



Real-Time Dynamic Insulin Pump Nursing Care of a Diabetic Patient after Heart Transplantation

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Dear Editor-in-Chief

Heart transplantation is an effective treatment of end-stage heart disease that can significantly improve the quality of life of patients and prolong life. Whether or not patients with transplant can have a favorable survival is by far a serious problem which needs to be solved by health care workers (1). The intermittent hyperglycemia can increase the risk of diabetes complications when compared to persistent hyperglycemia, especially damage to cardiovascular and endothelial cell (2). Thus, high blood sugar control in patients after heart transplantation is a very important step to the recovery (3).

The patient, a 48 years old male, had elevated blood sugar for six months and was admitted to Jiangsu Jiangyin People's Hospital hospital (Jiangsu, China) in 2014. He had been diagnosed with previous "dilated cardiomyopathy" for six years prior and in January he had a heart transplantation, and was given postoperative cyclosporine, mosaic, furosemide, spironolactone, Hua Falin, prednisone treatment at the Shanghai Zhongshan Hospital. A week before hospitalization, he had dry mouth, polydipsia, polyuria, lost ten pounds, and malaise. Before admission, his blood sugar was at 33.7mmol/L, and was administered fluid infusion for hypoglycemia and received other symptomatic treatments at the Zhongshan Hospital.

The study was approved by the Ethics Committee of Jiangsu Jiangyin People's Hospital and written informed consents were signed by the patients and/or guardians.

He returned to hospital for a random check-up and his blood glucose was at 18.4mmol/L. After admission, he was given insulin as part of his meals + Insulin Detemir before bedtime for hypoglycemic treatment with 722 real-time dynamic monitoring of 72 hours blood glucose insulin pump. The results suggest that his average blood glucose 6.9 ± 2.6 mmol/L, average $AUC > 7.8$ mmol/L accounted for 36%, average $AUC < 3.9$ mmol/L accounted for 14% of blood sugar fluctuations. The dose was adjusted according to the real-time dynamic blood sugar results and glucose trend. Insulin was administered before the three meals 2-10-16 U, and Insulin Detemir before bedtime 4U subcutaneously. He was discharged after the steady improvement of 07-19 glycemic control.

The patient underwent a heart transplant, and high blood glucose can easily make the patient have anxiety and fear. Therefore, the hospital staff should provide psychological support to keep the patient optimistic, and let him recognize the negative emotional impact on his blood sugar, and rest to ensure adequate sleep. Blood glucose monitoring guidance using real-time dynamic insulin pump system initialized 2H post-test fingertip blood glucose value input, pump

input, after that at four time points every day (6:00, 10:30, 16:30, 22:00) input finger peripheral blood glucose values to correct 722 dynamic insulin pump data. According to blood glucose of patients reasonably arrange the number of meals based on appetite and quantity, provide high protein, high nutrients, low-salt, low-fat diet, diabetes mellitus for patients. Exercise guidance to assure that the transplanted heart does not innervate. Complications were observation and nursed (4). After heart transplantation, the patient had diabetes with pre-admission high blood sugar. The blood glucose fluctuation range was wider, and the dose of insulin was not easy to control, which brings a certain difficulty to the rehabilitation work. The 722 real-time dynamic insulin pump integrates three functions that are continuous glucose monitoring system (CGMS), continuous subcutaneous insulin infusion (CSII) and Carelink (Data Management). It provides a real-time display of blood glucose, insulin infusion, and other functions.

For clinical use, insulin pump function or dynamic blood sugar monitoring function can be used simultaneously according to the situation of the patient during treatment. We chose the continuous glucose monitoring system (CGMS) of 722 real-time dynamic insulin pump which could monitor the overall situation in 72 h glucose with obvious advantages to treating patients with larger blood glucose fluctuation (5) revealing blood sugar drift changes and fluctuations in the trend that the conventional blood glucose monitors cannot display, comprehensively, and objectively reflecting the blood glucose level of patients in each period (6), by CGMS. Doctors could understand the blood glucose fluctuation of patients, to discover hypoglycemia, dawn phenomenon and high blood glucose peak without symptoms, and make proper treatment plans, with diet and exercise guidance according to patients' blood glucose fluctuation. Doctors can make timely corrections

to prevent high blood sugar so that blood sugar reaches a stable trend and reduces blood sugar fluctuations, delaying complications, and improving the patients with heart transplants quality of life.

The medical staff in our department provided adequate care on several levels; psychological, diet, exercise, medication, and dynamic monitoring of blood glucose for the patient. That shortened the hospitalization time and provided the patient with stable blood sugar and stable vital signs, and was subsequently discharged.

Conflict of interests

The authors declare that there is no conflict of interests.

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