Diabetes care reaches new heights as drone delivers insulin for patient

30 March 2020

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The international medical team that accomplished the world's first documented drone delivery of insulin for a patient living in a remote community described the project in an ENDO 2020 abstract that will be published in the *Journal of the Endocrine Society*.

The 16-minute test flight from Galway, Ireland, to the Aran Islands about 12 miles off the west coast of Ireland took place Sept. 13 last year, according to the drone project's principal investigator, Derek O'Keeffe, M.D., Ph.D., a consultant endocrinologist at National University of Ireland Galway. O'Keeffe said that after severe storms disrupted healthcare access in Ireland in recent years, they wanted to find a solution for future disasters when people with diabetes in remote regions may be stranded for days without their lifesaving diabetes medicines.

"We now have the drone technology and protocols in place to deliver diabetes medications and supplies in an actual disaster if needed," he said. "This is a milestone in improving patient care."

The large autonomous (self-flying) drone flew "beyond visual line of sight" during commercial flight operations in regulated airspace, O'Keeffe said. The project team's yearlong planning required approvals from aviation, pharmaceutical and clinical regulatory agencies.

Endocrinologist Spyridoula Maraka, M.D., M.S., of the University of Arkansas for Medical Sciences and the Central Arkansas Veterans Healthcare System, Little Rock, said the team had to address several healthcare delivery issues to send a prescription medicine via an unmanned aircraft operating a 4G cellular network using GPS waypoints.

"Insulin can be outside the fridge for hours, but it can't be exposed to extreme heat, so we put it in an insulated parcel with temperature monitoring en route," Maraka said. "We also put a security lock on the parcel in case the drone did not arrive at the right place."

Because legally a pharmacist must dispense a prescription drug, she arranged for a pharmacist to dispense the insulin and another diabetes medication, glucagon before loading them to the drone for delivery.

Another unique aspect of the project, according to Maraka, is that the drone returned with a blood sample collected from the patient for monitoring blood glucose control (HbA1c). "We wanted to find a way to monitor glycemic control remotely," she said. "It was the full circle of care, which has not been done by drone before."

Maraka stressed that this ability for remote diagnostics could save lives. "A patient with type 1 diabetes could develop life-threatening diabetic ketoacidosis after more than one day without insulin," she said. "A blood specimen would allow us to properly diagnose and treat the condition."

Provided by The Endocrine Society