Evaluating the Safety and Effectiveness of the Omnipod® 5 Automated Insulin Delivery System in Patients with Type 2 Diabetes

IDE G190270

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PROTOCOL SUMMARY

Protocol title	Evaluating the safety and effectiveness of the Omnipod 5 Automated Insulin Delivery System in patients with type 2 diabetes
Protocol ID	G190270
Purpose	To obtain feasibility data using the Omnipod 5 Automated Insulin Delivery System in patients with type 2 diabetes with suboptimal glycemic control.
Design	This study is a multi-center, feasibility study

Enrollment	A total of up to 36 subjects will be enrolled in the study to obtain a minimum of 24 evaluable subjects enrolled across 3-6 clinical study sites.
	
	The study subjects will be separated into 2 groups (N=12 each), depending on their previous insulin therapy with approximately 50% of subjects from each group, CGM naive:
	
	Basal-Bolus – Group A
	• 2 weeks standard therapy – using multiple daily injections (MDI) and Dexcom G6 CGM, followed by:
	• 4 weeks OP5 in Automated Mode with optional bolus, followed by:
	• 4 weeks OP5 in Automated Mode with simplified bolus
	• 6 month extension using Automated Mode (optional)
	
	Basal – Group B
	• 2 weeks standard therapy – using basal injection only and Dexcom G6 CGM, followed by:
	• 2 weeks OP5 in Manual Mode with Dexcom G6 CGM – with fixed basal rate, no bolus, followed by:
	• 4 weeks OP5 in Automated Mode with optional bolus, followed by:
	  ○ If % time in range 70-180 mg/dL during Automated Mode is ≤50%, 4 weeks OP5 in Automated Mode with simplified bolus, OR
	  ○ If % time in range 70-180 mg/dL during Automated Mode is >50%, 4 weeks OP5 in Automated Mode with optional bolus
	• 6 month extension using Automated Mode(optional)

Indication	The Omnipod 5 (OP5) is a single hormone insulin delivery system intended for the management of diabetes in persons requiring insulin. Continuous subcutaneous insulin infusion may be delivered by user-defined settings (manual mode) or automatically adjusted in response to feedback from a continuous glucose monitor (CGM). The Omnipod 5 can automatically increase insulin delivery based on CGM sensor glucose values and can decrease or suspend delivery of insulin when the glucose value falls below or is predicted to fall below predefined threshold values. The Omnipod 5 is interoperable with compatible iCGMs and ACE pumps. The Omnipod 5 is designed to assist patients with diabetes in achieving glycemic targets set by their health care providers.

Study duration	The study is expected to be completed within 18-months which includes clinical site initiation to completion and all data entry and monitoring procedures. The results from the 6 month extension for both groups will be evaluated and submitted separately from the other phases of the study.
Investigational devices	The Omnipod 5 is comprised of the following components: • Omnipod 5 tubeless, insulin delivery alternate controller enabled (ACE) pump (Pod) powered by the Horizon algorithm • Omnipod 5 Personal Diabetes Manager (PDM) which is a Samsung J3 locked down Android device that operates the Horizon App. • Dexcom G6 - Continuous Glucose Monitoring (CGM) system
Non-investigational, commercially available devices	• Contour® Next One blood glucose meter (Ascensia Diabetes Care, 5 Wood Hollow Road, Parsippany, NJ 07054 USA)
Primary safety objective	To evaluate the safety of the Omnipod 5 Automated Insulin Delivery System in patients with type 2 diabetes.
Primary safety endpoints	The primary safety objective will be evaluated by summarizing the following during Automated Mode: • Hyperglycemia - Overall percentage of time ≥250 mg/dL during all phases of Automated Mode • Hypoglycemia – Overall percentage of time <54 mg/dL during all phases of Automated Mode The results from the 6 month extension for both groups will be evaluated and submitted separately from the other phases of the study.
Secondary objective	To evaluate additional glycemic measures of effectiveness of the Omnipod 5 Automated Insulin Delivery System.
Secondary endpoints	Per subject glucose metrics during Automated Mode use will be compared to the standard therapy phase overall, separately for Group A and Group B: • Mean glucose • % of time in range 70-180 mg/dL • % of time > 180 mg/dL • % of time ≥ 250 mg/dL • % of time ≥ 300 mg/dL • % of time < 70 mg/dL • % of time < 54 mg/dL • Standard deviation • Coefficient of variation • Total daily insulin (TDI) (units, units/kg) • End of study A1C vs. baseline A1C The results from the 6 month extension for both groups will be evaluated and submitted separately from the other phases of the study.
Patient Reported Outcomes	Various subject completed questionnaires will be used to evaluate general and disease-specific quality of life, and device usability.
Eligibility criteria	***Inclusion Criteria*** Subjects must meet all the following criteria to be included in the study:

	1. Age at time of consent 18-75 years 2. Diagnosed with type 2 diabetes on insulin therapy by injection: basal-bolus (12 subjects) or basal only (12 subjects) regimens 3. A1C 8.0-12.0% 4. Has not used an insulin pump within 3 months of screening 5. Willing to use only the following types of insulin during the study: Humalog, Novolog, Admelog or Apidra during the study 6. Maximum insulin dose of 200 units/day 7. Stable doses over the last 4 weeks of other glucose-lowering medications as determined by Investigator 8. Willing to wear the system continuously throughout the study 9. Deemed appropriate for pump therapy per investigator's assessment considering previous history of severe hypoglycemic and hyperglycemic events, and other comorbidities 10. Investigator has confidence that the subject has the cognitive ability and can successfully operate all study devices and can adhere to the protocol 11. Must be willing to use the Dexcom App on the Omnipod 5 PDM as the sole source of Dexcom data (except for the Dexcom Follow App) during Automated Mode 12. Subjects scoring ≥ 4 on the Clarke Questionnaire must agree to have an overnight companion, defined as someone who resides in the same home or building as the study subject and who can be available overnight 13. Able to read and speak English fluently 14. Willing and able to sign the Informed Consent Form (ICF) ***Exclusion Criteria*** Subjects who meet any of the following criteria will be excluded from the study: 1. A medical condition, which in the opinion of the investigator, would put the subject at an unacceptable safety risk 2. Planned major surgery during the study 3. History of severe hypoglycemia in the past 6 months 4. History of diabetic ketoacidosis (DKA) in the past 6 months, unrelated to an intercurrent illness, infusion set failure or initial diagnosis 5. Diagnosed with a blood dyscrasia or bleeding disorder 6. Plans to receive blood transfusion over the course of the study 7. Currently diagnosed with anorexia nervosa or bulimia 8. Currently on hemodialysis 9. History of adrenal insufficiency 10. Has taken oral or injectable steroids within the past 8-weeks or plans to take oral or injectable steroids during the study 11. Unable to tolerate adhesive tape or has any unresolved skin condition in sensor or pump placement 12. Plans to use insulin other than U-100 insulin during the Omnipod 5 phase of the study 13. Cardiac disease with functional status New York Heart Association Class III or IV or current or known history of coronary artery disease that is not stable with medical management, including unstable angina, or angina that prevents moderate exercise despite medical management, or a history of myocardial infarction, percutaneous coronary intervention, or coronary artery bypass grafting within the previous 12-months. 14. Pregnant or lactating, or is a woman of childbearing potential and not on acceptable form of birth control (acceptable includes abstinence, condoms, oral/injectable contraceptives, IUD, or implant)

	15. Participation in another clinical study using an investigational drug or device other than the Omnipod 5 in the preceding 30-days or intends to participate during the study period 16. Unable to follow clinical protocol for the duration of the study or is otherwise deemed unacceptable to participate in the study per the investigator's clinical judgment

Study schedule	The study subjects will be separated into 2 groups, depending on their previous insulin therapy with approximately 50% of subjects from each group, CGM naive:
	
	Basal-Bolus – Group A (N=12)
	• 2 weeks standard therapy – using multiple daily injections (MDI) and Dexcom G6 CGM, followed by:
	• 4 weeks OP5 in Automated Mode with optional bolus, followed by:
	• 4 weeks OP5 in Automated Mode with simplified bolus
	• 6 month extension using Automated Mode (optional)
	
	Basal – Group B (N=12)
	• 2 weeks standard therapy – using basal injection only and Dexcom G6 CGM, followed by:
	• 2 weeks OP5 in Manual Mode with Dexcom G6 CGM – with fixed basal rate, no bolus, followed by:
	• 4 weeks OP5 in Automated Mode with optional bolus, followed by:
	  ○ If % time in range 70-180 mg/dL during Automated Mode is ≤50%, 4 weeks OP5 in Automated Mode with simplified bolus, OR
	  ○ If % time in range 70-180 mg/dL during Automated Mode is >50%, 4 weeks OP5 in Automated Mode with optional bolus
	• 6 month extension using Automated Mode (optional)
	
	Following the subject screening, enrollment, and device training, subjects from both groups will commence the outpatient 2-week standard therapy phase using a Dexcom G6 CGM. After completion of the standard therapy phase, subjects will be trained on the use of Omnipod 5 and transition to either Automated Mode or Manual Mode use depending on which group they have been assigned.
	
	Current Dexcom G6 CGM users may provide data from a 14-day period within the last 30-days. For non-G6 users, subjects will wear a study CGM, in blinded mode, to record glucose measurements over 14-days while subjects manage their diabetes at home per their usual routine and remaining on their current MDI, and sensor, if applicable, for 14-days.
	
	Subjects in **Group A** will use Automated Mode for 4 weeks with optional boluses followed by 4 weeks of simplified boluses. Subjects will then be eligible to transition to the optional 6 month extension phase.
	
	Subjects in **Group B** will use the system for 2 weeks in Manual Mode with a CGM and a fixed basal rate and no bolus. After completion of Manual Mode, Group B subjects will commence using the system in Automated Mode for 4 weeks with optional boluses. After completion of 4 weeks of Automated Mode, subjects will continue using Automated Mode for 4 weeks but will either continue using a simplified bolus or optional bolus depending on their time in range of 70-180 mg/dL over the previous 4 weeks of Automated Mode use.

	Subjects will then be eligible to transition to the optional 6 month extension phase.
Safety	An independent Medical Monitor will be responsible for individual and timely review of adverse events. The Medical Monitor will be a physician with relevant therapeutic and medical expertise that is not participating as an Investigator in the study and does not have a financial, scientific, or other conflict of interest with the clinical study.
Statistical Analysis	General Statistical Methods Standard statistical methods will be employed to analyze all data. Data collected in this study will be presented using summary tables and subject data listings. Unless otherwise noted, all p-values will be considered significant at a two-sided significance level of 5%. Continuous variables will be summarized using descriptive statistics, including count, mean, median, standard deviation (SD), minimum and maximum, and first and third quartiles. If the observed data are found not to follow a normal distribution, appropriate non-parametric methods may be employed. Categorical variables will be summarized by frequencies and percentages. Unless explicitly stated otherwise, percentages will utilize a denominator corresponding to the number of unique subjects. Sample Size This is a non-powered, multi-center, feasibility study. The sample size for the study is not hypothesis-driven and has been chosen to gather adequate safety and clinical performance data of the algorithm in the type 2 population. Primary Endpoint There are no hypotheses associated with the primary safety endpoints. The per subject percentage of time in each of the ranges will be summarized separately for each group no between-group analyses are planned. Standard summary statistics (i.e., mean, standard deviation, median, range) will be provided. Any statistical comparisons will be conducted at a two-sided significance level of 5%. Data from all sites will be pooled for all analyses and summaries; no separate analyses by site or formal testing of poolability will be performed. Secondary Endpoint There are no hypotheses associated with the secondary endpoints. Each endpoint will be summarized separately for each group; no between-group analyses are planned. Standard summary statistics (i.e., mean, standard deviation, median, range) will be provided. Any statistical comparisons will be conducted at a two-sided significance level of 5%. Safety All adverse events reported over the course of the study will be summarized and tabulated by group, study phase if applicable, event category, seriousness, severity, and relationship to the study procedure and the investigational device. For the purposes of summarization, an event will be considered “Related” if the relationship was deemed as “Possibly Related” or “Related”. In cases where the same event is reported more than once per subject, the event will only be counted once in the incidence table(s).