Effect of G-CSF(Granulocyte-Colony Stimulating Factor) on the peripheral nerves in streptozotocin-induced diabetic rat

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G-CSF(Granulocyte-colony stimulating factor) has been suggested to have neuroprotective effect on the central nervous system. However, it is difficult to expect this beneficial effect on all neuronal tissues. Therefore, we investigated that G-CSF is also beneficial in the protection of peripheral nerve damage of experimental diabetes (DM). Male Sprague-Dawley rats were divided into 5 groups as follows: Normal, Normal+G-CSF (50 ug/kg for 5 days), DM, DM+G-CSF (G-CSF, 50 ug/kg for 5 days), and DM+G-CSF extension (G-CSF, 50 ug/kg for 5 days and followed by two injections per week up to 24 weeks). In the result, body weight and blood glucose levels were not affected by G-CSF administration and current perception thresholds (CPT) were also not different significantly according to G-CSF treatment. The number of gastric small nerve fibers penetrating into mucosa (a) and intraepidermal nerve fibers (IENF) density of the foot (b) were also not different significantly among DM groups irrespective of G-CSF administration although mild reduced trend in the nerve damage was observed in the G-CSF treated groups as follows (DM vs. DM+G-CSF vs. DM+G-CSF extension, respectively). (a) Gastric small nerve fiber: 0.85±0.28 vs. 1.21±1.0 1 vs. 1.42±1.02, p>0.05 (b) IENF density; 4.90±0.32 vs. 5.21±0.24 vs. 5.69±0.33, p>0.05. Our results indicate that diabetic peripheral neuropathy (DPN) caused by diverse pathogenic mechanisms is difficult to be protected completely by sole G-CSF treatment and neuroprotective effect of G-CSF may be dependent on the neuronal type or distribution. G-CSF receptor presence or not is also considered to be important factor in this regard. However G-CSF combination with well known strategies including strict glucose control and oxidative stress lowering agents is worth investigating for novel DPN therapeutic approach.

The difference in the urine D-chiro-inositol level according to the characteristics of type 2 diabetes mellitus patients

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Background/Aims: D-chiro-inositol is known as a mediator of insulin’s action and it has been shown to lower the blood glucose concentration in type 2 diabetes mellitus patient. This study aims to compare the urine D-chiro-inositol levels between normal controls and type 2 diabetes mellitus patients and we also searched for the relationship between the clinical characteristics of diabetes mellitus patients and the urine D-chiro-inositol concentration. Methods: 103 normal controls and 111 type 2 diabetes mellitus patients were recruited. Urine D-chiro-inositol was measured by the high performance liquid chromatography/mass spectrometry method. Results: Excretion of urinary D-chiro-inositol was increased in the diabetic subjects (p=0.000). In the diabetic group, the D-chiro-inositol level demonstrated a statistically significant positive correlation with HbA1c (r=0.264, p=0.007), microalbumin (r=0.252, p=0.021) and blood urea nitrogen (r=0.259, p=0.008) and it showed an inverse correlation with albumin (r=-0.198, p=0.045), ALT (r=-0.237, p=0.019) and the GFR (r=-0.200, p=0.043) (Table 2). Only the fasting plasma glucose level (β=0.003, p=0.043) and the total cholesterol (β=0.008, p=0.024) were found to be significant variables on the multiple regression analysis. When diabetic subjects were divided into two groups according to the HbA1c level, the subjects with a HbA1c level more than 8% presented a higher level of urinary D-chiro-inositol (p=0.019). Conclusions: The urinary D-chiro-inositol excretion of the diabetic subjects was increased. For the subjects whose HbA1c level exceeded more than 8%, the urinary excretion level of D-chiro-inositol was also increased. So we can expect more effectiveness of pinitol treatment in this poor glucose control group.