**Chromium infusion in hospitalized patients with severe insulin resistance**

**Background:** Hyperglycemia is common in hospitalized patients and is associated with higher in-hospital mortality rate compared to patients with a prior history of diabetes and those with normoglycemia. Hyperglycemia may be caused by many factors, including insufficient doses of insulin, infection or inflammation, excessive calories from parenteral and enteral nutrition, dextrose infusions, and medications including corticosteroids, sympathomimetics, and immunosuppressants, and is often treated with subcutaneous or intravenous insulin.

While most hospitalized patients with hyperglycemia respond well to insulin therapy, some do not because of severe insulin resistance. The current treatment for these patients is steadily increasing doses of insulin and frequently at drip rates that exceed the saturation of insulin receptors. The maximal effect of insulin occurs at insulin concentrations between 200 and 700 mcU/ml (1), which is equivalent to an infusion rate of 2.0 to 5.0 mU/(kg\*min) or 8.4 to 21 units/hr for a 70 kg adult. In cases of severe insulin resistance patients may not respond to this therapy and have persistent hyperglycemia.

There have been some case reports of acutely ill, hospitalized patients with severe insulin resistance who were treated with intravenous chromium, with subsequent decrease in their insulin needs and resolution of their insulin resistance. The proposed mechanism of chromium on insulin resistance is through upregulation of insulin receptor, tyrosine kinase activity (2), leading to increased tyrosine phosphorylation of the insulin receptor, which is associated with enhanced signal transduction (3).

**Objective:** To investigate the effects of intravenous chromium on serum glucose and insulin infusion rates in hospitalized patients with severe insulin resistance.

**Data:** Data are available on hospital records over a period of three years for patients whom intravenous chromium was ordered. To be included, patients were required to demonstrate profound insulin resistance and uncontrolled hyperglycemia (defined as the inability to achieve a blood glucose value <200 mg/dl during the 12 hours before chromium was given despite administration of continuous insulin infusion at a rate >20 units/hr). A continuous infusion of chromium chloride at 20 mcg/hr for 10-15 hours for a total dose of 200-240 mcg was given to each patient.

**References**

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2. Davis CM, Vincent JB. Chromium oligopeptide activates insulin receptor tyrosine kinase activity. Biochemistry. 1997 Apr 15;36(15):4382-5.
3. Anderson RA. Chromium and insulin resistance. Nutr Res Rev. 2003;16(2):267-275.