

Letter to Editor about "hypothyroidism and Ramadan fasting"

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Hadjazdeh et al. have reviewed literature regarding hypothyroidism and Ramadan fasting and conclude that fasting can change serum concentrations of thyroid hormones and TSH in both animals and humans (1). They also indicate that fasted hypothyroid individuals may suffer from thyroid hormone changes and therefore recommend that hypothyroid patients should increase their dosage of levothyroxine by 25-50 µg daily.

We and others have shown that in experimental studies fasting is associated with a decrease in serum T3 and an increase in serum rT3. At least part of the reduction in serum T3 is due to a decrease in the peripheral conversion of T4 to T3. It has been shown that serum T3 and rT3 return to prefasting values upon refeeding with a mixed diet (2-4).

We have also found that refeeding with a mixed diet or with carbohydrate, even though hypocaloric, reverses the changes in serum T3 and rT3 caused by fasting. This finding complements those of other studies that demonstrate the importance of dietary carbohydrate in the modulation of serum T3 (5). Alteration in various parameters during Islamic (Ramadan) fasting is completely different from experimental fasting. From a physiological standpoint, Islamic fasting provides a unique model of intermittent daily fasting for one month. It is also distinct from regular voluntary or experimental fasting in that the faster does not drink during fasting hours. Therefore, one may assume that physiological changes occurring during Islamic fasting would differ

from those observed during an experimental fast (6).

No significant alterations in serum concentrations of T4, T3, TSH, and TSH response to intravenous injection of TRH were found to occur in fasting males during Ramadan (7). In women, serum T4 and T3 concentrations may decrease in the last days of Ramadan however, the being mainly due to alterations in protein binding, as free thyroid indices remain unchanged (8, 9). A small increase in serum T4 in the last days of Ramadan has been reported by some studies, but not substantiated by others (7-10, 11). Serum T3 may decrease in premenarche girls without increase in serum TSH (12).

Is thyroid hormone replacement altered during Ramadan? Karoli et al. studied the impact of bedtime levothyroxine supplementation on serum TSH levels during Ramadan in 47 patients, and found that 29 of 47 patients had changes $\geq 2 \text{ mU/l}$ of serum TSH by the end of Ramadan. However, they related these changes mainly to the interval between levothyroxine ingestion and the last meal (13). Since there is no change in disposal of thyroid hormones in the first 24 hr of experimental fasting (5), there should be no need to change the dosage of levothyroxine during Ramadan fasting. However, other factors which change the absorption, metabolism and disposal of thyroid hormones during Ramadan should be carefully considered by both patients and physicians. Foods and medications such as iron sulphate, calcium preparations, cholestyramine, resin,

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sucralphate, aluminum antacids, raloxifene, activated charcoal, various soya products and food and herbal remedies affect levothyroxine absorption (14-17). Also a fiber-enriched diet, and coffee in early morning may interfere with the absorption of levothyroxine (18, 19).

Based on the available data (20), it can be postulated that during Ramadan, the proper administration of levothyroxine is achieved if it is taken an hour before Sehur (meal taken before dawn); however most of the patients find it difficult to wake up that early and either miss the dose or take it with the meal. This problem can be easily managed, if levothyroxine is taken at bedtime, which too has an almost identical lowering effect (if not better) on TSH (21-23). The effect may be due to the better effect of factors such as gastric motility, heavy meals, circadian rhythm, and effect of deiodinase activity (24). However, the patient should not take any food for at least 2 hours before bedtime.

In conclusion, changes in serum thyroid hormones and TSH concentrations during Islamic fasting are minimal and do not alter the health of fasted individuals. In addition, Ramadan fasting per se does not cause any need for changes in dosage of levothyroxine in hypothyroid patients, although other factors that require change in levothyroxine dose, in particular the distance between ingestion of medication and last meal and/ or next meal should be considered.

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