

Iodine, Ingesting or not?

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Abstract

Currently, the population use medicines that contain fluorine/chlorine and ingest bromide that is found in breads, thus they occupy the place iodine injuring the thyroid. Iodine deficiency is a major public health problem thus as medical iodophobia. This mini-review addresses the effect of iodine supplementation in the prevention and treatment of chronic diseases. In this baseline, there are six systematic reviews published in the last 6 years beyond WHO/ UNICEF encourage the safe use iodine in the dosages of 200 µg/day during in pregnancy and 250 µg/day in lactating women. However, one study Australian showed that of 396 healthcare providers only 71% were aware of the National Health and Medical Research Council's recommendation for iodine supplementation, (38%) were aware of the recommended dose or and (44%) duration. Beyond of knowing therapeutic property iodine, a clinical trial showed that iodine supplementation in overweight women reduces the prevalence of hypercholesterolemia. Although there is strong evidence showed that iodine prevents and fight various diseases some doctors and gynecologists still not prescribe iodine in pregnancy and lactation by fear, ignorance or lack of knowledge. Thereby, one change of paradigm in the current medical model in relation in to iodine intake needs to be urgently done.

Keywords: Iodine supplementation; Thyroid; Δ-Iodolactone; Chronic Diseases; Prevention

Introduction

Currently, the food industries made us sick while the pharmaceutical industries give us vitiates with various medicines prescribed by doctors. Unfortunately, what we hear most of patients with chronic diseases are the old phrase: "Doctor, I would give anything to get my health back", but unluckily, we are not taught how to eat right and what body really needs. Worldwide, the people they feed of fast food, what is one empty food without essential nutrients to body, predisposing the malnutrition, diabetes, obesity and metabolic syndrome. Added to this, the increase of stress, toxins, the decrease of basic nutrients as the vitamins, minerals, amino acids and the decrease of enzyme activity and hormones is the gateway for diseases. On the other hand, the current medical model is based in on suppression of symptoms where more medicines are prescribed for treatment of symptoms and the prevention concept of diseases and like be having health is few taught in the medical schools.

Diseases do not stay in the healthy body they remain in a sick body and does not appear alone. Behind every disease, there is a state of nutritional deficiency in all sick patients. Factors as the toxins, malnutrition, stress, infections and electromagnetic pollution need to be investigated urgently in all patients with chronic diseases [1]. In this sense, the iodine is the nutrient most worst understood in the scientific community due to medical iodophobia. Thereby, is the objective this narrative review explain the role of iodine in prevention and treatment of chronic diseases.

Discovery of iodine and use in the medicine

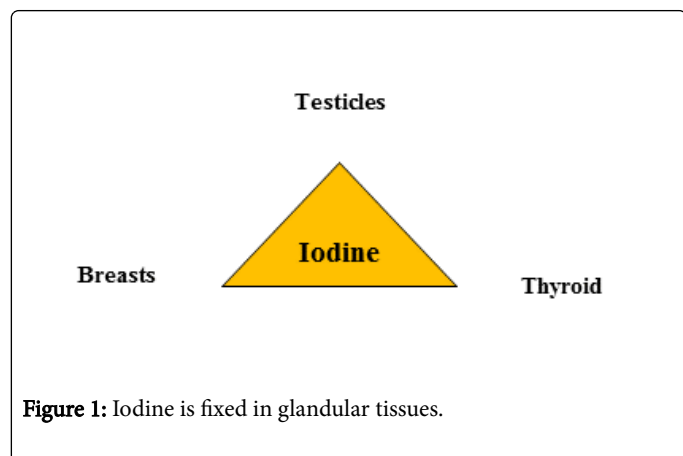
The iodine is stable halogen heaviest and it exists as a lustrous, purple-black metallic solid at a standard conditions. The elemental

form was discovered in the 1811 by the chemist Bernard Courtois that also isolated Morphine. Two years last, it is named by Joseph-Louis Gay-Lussac and in 1824 Francis Coindet correlated the iodine deficiency with goiter. Jean-Batiste-Boussingault in the 1831 showed that the workers in the silver mines had no goiter due to possibility that mine water and the salt made from it might contain iodine [2]. Last, Jean Lugol mixed 5% iodine more 10% potassium iodide in distilled water and called the lugol solution. Additions of potassium iodine increase the solubility of iodine in water and the recommended daily amount of Lugol was 0.1-0.3 ml, containing 12.5-37.5 mg elemental iodine. This solution was used as disinfectant, antiseptic and disinfection of drinking water during an emergency. Although, the lugol solution have failed in the treatment of tuberculosis she was used with success for hyperthyroidism by Henry Stanley Plummer and the use of iodine in the treatment of goiter promoted the birth of medicine western [3-4].

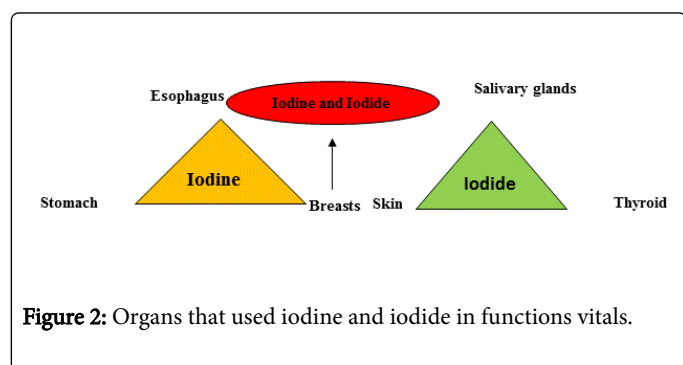
Despite of great interest scientific community by iodine, in 1948 the researchers Wolff and Chaikoff reported in rats that after a certain amount of iodine, the thyroid does not absorb most iodine [5]. However, what happened was one phenomenon called saturation. They interpreted that the iodine it destroyed thyroid, did not measure thyroid hormones and mistakenly translated to humans, included in all medical and nutrition textbooks including endocrinology. Later, Wolff became deputy director of NIH-National Institute of Health and your privileged position influenced the medical class they do not prescribe iodine. The organic iodine found in the x-rays and destroy the thyroid causing hypothyroidism, while inorganic iodine is used by all cells human besides treats, combat and to prevent various diseases.

Human body stores around 1500 mg iodine and thyroid store only 50 mg iodine that is an essential micronutrient and a component of the thyroid hormones, the thyroxine (T4) and triiodothyronine (T3), besides playing a vital role in the development of most organs [6,7]. The regulation of the basal metabolic rate and macronutrients

metabolism is done by T4 and T3 [8,9] and their actions are initiated through nuclear receptors that are found in most organs [10,11]. Almost all cells of the body use iodine which is fixed in glandular tissues as the breasts, salivary glands, parotids, pancreas, gastric mucosa, lachrymal glands and prostate (Figure 1). The white blood cells need iodine to promote defense against infections. Esophagus and stomach use iodine and the skin, thyroid, salivary glands use iodide, and however the breasts use both iodine and iodide in the functions vitals (Figure 2).

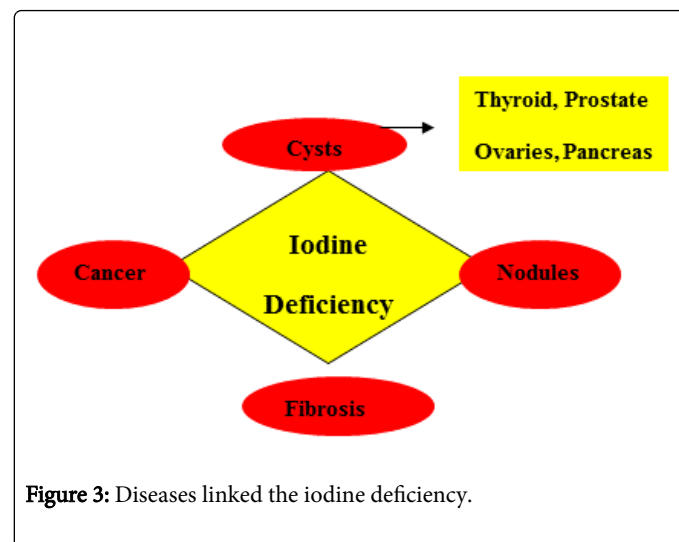


Developmental abnormalities of thyroid function occur when there is iodine deficiency and disrupt the metabolism of thyroid hormones. In this sense, iodine deficiency decreases the level of T4 progressively following a pattern similar to serum in the most tissues, but the level of T3 follows different patterns. Thus, occur increased iodine trapping, increased conversion of T4 into T3, and the preferential synthesis of T3 attempt to keep the concentration of T3 in the normal [12,13]. When the thyroid does not have enough iodine to work in a defense mechanism, it grows in size in an attempt to secure more iodine. Besides, severe iodine deficiency results in endemic mental retardation, endemic goiter, hypothyroidism, increased prenatal death and infant mortality and decreased fertility [14, 15].



Deficiency iodine is one of major public health problem in the most of countries and affects around 95% of population in the worldwide. In the last 30 years, National Health and Nutrition Examination Survey (NHANES) showed that there is a decreased of 50% in the iodine intake [16]. The Japan and China are the countries that have lowest world rate of perinatal mortality because one of sources iodine intake is through of seaweed and the women intake a big quantity of seaweed compared to other women of the world [17-34]. Seaweed has a capacity of accumulated most iodine that sea water, however the distance from the sea also influences the iodine content of plants, how

much major the distance, lower the concentration of iodine [18]. Indeed, the iodine deficiency leads to the formation of cysts that progress to nodules and form fibrosis that can progress to cancer of the thyroid, breasts, uterus, ovaries, and prostate (Figure 3).



Strong evidence on iodine intake

Iodine removes immortality from cancer cells, causing them to regain apoptosis due to the formation of δ -iodolactone that inhibit growth in human thyroid carcinoma cell lines as well in breast cancer cells [19]. Besides, the ability of perspire is coordinated by iodine and patients with cancer has difficulty perspiring due to iodine deficiency in the skin. Increase of various types of cancer is linked with iodine deficiency, minerals and vitamins that are lacking in the sun as selenium and magnesium [20-38]. Survival rates of cancer are the same as those of the last 70 years [21] even with all the advances like mammograms, surgery, chemotherapy and radiotherapy. Indeed, nothing has changed, just only the diagnosis is faster and the detection is premature giving the impression that there was an increase in the survival of the patient with breast cancer. People stay longer with the disease due to early diagnosis.

Recently, a study done at the Thailand examined thyroid cancer trends in three geographically separated populations of according with to the historical prevalence of iodine deficiency. Results showed that carcinoma incidence increases, and follicular carcinoma incidence decreases, as population-level iodine deficiency declines, and suggests that iodine exposure may affect later stages of thyroid carcinogenesis [22]. The cognitive ability of offspring might be irreversibly damaged due to of their mother's mild iodine deficiency during pregnancy. Based on this hypothesis, a systematic review was done to compare the costs and benefits of a strategy of iodine supplementation for pregnant women in a mild to moderately iodine deficient population against no iodine supplementation. Results showed that in the NHS perspective there is a saving of £199 per/women supplemented and 1.22 IQ points gained and societal perspective there is a saving of £4476/women & 1.22 IQ points gained. These results reinforce the policy for all pregnant women to take iodine supplements, because cost effective- assuming IQ gains however, currently about half of women in the UK take iodine supplements in pregnancy and QI points gained is lower in more socio-economically disadvantaged [23]. In this baseline, there are six systematic reviews published in the last 6 years beyond WHO/

UNICEF [30] encourage the safe use iodine in the dosages of 200 µg/day during in pregnancy and 250 µg/day in lactating women [24-31]. In contrast, there is a small trial showed that the Iodine supplementation in pregnancy did not result in better childhood neurodevelopment, although the dosage of iodine it was just 150 µg/day [32]. On the other hand, one study Australian showed that of 396 healthcare providers only 71% were aware of the National Health and Medical Research Council's recommendation for iodine supplementation, (38%) were aware of the recommended dose or and (44%) duration [33]. Indeed, the research reported that the main reasons for not recommending iodine supplements included belief there was no need for iodine supplements due to mandatory iodine fortification of food (28%) and unawareness of the recommendation (25%). In summary, is needed to improve healthcare providers' knowledge and adherence iodine supplement recommendation in the Australian.

When we ingest lugol solution, the iodide enters together with the sodium in the membrane of the thyroid cell through sodium-independent chloride/iodide transporter as well "Pendrin" because the iodine does not enter in the thyroid cell. The passage of sodium by the membrane is done Natural Iodine Symporter (NIS) which estimates the TSH allowed a better uptake of iodide and sodium through NIS. Thus, there is an increase of TSH to uptake iodide and sodium through NIS while you use the lugol solution and no diagnosis of hypothyroidism because with time your levels of TSH return to normal. Increase of TSH in the use of lugol solution facilitates the formation thyroid hormones helping thyroid and TSH stimulates tyrosine oxidase that dependent of vitamin B2, the oxidize iodide in iodine when he enters into the cell. However, due to formation hydrogen peroxide by tyrosine oxidase, it may produce immunological fragments in the molecule injuring thyrocytes taking to autoimmune disease. In this sense, is crucial the administration of selenium 200-400 mcg/day that stimulates the glutathione peroxidase neutralizing the hydrogen peroxides. Besides of selenium is viable to take vitamin C 2000-5000 mg/day two hours after of ingested of lugol solution and a spoonful of coffee Himalayan salt diluted in water because provides the symporters support and antioxidant effect.

Women that take thyroid hormones as Puran® and Synthoid® can talk to your doctor about the possibly of take lugol solution and thyroxine and triiodothyronine bioidentical to help thyroid and reduce side effects [35]. The use of Armour Thyroid, compost natural done of desiccated thyroid extract of pig can be a good alternative to patients that no respond to synthetic hormones [36-37] because this compost have both T3 and T4 and no only T4 that is not is hormone and yes a pro-hormone. Furthermore, women in use of contraceptives have the thyroid function decrease and making it difficult in to convert T4 in T3. Thus, the lugol solution that is a product cheap may help women that take the medicines above. Added to this, there is a competition between the halogens fluorine, chlorine, bromine that occupies the place of iodine in the thyroid and are present in various products including the medicines as the fluoxetine, bromazepam, that influencing the thyroid further aggravating the problem.

Beyond of the therapeutic properties of iodine, such as alkalinizing agent, anti-bacterial, antifungal, antiviral, antiparasitic, anticancer, detoxifying agent of mercury and mucolytic agent, a randomized controlled trial showed that iodine supplementation in overweight women reduces the prevalence of hypercholesterolemia. These findings suggest that moderate to severe iodine deficiency in overweight women elevates serum TSH and produces a more atherogenic lipid

profile and iodine prophylaxis can reduce disease risk in overweight adult [39].

Follow-up of patients in iodine supplementation and monitoring of levels of thyroid hormones is crucial, thus the pharmaceutical care have showed be a good tool in patient management with chronic diseases and can help in controlling of disease [40-42].

Conclusions

Thyroid, pancreas and adrenal glands are organs unison and malfunction of any of them is the gateway to diseases. The health of patients is not duty only of doctors or health professional since each people will also be responsible by your health. Added to this, the information only has value if it you go from thinking to acting and unfortunately is not equally distributed. Although there is strong evidence showed that iodine prevents and fight various diseases some gynecologists still not prescribe iodine in pregnancy and lactation by fear, ignorance or lack knowledge. Base supplements of iodine as Iodara® available in Brazil dosage of 100-200 mcg/day should be prescribed to pregnancy and lactating for doctors or health professionals. Furthermore, to prevention of diseases, two drops of lugol solution diluted in 300 ml of water corresponds the amount of iodine similar to the Japanese population however, are crucial the monitoring T3, T4 and TSH levels besides that test reverse T3. Higher dosages to treatment of chronic diseases need to follow of expert professional in the area. The greatest challenge for us scientists is change paradigm in the medical model with strong evidences to win the ignorance that many professionals have in relation to iodine.

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