Low doses of insulin-like growth factor-I improve nitrogen retention and food efficiency in rats with early cirrhosis

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Background/Aims: In order to ascertain whether malnutrition is an early-onset feature of liver cirrhosis and whether the anabolic hormone insulin-like growth factor I (IGF-I) could be useful in the treatment of this complication, we analyzed the nutritional alterations present in rats with early-stage liver cirrhosis and the effects of IGF-I on nutritional parameters in these animals.

Methods: After a 24 h fast, a ¹⁵N-enriched diet was administered for 5 days to normal control rats and to cirrhotic rats receiving subcutaneous injections of vehicle (Group 1) or IGF-I, 2 µg 100 g bw⁻¹ day⁻¹ (Group 2) during the 5 experimental days. ¹⁵N, a stable N isotope, was measured in biological samples by mass spectrometry.

Results: Compared with control rats, Group 1 animals showed significant reductions in N intake and food efficiency (p<0.05, both). In addition, the weight of the gastrocnemius muscle, its total N content and the dietary N content of this muscle were significantly lower in Group 1 than in control animals (p<0.05, all). In rats from Group 2, mean values of N intake, food efficiency, gastrocnemius N content and the amount of dietary N incorporated into this muscle were similar to those in control rats, and (with the exception of gastrocnemius N total content) significantly higher than those in non-treated cirrhotic rats (p<0.05, all).

Conclusions: A variety of nutritional disturbances were detected in rats from the early stages of liver cirrhosis. Low doses of IGF-I were found to reverse most of these changes. These results stimulate further studies to determine whether IGF-I might be useful in the correction of the malnutrition present in patients with liver cirrhosis.

Key words: Food efficiency; IGFBP; Insulin-like growth factor-I (IGF-I); Liver cirrhosis; Malnutrition; Nitrogen balance; N intake; Stable isotope ¹⁵N.