THE ROLE OF INSULIN TREATMENT IN CONTROLLING OXIDATIVE STRESS IN BLOOD OF DIABETIC RATS

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An increase in oxidative stress is associated with hyperglycemia, development, and progression of diabetes complications. This condition can lead to lipid peroxidation in muscle cell membranes, which contributes to the development of insulin resistance. The purpose of the present study was to verify the action of insulin combined with HBO treatment in oxidative stress control of streptozotocin-diabetic rats. The rats were subjected to 24-hour starvation and given an intraperitoneal injection of streptozotocin (STZ, 60 mg/kg body weight, dissolved in 0.01 M sodium citrate buffer, pH 4.5) to induce diabetes. A total of 48 male Wistar rats were randomly divided into 4 groups: 1) Control group, no diabetic induction without HBO treatment; 2) HBO group, exposed to 100% oxygen at 2.8 ATA (atmosphere absolute) for 1 h once daily, for 5 days (two weeks); 3) DM group, diabetes induced by streptozotocin (STZ) injection; and 4) DM + HBO group, received both STZ injection and HBO exposure; 5) DM+INS group, NPH insulin 5U/day, 6) DM+HBO+INS, received both NPH insulin and HBO exposure for 2 weeks. The body weight, glycemic control, and parameters of oxidative stress were evaluated. DM+INS reduced the oxidative stress levels and the activity of catalase and superoxide dismutase in blood when compared to DM+INS+HBO rats. In conclusion, our results reveal that dual therapy with HBO and insulin promotes more benefits to oxidative stress control in blood of hypoinsulinemic rats than insulinotherapy alone.

Keywords: diabetes mellitus type 1, streptozotocin, hyperbaric oxygen therapy, neutral protamine hagedorn (NPH) insulin