

## Toxic chemicals used in wars

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WAR SEEMS TO BE PART AND PARCEL of the modern contemporary life. Despite the sufferings that it caused, man is still very much preoccupied with it. Warriors' Day is one occasion that serves to remind us how dreaded war is, and Malaysia has had its fair share of the effects of war.

Yesterday, Malaysia paid tribute to her heroes and their families who have sacrificed their lives in defending the honour of the country.

As we recall those sad moments of war, perhaps it is time for us to reflect at the kind of dangers that our soldiers can be exposed to especially in these days where deadly gases, bombs and microorganisms become part and parcel of war.

For example, the nerve gas attack in a Japanese subway station on March 20 this year. The incident involved a chemical called Sarin (isopropyl methylphosphonofluoridate).

It is a volatile liquid that, when absorbed into the human body, will react irreversibly with enzyme, including that in the red blood cells and plasma. The binding to these enzymes will lead to the accumulation of certain naturally-occurring chemicals called acetylcholine at the nerve endings. This will result in a major adverse condition - namely "cholinergic overdrive".

The signs and symptoms of this include excessive salivation, nausea, vomiting, diarrhoea and defaecation. It can cause general muscle weakness which could affect respiration. It is also able to cause lethargy, incoordinated muscle movements, seizures and coma.

Other examples that belong to the same class of nerve gas are tabun, soman and VX. Although each has its own characteristics, the effects are very much the same.

These gases are very potent, requiring only small amounts to kill. In addition, they are also difficult to detect because they are generally odourless and also colourless (except when impurities are present).

This year marks the 80th anniversary of the first large-scale use of chemical weapons. It was in 1915 during the First World War when about 150 tonnes of chlorine gas (similar to the one reported found in Ipoh last May) were released in Ypres, Belgium. More than 5,000 men died.

Another type, called "tear gas", was first used in 1914 in France. Today, this type of gas is more commonly used in civilian riot control and for crowd dispersal. They are capable of irritating the eyes. In high concentrations, tear gas also irritates the respiratory passages, leading to a burning sensation. These types of chemicals are generally referred to as harassing gases.

Later in the course of the First World War, phosgene and diphosgene gas were introduced. These gases were generally more effective when delivered in shells and bombs far behind the enemy lines. They affect the respiratory system and cause difficulty in breathing (asphyxia).

Early symptoms are headache, nausea and vomiting. Such gases are generally called "asphyxiating agents". Others include chlorpicrin and nitrous fumes. Then there was hydrogen cyanide gas (similar to that found in a Tokyo subway on May 5). Cyanide, as most would recall from the dumping incident in Pangkor earlier this year, is a supertoxic chemical that can kill almost immediately regardless of its form.

In gas chambers, the substance is dropped into water to generate the hydrogen cyanide gas required to poison the victim.

In July 1917, another poison, mustard gas was introduced. It was developed from a substance, dichlorodiethylsulphide, code-named LOST, which is an acronym of its German inventors, Lommel and Steinkopf. The gas was used as aerosols or sprays in order to contaminate the war zone and thus poison those present.

Unlike the rest, mustard gas can penetrate clothing, leather and rubber goods rapidly, and attacks the skin as well as the mucous membrane, thus affecting the whole body. Such agents are called vesicants.

A few months later, yet another chemical, arsine (a finely ground powder) was used as choking gas. The powder is so fine that it can penetrate even conventional gas masks to induce vomiting. This forces the victims to take off their masks and invariably exposes them to other gases discharged simultaneously. As a result, during the First-World War, tens of millions of gas shells were fired and about 100,000 men died of toxic gases, and more than one million suffered in agony due to the use of chemical weapons.

Such practices were condemned by many countries, and in 1922, the Washington Protocol was signed to ban the use of such chemical. Three years later in 1925, 106 states ratified the Geneva protocol. In fact, long before that, the 1899 Hague Convention renounced "the ... diffusion of asphyxiating or harmful gases". But despite all these, newer and more lethal chemicals have been developed.

In the second World War, the use of newer chemicals were reported to be rather limited. But this story has its own tragic twist. Millions - including women and children - were deliberately poisoned by other equally lethal gases like carbon monoxide and hydrogen cyanide.

Various contraptions were conceived to spew gases into special chambers set up for this purpose. Army trucks were modified into death chambers where carbon monoxide from the exhaust fumes were directly channeled to the victims. At times, "live" experiments were carried out to study the effects of such gases on humans.

The Vietnam War on the other hand, saw the indiscriminate use of other types of chemicals, namely the chlorophenoxy group of compounds or better known as Agent Orange. One of its constituents is the compound 2,4,5-T (trichlorophenoxyacetic acid), which acts as a selective weedkiller, particularly broad-leaved plants. Another is 2,4-D (dichlorophenoxyacetic acid) which is normally used as a defoliant.

In their desperate attempts to seek out the Vietnamese guerillas, the US Air Force sprayed during millions of gallons of these substances. This caused untold damage, not only to the environment, but also to human health.

For example, 2,4,5-T is toxic when absorbed through the skin or when inhaled. Worst still is its contaminant, dioxin, which is very toxic, even to the fetus, and can cause liver damage as well as neurological disorders.

Similarly, 2,4-D has been documented to cause various effects ranging from irritation of the skin and mucous membranes to nerve damage. This class of herbicide has also been associated with increased risks of a type of cancer, non-Hodgkin lymphoma.

In short the use of Agent Orange during the Vietnam War resulted in devastation on both the Americans and Vietnamese.

In fact, in 1979, a group of American veterans filed against the US government and several chemical companies to gain compensation for the health problems associated to the exposure to these substances during the War.

Of late, yet another class of chemical, ironically called 'humanitarian' gases, have been introduced. These agents are supposed to render the victims immobile and temporarily incapacitate them. No doubt, in due course, more will be added to the list of deadly war chemicals.

From the brief history above, it is apparent that man has failed to learn from history. Despite the many tragic memories and experiences, chemicals continue to be manufactured and stockpiled, especially in the United States and Russia.

Although 150 countries agreed to ban the production and stockpiling of chemical weapons in the Chemical Weapons Convention in 1992, there is no guarantee that everyone will keep their side of the bargain.

Each time a war is fought, including the Gulf War of 1990, allegations about the use of chemicals are bound to surface. It is only a matter of time before the gruesome stories of chemical warfare become reality again.

As long as the current hypocrisy continues, it is not only the soldiers, but the entire human species which is in danger of annihilation.

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