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HEALTH PHYSICS DIVISION

CONCERNING THE USE OF POTASSIUM IODIDE AS A PROTECTIVE MEASURE TO
THOSE PERSONS WHO ARE EXPOSED TO RADIOIODINE IN THE ATMOSPHERE

CHARLES H. PERRY

OAK RIDGE NATIONAL LABORATORY

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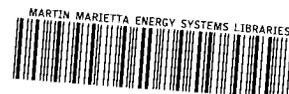
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Abstract

In those cases where persons are exposed to radioiodine in the atmosphere and it is deemed advisable to give them daily doses of 100 mg of potassium iodide to act as a diluent to the absorbed I^* , it is mandatory and it is feasible that those persons be first examined by a physician. This procedure will satisfy the legal aspect of the administration of the iodide as well as prevent the use of this dosage to those persons who are supersensitive to iodide; have or have had active tuberculosis or an arrested case; or have impaired kidney function.

A request (1) has been made for our recommendations concerning the suggested (2) dose of 100 mg of potassium iodide daily to those workers who are exposed to radioiodine in the air. The question (1) was raised concerning the possibility of the occurrence of deleterious effects if this procedure is followed.

An investigation has revealed that small doses of KI produce toxic manifestations occasionally (3), or perhaps rarely (3,4). It is estimated (5) that of all the people given a daily dose of 100 mg of KI, over 95 percent will not show deleterious effects.

Of the remaining five (or less) percent, it is suggested (3) that the complications which are said to arise may be divided into three categories:

1. The usual toxic manifestations which may turn up with a small fraction of the ordinarily toxic dose. These are usually not serious and recede upon cessation of treatment. Anaphylactoid responses, which may be serious ordinarily, are seen only after administration by needle.
2. Precipitating of acute hyperthyroid crises in an individual where thyrotoxicosis may have been latent: the so-called "Jodbasedow".
3. Occasionally when localized tuberculosis, especially of the lungs, is present, it is thought that the administration of iodide, even in small doses, has resulted in a dissemination of the disease in the form of fatal miliary tuberculosis.

In the case of severe kidney failure, it is believed that the rate at which iodide is excreted may fall below the rate at which it is administered, so that a cumulative effect occurs.

Sollmann (6) points out quite thoroughly the possible dangers in the routine administration of iodine. References (7) to two cases concerning the induction of hyperthyroidism in individuals having adenomatous goiters are made. It is the general opinion (7) that small doses of iodine will rarely, if at all, cause hyperthyroidism. However, it is pointed out (8) that in incipient hyperthyroidism, particularly in a goiter-belt, a very rare individual after many weeks of daily doses of 100 mg of iodide, might exhibit the so-called "escape from iodine", in which brisk hyperthyroidism might ensue despite the continued administration of iodide in heavy doses.

Modern authorities (3,8) dispute the question of scar tissue in tuberculosis in its relation to iodide, although it is recommended (4) that those persons having a past history of active tuberculosis, even though presently dormant, should not be given this amount of iodine.

Iodine rashes have been noted (4,6,7) which have been caused by the administration of small doses of iodide, and it has been suggested (9) that skin lesions might develop.

It is pointed out that in chronic Bright's disease (8), and with severe kidney failure (3), the resulting accumulation of iodide in the body would cause iodism (6). However, it is recommended (4) that this amount of iodine not be given to persons who have impaired kidney function.

Routine measurements of basal metabolic rate and blood cholesterol are not justified (8) in that they are inconclusive in some cases. In Graves' disease the values of these tests are borderline or are sometimes normal until the damage is done.

It is generally agreed that no therapeutic or prophylactic procedure which uses drugs is without hazard (5,10). For this reason, and for the purpose of obeying pertinent medical laws, it appears that it is justifiable and mandatory to have the persons concerned examined (8) by a physician before a dose of KI in the therapeutic range is prescribed as a prophylactic. This procedure would certainly satisfy the legal (5) aspect of the subject quite thoroughly.

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