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7/27/87 (Revised)

## THE USE OF TEAR GAS IN THE REPUBLIC OF KOREA: A REPORT BY HEALTH PROFESSIONALS.

### I. INTRODUCTION

Between July 11 and July 18, 1987, five public health specialists from the United States visited Seoul, South Korea to study the health effects of an unprecedented use of tear gas in that country. According to press sources, the government of the Republic of Korea has admitted to the use of 351,000 canisters and grenades against civilians throughout the cities of South Korea in June, 1987. Tear gas use continued through the first two weeks of July as well. All told, it is estimated that more tear gas was used during the month of June than in all of 1986.

The mission was organized by Physicians for Human Rights, a Boston-based national organization of health professionals founded in 1986 to bring the skills and influence of the American medical community to the defense of international human rights. The mission was co-sponsored by two other national health organizations: the American College of Physicians, an organization of 60,000 internists headquartered in Philadelphia, Pennsylvania and the American Medical Student Association (AMSA), with 30,000 members, located in Reston, Virginia.

## STAFF

Jonathan Fine, M.D.  
*Executive Director*

Susannah Sirkin  
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The visiting team included Paul Epstein, M.D., M.P.H., an internist on the staff of the Cambridge Hospital, Cambridge, Massachusetts and a lecturer at Harvard Medical School; Jonathan E. Fine, M.D., M.P.H., Executive Director of Physicians for Human Rights and former director of public health for the City of Boston; Howard Hu, M.D., M.P.H., a fellow in epidemiology and occupational health at the Harvard School of Public Health, Boston, Mass.; Preston Reynolds, M.D., Ph.D., President of AMSA; and Bailus Walker, Jr., Ph.D., M.P.H., Professor of Environmental Health and Toxicology at the Graduate School of Public Health Sciences, State University of New York, Albany, President-elect of the American Public Health Association, and former Commissioner of Public Health for Massachusetts.

While this mission was organized on an urgent basis and was of short duration, every effort was made to see a wide spectrum of people within South Korea to gain a balanced perspective. Among those interviewed were medical administrators, professors of medicine and public health, front-line physicians, medical and other university students, many victims of tear gas exposure, religious leaders, leaders of women's organizations, many ordinary citizens, political leaders, human rights activists, and officials of the U.S. Embassy in Seoul.

Regretfully, we were not able to arrange interviews with officials of the government of the Republic of Korea. However, we sought out individuals whom we believed were understanding, and possibly sympathetic, to the government's approach to crowd control.

The findings and conclusions in the report are those of the mission participants alone. The sponsoring organizations have had no opportunity to review this document and have, as yet, neither approved nor disapproved of its contents.

## II. PRINCIPAL CONCLUSIONS

1. During the months of June and July, 1987, and on frequent prior occasions, massive amounts of tear gas have been used indiscriminately by the government of the Republic of Korea against its civilian population.

2. Many innocent civilians have been among those injured.

3. Through laboratory analysis carried out at the Massachusetts Institute of Technology at our request, we have been able to identify that O-chlorobenzylidene malononitrile, commonly referred to as CS gas, is in use in South Korea.

4. Widespread suffering has occurred in many neighborhoods of the major cities of South Korea from the use of CS gas. Hundreds of thousands, possibly millions, of Koreans have been exposed to the gas. Serious and painful acute illnesses have been caused, sometimes with permanent impairment of health. Long-term chronic illness may result in some cases. Individuals with prior exposure and susceptibility may be affected more severely.

5. Many affected individuals have gone without proper - or any - medical care following exposure and illness. While the reasons for this medical neglect are complex, it is fair to say that the government has not facilitated the care of victims. Some have feared harassment by the police should they seek care. Many others have been unable to afford hospital treatment. Both groups have suffered silently without professional medical attention.

6. There is an urgent need for medical research concerning the identification of tear gas compounds in use in the Republic of Korea and clinical, epidemiologic, and laboratory studies on the acute and long-term health consequences of their use.

7. There is considerable evidence that these essential studies cannot be undertaken in South Korea today. The government has not allowed research by responsible medical investigators of this problem and has refused to identify for health professionals the chemical compounds it is using, thereby blocking essential medical studies and proper treatment.

8. We believe "tear gas" is a misnomer for a group of poisonous gases which, far from being innocuous, have serious acute and longer-term adverse effects on the health of significant numbers of those exposed.

9. We therefore have concluded that the use of tear gas against civilians in South Korea is inhumane and medically unacceptable.

### III. RECOMMENDATIONS

1. The government of the Republic of Korea should promptly make available to the public and to medical and health professionals: (1) the chemical composition of all tear gas compounds being used within South Korea; (2) information on the concentrations and various formulations of these agents; (3) previous toxicology studies done by, or available to, the Korean armed forces; and (4) any other technical information relevant to understanding their health and medical consequences.

2. The South Korean government should immediately encourage scientists and medical research personnel in Korea to undertake all necessary epidemiological and clinical studies to elucidate the health effects of tear gas agents in use in South Korea. This research must be objective and independent. It should encompass the acute, the sub-acute, the long-term and the chronic effects of these agents. Studies should include the effects of these agents on the high risk populations of the elderly, infants and children, individuals with preexisting chronic diseases and hospitalized patients. All engaged in the research should be assured unequivocally that there will be no reprisals nor attempts to influence or bias these investigations.

3. The government of the ROK should provide adequate medical care to all exposed to tear gas agents who seek or need care and should ensure that cost of services or fear of arrest be no barrier.

4. We view the use of CS gas and other tear gases with comparable clinical effects as tantamount to chemical warfare against civilians. We therefore call for the banning of these agents against human populations everywhere.

5. These recommendations apply equally to all governments which possess and use these compounds.

#### IV. PREVIOUSLY KNOWN TOXIC EFFECTS

Over the past several decades, a number of toxic materials have been employed for crowd control. Three have emerged as significant, in so far as effectiveness is concerned. These are: 1-chloroacetaphanone (CN), dibenzoxazepine (CR), and orthochlorobenzylidene malononitrile (CS).

We believe the agent most frequently used to control the recent demonstrations in Korea is CS and several of its formulations. CS is a white crystalline solid which, in exposed persons, causes burning and blistering of the skin, headache, uncontrollable coughing and sneezing, and burning of the eyes, nose, tongue and throat. Other symptoms include tightness of the chest and a feeling of suffocation. These symptoms are exacerbated in hot and/or humid weather such as exists in much of South Korea in the summer months. Prompt

removal of people to fresh air usually results in recovery in 15 to 30 minutes if exposure has been brief and mild. However, the pain from these symptoms often is intense and, if burns occur, of several days duration. Nausea, vomiting, and fainting sometimes occur. Other acute effects that have been reported include a rise in intraocular pressure which may result in acute glaucoma and major structural damage to the eyes, and an acute, though transient, elevation in blood pressure.

There is also evidence which suggests that CS can, in some cases, result in pneumonia, pulmonary edema (accumulation of fluid in the lungs), heart failure, and liver damage. The development of pulmonary edema can be insidious and may take several hours to develop so that seriously damaging or even fatal exposure may occur without an individual being aware of the extent of potential damage. CS also has the potential to cause a chronic asthmatic condition termed Reactive Airways Dysfunction Syndrome (RADS) -- a disorder that has been recognized only within recent years. Individuals with RADS develop the illness after a single exposure to high concentrations of irritating vapors, fumes, or smoke. It can lead to long-term respiratory disease. Little is known about the incidence and prevalence of RADS among persons exposed to irritants such as CS, the duration of exposure necessary to produce the illness, and whether CS specifically causes RADS. Further investigation on the topic is needed.



## V. FINDINGS FROM THE CURRENT INVESTIGATION

### (1) TRAUMA FROM DELIVERY DEVICES

After interviewing and examining patients, and reviewing documentation on a number of cases, we found that tear gas delivery devices, namely KM 25 grenades (known in Korea as "apples") and SY 44 canisters, have commonly been responsible for trauma casualties. So-called KM 25 "apples" are essentially hand grenades which, upon detonation, scatter plastic and metal fragments with a deep penetrating force. Injuries to the brain, the chest, the extremities and the eyes were noted by our delegation. Eye trauma may result in partial or total blindness, the extent of injury possibly exacerbated by the presence of tear gas chemical on the penetrating fragments. One hospital director informed us of four to six cases of partial to total blindness admitted to his institution during June 1987.

The following cases illustrate injury from delivery devices:

Case #1. K.C.K. is a 39-year old man who was watching a demonstration in Seoul on 6/13/87 when a KM 25 grenade exploded within 3 meters. He received multiple penetrating puncture wounds in the right arm and chest. At a nearby hospital, 102 plastic fragments were surgically removed. Five weeks later, the patient is still in considerable pain with large areas of scarring.

Case #2. P.K.Y. is a 50-year old mother who was sitting on steps near a demonstration in Seoul on 6/10/87 when a KM 25 grenade exploded within 5 meters. She suffered a penetrating right eye injury that has resulted in intraocular hemorrhage and poor prospects for recovery of vision in that eye.

We have also documented several projectile injuries caused by SY 44 canisters that were shot directly at people. For example:

Case #3. On 6/10/87, K.M.S., a 19-year old Seoul student, sustained a direct hit from an SY 44 canister that was shot from a rifle at a range of 3 meters. He suffered multiple rib fractures, a hemothorax (bleeding into the cavity between the lungs and the internal chest wall), and a collapsed left lung. He was hospitalized for 3 1/2 weeks.

The case of Lee Han Yol should be mentioned. He died at Severence Hospital in July 1987 from a canister injury to the head sustained in a demonstration in Seoul in June. Over 200,000 persons gathered in Seoul July 9, 1987, to protest his death.

## (2) INDISCRIMINATE USE AND INDISCRIMINATE EFFECTS

Use of tear gas and, consequently, its effects have often been indiscriminate. This is not surprising, given the difficulty in controlling exposure to airborne particles. We took testimony from about fifty individuals on acute effects. While these numbers are small, most persons we encountered reported on exposure to tear gas at one time or another. Of those interviewed, the majority were bystanders. Severe, transient shortness of breath and irritation of the eyes, nose, throat and exposed skin surfaces were common, as were superficial and blistering burns among persons exposed to tear

gas powder. For example, one U.S. Embassy officer, observing a demonstration in Seoul 1986, described the discharge of tear gas powder from a projectile above his head as he tried to escape with others from a sudden attack. He suffered a painful burn on the back of his neck which lasted for more than one week. Cough, sore throat, and continuing nasal discharge persisted in several persons for a period of weeks. A few individuals reported prolonged anxiety, sleeplessness, repeated episodes of trembling and of startle reactions for weeks following intense exposure.

For a variety of reasons, we were unable to make an estimate of the total number of cases of serious acute injury in any of the above categories in Seoul or elsewhere in the country. However, we believe these cases may total several hundred or even thousands and that the symptoms and illnesses reported are representative of the effects on the general population of exposed individuals.

The following are examples of indiscriminate use:

1. On several occasions during the month of June, 1987, Yonsei University was the scene of repeated demonstrations and the heavy use of tear gas. The wind frequently carried tear gas into Severence Hospital - located on the grounds of the university. Medical students reported to us on acute tear gas effects on patients and personnel (see p. 13 of this report). Hospital authorities asked the police to cease using the gas but without avail.

2. The police have been unintended victims as well. Medical students caring for injured police reported numerous burns on their faces, along the edges of gas masks, as well as in the axillae (under arms) and groin areas.

3. On 7/9/87, combat police chased demonstrators into the compound of the Anglican Church in downtown Seoul, throwing or launching an estimated fifty grenades and canisters against buildings and individuals. However, casualties are difficult to document, as several of those exposed were arrested and "dragged" from the premises. As a result, 44 Anglican priests participated in a week-long hunger strike, demanding an end to the use of tear gas.

4. As part of our assessment, we also conducted a random community survey of small shopkeepers within a two block radius of two campuses (Yonsei and Ewha universities) where student demonstrations were common. 29 shopkeepers were asked to participate in the survey. 25 (86%) agreed. 21 (84%) of respondents reported exposure to tear gas on more than 10 occasions. 17 (65%) reported eye burning and skin irritation. 11 (44%) reported "tear gas cold", a cluster of symptoms including runny nose, sneezing and sore throat. 12 (48%) reported cough; and 11 (44%) reported shortness of breath during the day of tear gas use.

Of special interest are portions of this sample who reported symptoms lasting up to several weeks: 4 (16%) with skin burns, 5 (20%) with prolonged cough or shortness of breath, and 4 (16%) with disturbances of vision.

Finally, 5 (20%) of the sample reported closing their businesses entirely upon tear gas exposure, and 7 (28%) reported economic losses due to tear gas contamination of merchandise. Almost all of the victims of indiscriminate use we interviewed expressed anger and frustration.

### (3) EFFECTS OF EXPOSURE ON HIGH RISK INDIVIDUALS

The acute effects of exposure to noxious chemicals is usually most pronounced in four vulnerable groups: hospitalized patients, children, the elderly, and the chronically ill. Data on hospitalized patients was hard to obtain due to fear by hospital authorities of government reprisals for disclosure of information. Nevertheless, physicians of one hospital reported that four patients with asthma and two with chronic obstructive lung disease were seriously affected, and that their hospitalizations were prolonged, on the average, by one week.

In the same institution, all patients in beds near windows were the most severely affected by the acute symptoms. Children on pediatric wards at two hospitals were reported to be crying, in pain, and coughing; a sense of their helplessness was conveyed: they were the group least able to protect themselves. One individual we interviewed in our neighborhood survey reported that children of several families developed cold-like symptoms which persisted for weeks following exposure. The elderly also suffered from the acute effects, but the effects of tear gas on preexisting chronic illnesses could not be determined by us and is unknown to Korean physicians. We believe these findings are characteristic in heavily exposed areas.

## VI. INTERFERENCE WITH MEDICAL AND SCIENTIFIC INVESTIGATION

According to several physicians judged highly reliable, the government has refused to cooperate in or allow studies of the health consequences of tear gas use. It has also refused to inform the medical community of the chemical composition of the agents employed. Moreover, intimidation has been very effective. Senior and junior physicians, without exception, confirmed that no one has dared undertake the necessary laboratory, clinical and epidemiological studies for fear of serious reprisals by the government.

For example, in their 1986 convention, Korean dermatologists discussed studying the impact of toxic gases and their possible long-term effects. However, a government agency told them that this would not be permitted. Public health authorities refused to allow or collaborate in a study proposed by the faculty at one medical college. The dean of the same medical school told us that if studies were performed, the government would not permit the publication of results. Still another scientist reported that eight laboratories refused to perform chemical analyses on "tear gas" substances. The result is nothing less than a total obstruction and inhibition of effective study and thus of an appropriate clinical response to tear gas.

Lastly, we found no evidence that the government or private health authorities have issued guidelines to the public on methods of prevention and treatment of acute tear gas injuries.

## VII. IN CLOSING

Based on the survey we have conducted, the interviews with victims, the majority of whom did not themselves participate in demonstrations, and the testimony of Korean medical personnel, we conclude that the chemical agent or agents used in Korea are toxic and dangerous substances of which various methods of delivery enhance their ability to cause serious injury and even death.

Thus, we believe "tear gas" is a misnomer, since these agents cause far more harm than the induction of tearing. The agents used are more properly termed poisonous gases. Throughout Korea, thousands of innocent civilians and peaceful demonstrators have suffered from the painful, though transient, acute effects of these poisonous agents. Significant numbers have developed complications leading to diminished vision, even blindness, prolonged upper respiratory illnesses, severe blistering skin conditions, and internal injuries from penetrating wounds resulting from high velocity penetration by tear gas bomb fragments which are difficult to remove from their bodies. Others suffered a worsening of preexisting asthma and other chronic illnesses; an unknown number are at risk of developing new onset, permanent reactive airways disease or skin hypersensitivity. Still unknown are a number of possible chronic effects, possible carcinogenicity and any influence of CS gas on fertility. Until research is allowed on the longer-term effects of these agents, the fear of South Koreans of these possible complications can not be allayed.

For these reasons, and others cited in our report, we conclude that, judging even only from the known effects, these poisonous gases are inhumane. We agree totally with the vast majority of Koreans interviewed that their use should be discontinued.

Finally, we conclude that for these medical and public health reasons, CS, and any other tear gases with comparable toxic effects, should be banned from further use against human populations everywhere.

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