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LETTER TO THE EDITOR

Paradoxical urinary iodine concentration in an endemic goitre area of Tunisia

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Endemic goitre has been reported in the western part of Tunisia [1]. A recent study has shown that iodine content of drinking water is frequently inferior to 0.04 µmol per liter (0.5 µg/dl) [2]. Urinary iodine concentration in a group of about 50 (or more) casual samples has been recommended [3] since urinary iodine excretion has been accepted as the indicator of choice for grading the severity of iodine deficiency in communities [4].

We measured iodine in casual urine samples of 52 adult volunteers from Ghardimaou, an area where the highest prevalence of goitre has previously been observed in Tunisia [1]. We compared the results with those of 51 adult volunteers living in Tunis. Urine concentrations were measured with a fully automated Technicon AutoAnalyzer II (Technicon, Tarrytown, NY); the smallest detectable concentration was 0.04 µmol per liter [5]. Since differences in the daily excretion of creatinine can lead to erroneous values for iodine excretion when the iodine:creatinine ratio is used, we expressed the results only as iodine concentrations [3]. In commercial salt samples, iodine concentrations were measured by the titration of iodate with thiosulfate [6]. The possible presence of dietary goitrogens was screened by measuring urinary thiocyanate concentration with the colorimetric method of Aldridge [7] modified by Bourdoux et al. [8]. The volunteers inhabiting Ghardimaou were enquired about their alimentary habits (fish, meat, salt, tobacco, milk, etc.).

The results for urinary iodine are shown in Figure 1. One subject from Ghardimaou exhibited a very high urinary iodine concentration and was not further considered.

Among the 51 volunteers of Ghardimaou, 16 (31.4%) were goitrous. Their urinary iodine contents exhibited a large scatter ranging from 0.17 to 5.7 µmol per liter (2.2 µg/dl to 72.2 µg/dl). The median was 0.87 µmol per liter. Only 2 persons (4%) had values inferior to 0.24 µmol per liter (3 µg/dl), and 10 persons (19.6%) presented levels inferior or equal to 0.4 µmol per liter (5 µg/dl). Low concentrations did not seem to be correlated with the presence of a goiter since goitrous persons had high levels (0.63 µmol/l to 2.05 µmol/l–8 to 26 µg/dl) and the lowest levels (0.17 and 0.20 µmol/l–2.2 and 2.5 µg/dl) were seen in non goitrous persons. None of our 51 volunteers living in Tunis, the main town, was goitrous. Their urinary iodine contents ranged from 0.25 to 6.49 µmol/l (3.2 to 82.4 µg/dl). The median was 1.10

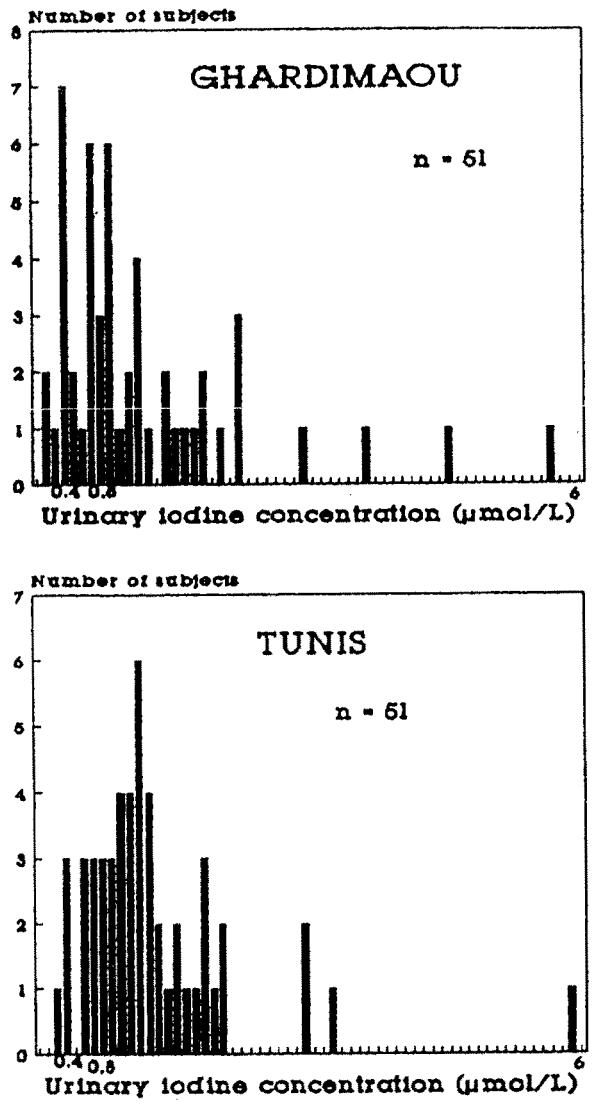

Figure 1. Urinary iodine concentrations in adult volunteers from Ghardimaou (endemic area) and Tunis (non endemic area).

µmol/l – None had levels inferior to 0.24 µmol/l (3 µg/dl) and only 4 persons (7.8%) had values inferior or equal to 0.4 µmol/l (5 µg/dl). A Mann Whitney U test did not evidence significant difference between the two groups ($p = 0.496$).

We did not find elevated thiocyanate concentrations in the urine of Ghardimaou subjects: 46.55 to 431 µmol/l with a median of 124.13. There was no difference between goitrous and non goitrous persons. The 2 highest values concerned non goitrous persons (253.43 and 431 µmol/l).

The determinations of iodine (iodate form) in different samples of commercialized iodated salt have shown variations of concentrations, extending from 3.2 to 12.4 mg per kg of salt. In non-iodated salt samples, we found values varying around 3.0 mg of iodine per kg of salt. Sixty seven per cent of our Ghardimaou subjects never ate fish, 28% never consumed dairy products and 25.5% ate meat every day. Only five men smoked tobacco and did not exhibit the highest levels of thiocyanate (94.82; 112.06; 141.37; 196.54 and 217.22 µmol/l).

According to our results, it seems that in Ghardimaou, where goitre is still frequent (31.4% of our subjects), urine iodine excretion is not different from that in Tunis, a region where goitre is less frequent (0% of our subjects). It seems that besides a high frequency of goitre in this region, iodine intake is sufficient, except for some cases. Iodated salt has been introduced in 1972, but this prevention is to be controlled: iodated salt must be exclusively commercialized in the endemic area, and its iodine concentration must be more uniform. Thiocyanate levels are normal, that is to say, no natural goitrogens producing high quantities of thiocyanates are present in food. The presence of a non-producing thiocyanate goitrigen is possible and is to be looking for. A similar study concerning children is necessary to assure the persistance of endemic goitre and to evaluate the iodine intake of children.

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