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OXIDANT-ANTIOXIDANT BALANCE IN PATIENTS WITH TOXIC NODULAR GOITRE TREATED WITH RADIOIODINE THERAPY

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Rationale: Oxidative stress is defined as an imbalance between production of reactive oxygen species and system's ability to counteract or detoxify their damaging effects. It plays an important role in hyperthyroidism-induced tissue damage.

Objective: The purpose of this study was to determine whether radioiodine therapy can reduce oxidative stress in patients with toxic nodular goitre.

Material and methods: A group of 50 patients with toxic nodular goitre was studied. The group consisted of 36 female and 14 male aged 20-68 years. Control group was assembled consisting of 17 normal adult volunteers (age and sex-matched). All the patients were in mild hyperthyroidism with serum TSH levels below 0.1 mU/l and effective half-life more than 3 days at the time of treatment. Malignant changes were excluded in all nodules by fine needle aspiration biopsy. In the investigated groups, malondialdehyde (MDA) as a marker of oxidative stress, glutathione (GSH) and glutathione peroxidase (GPx) activity as a parameters of antioxidant system before and 6 months after radioiodine therapy were determined. The serum fT4, fT3 and TSH were evaluated before and monthly up to 12 months after RIT. In order to assess thyroid volume thyroid ultrasound, and thyroid scan were done after 12 months of ¹³¹I therapy. The activity dose was calculated by Marinelli's formula and ranged between 280 and 800 MBq. The absorbed dose ranged between 160 and 300 Gy, and was proportional to thyroid volume.

Results and discussion: Significantly increased serum MDA levels with significant decrease in GPx activities and GSH level were observed in patients with toxic nodular goitre before treatment compared to controls subject. Achievement of euthyroidism after 6 months of radioiodine administration resulted in a significant decrease of MDA level, significant increase of GSH level and in GPx activities. Euthyroidism was achieved in 45 patients and hypothyroidism developed in 5 patients. Thyroid volume reduced to about 47% (average).

Conclusions: Results confirm the imbalance of the antioxidant/oxidant status in patients with toxic nodular goitre. Improvement of this balance can be achieved by radioiodine therapy.