of gas. Let me illustrate the importance of this latter knowledge.

If your casualties are mostly from a mustard gas bombardment it is unlikely that the enemy is going to advance, because mustard gas being persistent renders ground untenable. It may not, therefore, be necessary to clear your front line medical units, and you can hold on to your cases. If, on the other hand, the enemy bombards with lung irritants or the chlorarsines it is probable that he is going to advance, and you must clear your medical units of all cases which it is safe to move.

To decide which cases should be evacuated and which retained, sound knowledge of the effects of the various types of gases is essential. The first duty of the medical officer is to prevent unnecessary wastage.

Gas is a terrifying weapon and large numbers of men, especially amongst raw troops and troops who have been injudiciously trained, when subjected to a heavy bombardment, will report sick believing they have been gassed, when in reality they have only smelt gas in a concentration which would do them no harm, or have smelt the fumes of high explosive. Again, when troops have been subjected to the heavy strain of prolonged bombardment or fighting, it will only need a small dose of gas—so great is its moral effect—to precipitate a nervous breakdown. The majority of these cases if given a rest and firmly handled, will be fit to return to their units in a short time and need never leave the divisional area. It is stated, by those best qualified to speak, that a dose of gas sufficient to cause harmful results will from the first reveal some sign to the trained observer which will enable him to decide how to dispose of the patient.

Experience in the late war led to the following classifications of gas casualties:

2. Early acute: lung irritants.
3. Late acute: vesicant.

In each of these classes answers have to be found to these questions:

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1 Excerpt from a lecture given at the Royal Army Medical College.
Should they be evacuated?
When should they be evacuated?
How should they be evacuated, i.e., as lying or sitting cases?

Of course every rule must necessarily give way to urgent military situations, but speaking broadly in each class certain principles can be laid down for guidance.

In the case of the lachrymators and chlorarsines as a rule the disability is transitory and patients may be returned to duty in a period varying from a few hours to a few days, though in a few instances general toxic symptoms develop which necessitate evacuation to the casualty clearing station zone or to lines of communication units. For such cases special centres which can serve as divisional or corps treatment and rest stations are most advantageous.

In the case of the lung irritants, pulmonary oedema develops early though its onset may be insidious. The first and second questions may therefore be answered by saying that all cases where definite signs and symptoms of damage appear should be evacuated, and that evacuation from forward medical units, whether field ambulances or casualty clearing stations should be delayed for forty-eight hours.

If the patients develop cyanosis and oxygen administration is necessary, they should, if possible, be retained until convalescence is definitely established, respiration, temperature, and pulse being taken into consideration, and the pulse, which always shows tachycardia in convalescence, being looked upon as the most important of these. The answer to the third question is that all cases of irritant gas poisoning should when possible be evacuated as lying patients from the time of gassing until convalescence is advanced.

The late acute cases—the vesicants—give more time and opportunity to arrange for serious developments. In mustard gas poisoning the lung trouble, broncho-pneumonia, does not develop before the third day and the early skin lesions are no contra-indication to the patient walking from the front line and being subsequently sent on as a sitting case. Once, however, broncho-pneumonia or serious septic infection has set in, he must of necessity be treated as any other serious case. The most urgent point in dealing with mustard gas casualties is to arrange for prompt disposal of the case and disinfection of the patient and his clothing so that he may not further infect himself or infect others.

So urgent and important did the problem of handling gas casualties become—they numbered some twenty per cent of the total towards the end of the war—that the French and Americans each organized special units for their reception.

The British only partially adopted this procedure. Some divisions told off field ambulances for the reception of gas casualties and similarly corps detailed casualty clearing stations for this purpose. These units had certain special equipment and numbered in their personnel medical officers.
and other ranks who were highly skilled in the treatment of gas poisoning. They answered their purpose well in normal periods of trench warfare, but in rush periods and in a war of movement it was found impracticable to sort out and segregate the gas cases from others and to transport them to special units.

In such times, therefore, it became necessary to distribute equipment and trained personnel as widely as possible and to the best advantage, and to endeavour to ensure a high standard of knowledge of gas poisoning amongst front line field ambulances. The above objections did not apply to the same degree at the base. At certain bases special hospitals were designated for the reception of gas cases, not so much in order to arrange for special treatment for the most serious cases—the early acute cases resulting from lung irritants had to be treated further forward—but because at the base it was possible to make a more accurate study of such problems as the length of stay in hospital and period of convalescence and subsequent degree of disability. Once the treatment of gas casualties was thoroughly understood it was found that a large percentage of cases made a rapid recovery and were able to return to full duty.

As I pointed out when dealing with the vesicants, neuroses are common and troublesome sequela. Functional blepharospasm, aphonia, indigestion and disordered action of the heart were prevalent amongst patients recovering from mustard gas poisoning. But once the true significance of these disabilities was appreciated and treatment was based on sound psycho-therapeutic lines, they became less frequent and it was found that the stay in hospital and period of convalescence were greatly reduced. This lesson was more quickly learnt in France than in England, where cases were widely scattered and under the care of medical men who had little special training, and so in many instances patients were kept for lengthy periods under medical care to the great detriment both of the individuals themselves and also of the country. In the future, therefore, should a similar situation arise, it is very necessary that gas patients evacuated from overseas should be sent to special hospitals in this country which should be staffed by medical men with special training.

The second problem of medical administration is the organization of treatment.

Many of the slight cases—lachrymators and chlorarsines—need never go further back than the regimental aid post. As regards the lachrymators, no treatment beyond removal from the gas need be applied in the majority of cases. A whiff or two of chloroform will relieve the pain in the nose, throat, and teeth, caused by the chlorarsines. In the case of the early acute cases—the lung irritants—the organization of treatment is more difficult. The essentials are rest, warmth, and oxygen. Rest can be ensured by evacuating as lying cases, warmth by blankets, hot-water bottles, etc.; but the provision of oxygen at the front, or even to field ambulances, is more difficult. For, though the Haldane oxygen delivery
apparatus makes administration easy, the quantity of oxygen necessary is enormous, and its supply is largely a matter of transport. The usual cylinders are bulky and heavy. During the war the Air Force had special light cylinders for pilots flying at high altitudes, and at present one of the problems which is engaging the attention of the Oxygen Research Committee is the provision of a light cylinder which will be sufficiently strong to withstand the high pressure developed when it is fully charged.

In casualty clearing stations and field ambulances acting as such, it is possible to arrange for special wards where an oxygen supply can be arranged with delivery pipes over each bed.

Even if oxygen is not available in quantity, early venesection may relieve the blood concentration resulting from the pulmonary oedema and benefit the patient; and this procedure should be carried out at aid posts and dressing stations when the patient’s condition indicates the onset of serious symptoms of lack of oxygen.

The third group of cases, the late acute caused by vesicants, should be placed in fully equipped wards before urgent symptoms develop. The urgent need in the field units—regimental aid posts and field ambulances—is to remove and dispose of the infected clothing and relieve the early eye and skin lesions. I have already dealt in my first lecture with the disinfection of clothing contaminated by mustard gas. It should be possible with mobile disinfecting units to arrange for this close to the front. The eyes should be bathed and the patient washed over with a two-per-cent solution of bicarbonate of soda.

When special units are detailed for the reception of gas casualties, accommodation should be organized so that cases can be sorted, their clothing disposed of and treatment initiated without delay.

Accommodation should, therefore, consist of a receiving room, a room for contaminated clothing, a lavage room, and wards for serious and light cases.

Organization of treatment should extend beyond the acute illness into convalescence whether the patient remains overseas or is evacuated to the United Kingdom. It is necessary to arrange for graduated exercise for the cases of lung irritant poisoning who suffer from “effort syndrome,” and for administration of oxygen to those who suffer from nocturnal dyspnoea. It is also necessary to arrange for the re-education of the convalescents who develop conversion hysterias after either vesicant or chlorarsine poisoning.

If in war we are to deal adequately with administrative problems such as those which I have indicated above, we must have adequate training in peace. This training would naturally fall under the following headings:

1. The training of medical officers.
2. The training of other ranks, R.A.M.C.
3. The training of stretcher bearers.
4. Medical aspects of the general training of troops in gas defence.
The Handling of Casualties from Chemical Weapons

(1) Training of Medical Officers.

In the late war one of the chief difficulties of the medical services was dissemination of intelligence regarding the effects of poisonous gases and their treatment. This was inevitable in view of the secrecy which had to be maintained regarding the gases used, but apart from that we have, I hope, learnt the lesson that a special organization is necessary to disseminate medical intelligence regarding prevention and treatment of diseases and injuries which may cause serious wastage. The beginning of such an intelligence service has been made in the institution of hospital or district libraries.

At present no official manual dealing with the medical aspects of gas warfare is available, but the official medical history is now published. These lectures on gas warfare are also part of the course of instruction for officers attending the Royal Army Medical College.

(2) Training of Other Ranks, R.A.M.C.

The chief points to be attended to are:
(i) The disinfection and disposal of clothing contaminated by mustard gas.
(ii) The sorting of gas casualties into serious and light cases.
(iii) The provision of oxygen equipment and of wards for the administration of oxygen.
(iv) The technique of venisection and saline infusion.
(v) The instruction of other ranks in the application of defensive apparatus to wounded and helpless patients.

(3) Training of Stretcher Bearers.

Medical officers in charge of troops when training regimental stretcher bearers in first aid, should instruct them in the handling of and first-aid treatment for gas casualties, laying stress on the necessity for evacuating as lying cases casualties from the lung irritants, and the precautions to be adopted in handling the clothing and equipment of patients contaminated by mustard gas.


In addition to the training of Royal Army Medical personnel in gas defence, medical officers in charge of troops should pay attention to such points as the effects on efficiency brought about by wearing respirators and the periodic cleansing and disinfection of respirators. The respirators of patients evacuated to hospital with infectious disease should be disinfected in the appropriate manner when the remainder of their kit is dealt with.

Finally, in all manoeuvres and camps of exercise, training in the medical aspects of gas warfare should have a place.
What the Medical Organization in a future war will be is at present impossible to say. In the late war no special organization existed on the medical side in France—though treatment was supervised both at the front and bases by consultants who had special knowledge, and liaison was maintained between the medical and gas directorates. It appears, however, that if chemical weapons are again used—and it seems to be inevitable that they will be in any great future war—it will be necessary to organize a specialist Gas Medical Service on the lines of the specialist Service in Hygiene and Pathology. It will be of vital importance, firstly, to ensure that close liaison is maintained with research workers at home and in the field, so that information regarding the effects of new compounds and their treatment may reach the medical officers most concerned; and, secondly, to organize the handling and treatment of casualties.

We know what gas warfare was in the late war, and we know its possibilities in the future. We should not neglect any measure which will minimize suffering and wastage.