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ORIGINAL ARTICLE

Usage and Effectiveness of the Low Glucose Suspend Feature of the Medtronic Paradigm Veo Insulin Pump

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Abstract

Background:

Sensor-augmented insulin pumps may be programmed to suspend insulin delivery in response to hypoglycemia. The Medtronic Paradigm® Veo™ pump with automatic low glucose suspend (LGS) was released in 2009. Data from 7 months of real-world use of the system were analyzed to assess usage patterns and effectiveness of LGS.

Method:

Data from 935 patients totaling 49,867 patient days were collected; the LGS feature was on for 82% of these days. A subset of 278 subjects who used the pump for ≥3 months was analyzed separately; these subjects provided 28,401 patient days of data, with LGS used for 92% of the time.

Results:

The LGS threshold was most commonly set between 50 and 60 mg/dl. A total of 27,216 LGS events occurred, and 60% began in the afternoon or evening. The median duration of LGS events was 9.87 min, 45% lasted for <5 min, and 11% lasted for >115 min (equivalent to the full extent of the LGS event between 115 and 120 min). Among the episodes lasting for >115 min, the mean sensor glucose (SG) was 58.8 ± 12.4 mg/dl at LGS activation (time 0), rose to 102.2 ± 52.8 mg/dl by the end of the LGS episode (when insulin delivery was automatically resumed), and was 150.1 ± 68.6 mg/dl at 240 min. In the 278-subject subgroup, LGS usage significantly reduced the number of SG readings <50 mg/dl ($p = 0.001$) and >300 mg/dl ($p = 0.001$).

Conclusions:

The LGS feature was on for most of the patient days in the study. Most LGS episodes lasted for <10 min. Use of the LGS feature significantly reduced exposure to hypoglycemia. Profound hyperglycemia resulting from LGS episodes lasting >115 min was not observed.

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Abbreviations: (AUC) area under the curve, (BG) blood glucose, (CGM) continuous glucose monitoring, (LGS) low glucose suspend, (SAP) sensor-augmented pump, (SD) standard deviation, (SG) sensor glucose

Keywords: hypoglycemia avoidance, low glucose suspend, pump suspension, semi-closed loop, Veo insulin pump

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