Effect of Intensive Insulin Therapy Using a Closed-Loop Glycemic Control System in Hepatic Resection Patients

A prospective randomized clinical trial

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OBJECTIVE — Intensive insulin therapy (IIT) reduces morbidity and mortality in patients in surgical intensive care units. The aim of this study is to assess the effect of IIT using a closed-loop system in hepatectomized patients.

RESEARCH DESIGN AND METHODS — Patients were randomly assigned to receive IIT using a closed-loop system: an artificial pancreas (AP group) or conventional insulin therapy using the sliding-scale method (SS group).

RESULTS — The incidence of surgical-site infection in the AP group was significantly lower than that in the SS group. The length of hospitalization required for patients in the AP group was significantly shorter than that in the SS group.

CONCLUSIONS — Total hospital costs for patients in the AP group were significantly lower than for patients in the SS group. IIT using a closed-loop system maintained normoglycemia and contributed to a reduction in the incidence of SSI and total hospital costs due to shortened hospitalization.

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Insulin therapy using artificial pancreas in hepatic resection

![Graph showing blood glucose levels over postoperative time](image)

Figure 1.—Postoperative blood glucose levels in the SS and AP groups during the first 18 h following surgery.

Hepatic resection performed for 18 h in patients with liver resection at surgical ICU and excellent glucose control was successfully observed without hypoglycemia by using a closed-loop system. We strongly believe that perioperative tight glycemic control for an abbreviated period (at least for 18 h) from the postoperative early stage had a prevention of postoperative infectious morbidities.

When the overall costs during hospitalization were calculated, patients with SSI had a crude median cost of $28,681 compared with $16,352 for uninfected patients ($P < 0.001). This is the first report that demonstrates that perioperative tight glycemic control might reduce the incidence of postoperative SSI and decrease the total costs associated with hospitalization for patients undergoing hepatic surgery for liver neoplasms.

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