BRIEF ARTICLE

Effect of intensive *vs* conventional insulin therapy on perioperative nutritional substrates metabolism in patients undergoing gastrectomy

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Abstract

AIM: To investigate the effect of intensive *vs* conventional insulin therapy on perioperative nutritional substrates metabolism in patients undergoing radical distal gastrectomy.

METHODS: Within 24 h of intensive care unit management, patients with gastric cancer were enrolled after written informed consent and randomized to the intensive insulin therapy (IIT) group to keep glucose levels from 4.4 to 6.1 mmol/L or the conventional insulin therapy (CIT) group to keep levels less than 10 mmol/L. Resting energy expenditure (REE), respiratory quotient (RQ), resting energy expenditure per kilogram (REE/kg), and the lipid oxidation rate were monitored by the indirect calorimeter of calcium citrate malate nutrition metabolism investigation system. The changes in body composition were analyzed by multi-frequency bioimpedance analysis. Blood fasting glucose and insulin concentration were measured for assessment of Homeostasis model assessment of insulin resistance.

RESULTS: Sixty patients were enrolled. Compared with preoperative baseline, postoperative REE increased by over 22.15% and 11.07%; REE/kg rose up to 27.22 ± 1.33 kcal/kg and 24.72 ± 1.43 kcal/kg; RQ decreased to 0.759 ± 0.034 and 0.791 ± 0.037; the lipid oxidation ratio was up to 78.25% ± 17.74% and 67.13% ± 12.76% supported by parenteral nutrition solutions from 37.56% ± 11.64% at the baseline; the level of Ln-HOMA-IR went up dramatically ($P < 0.05$, respectively) on postoperative days 1 and 3 in the IIT group. Meanwhile the concentration of total protein, albumin and triglyceride declined significantly on postoperative days 1 and 3 compared with pre-operative levels ($P < 0.05$, respectively). Compared with the CIT group, IIT reduced the REE/kg level (27.22 ± 1.33 kcal/kg *vs* 29.97 ± 1.47 kcal/kg, $P = 0.008$; 24.72 ± 1.43 kcal/kg *vs* 25.66 ± 1.63 kcal/kg, $P = 0.013$); and decreased the Ln-HOMA-IR score ($P = 0.019$, 0.028) on postoperative days 1 and 3; IIT decreased the level of CRP on postoperative days 1 and 3 ($P = 0.017$, 0.006); the total protein and albumin concentrations in the IIT group were greater than those in the CIT group ($P = 0.023$, 0.009). Postoperative values of internal cell fluid (ICF), fat mass, protein mass (PM), muscle mass, free fat mass and body weight decreased obviously on postoperative 7th day compared with the preoperative baseline in the CIT group ($P < 0.05$, respectively). IIT reduced markedly consumption of fat mass, PM and ICF compared with CIT ($P = 0.009$ to 0.026).

CONCLUSION: There were some benefits of IIT in decreasing the perioperative insulin resistance state, reducing energy expenditure and consumption of proteins and lipids tissue in patients undergoing gastrectomy.