

Artificial Pancreas Could Help Pregnant Diabetic Women

Nicky Broyd, is a freelance writer for WebMD

[Medscape Nurses](#)

February 1, 2011 - For the first time, research has successfully demonstrated the potential benefits of an artificial pancreas in pregnant women with type 1 diabetes. It's hoped the development, funded by Diabetes UK, could drastically reduce cases of stillbirth and mortality rates among pregnant women with the condition.

Pregnancy and Diabetes

Pregnancy poses additional risks for women with diabetes as hormonal changes make it very difficult to keep blood glucose levels within a safe range, especially at night. As a result of high blood glucose levels, babies of women with diabetes are five times as likely to be stillborn, three times as likely to die in their first months of life, and twice as likely to have a major deformity.

Hypoglycemia (low blood sugar) in pregnancy is a major cause of maternal mortality.

Strict glycemic control is more readily achievable by pregnant women with type 2 diabetes. However, researchers say there has been a disappointing lack of progress in managing type 1 diabetes in pregnancy.

Around 18.8 million people in the U.S. have been diagnosed with diabetes. The CDC says type 1 diabetes accounts for about 5% of adult cases of diabetes.

Artificial Pancreas

The pancreas produces insulin, the hormone that helps to control blood sugar levels. For this latest study, led by Helen Murphy, MD, of Cambridge University, the performance of an artificial pancreas or "closed-loop insulin delivery system" was evaluated in 10 pregnant women with type 1 diabetes. The researchers found the device was able to automatically provide the right amount of insulin at the right time, maintain near-normal blood glucose levels, and, in turn, prevent nocturnal hypoglycemia in both early and late pregnancy.

The artificial pancreas was created by combining a continuous glucose monitor (CGM) with an insulin pump, both of which are already used separately by many people with type 1 diabetes.

An insulin pump removes the need for a series of daily insulin injections. However, people with diabetes still have to test their blood glucose levels frequently and calculate the amount of insulin to take. In comparison, the "artificial pancreas" takes minute-by-minute glucose readings from interstitial fluid using a continuous glucose monitor. The signal will then be transmitted wirelessly to a handheld computer, which calculates the amount of insulin needed. That information is then sent to an insulin pump, which delivers the insulin.

Previous studies have shown improved blood glucose control and reduced hypoglycemia with overnight use of an artificial pancreas in children with type 1 diabetes, but this is the first time it has been successfully used in pregnant women with the condition.

"For women with type 1 diabetes, self-management is particularly challenging during pregnancy due to physiological and hormonal changes. Previous studies indicate that pregnant women with

the condition spend an average of ten hours a day with glucose levels outside the recommended target,” Murphy says in a statement.

“These high blood glucose levels increase the risk of congenital malformation, stillbirth, neonatal death, preterm delivery, macrosomia [oversized babies], and neonatal admission. So to discover an artificial pancreas can help maintain near-normal glucose levels in these women is very promising,” she says.

Early Days

Diabetes UK Director of Research Iain Frame, MD, says in a news release, “Although early days, this exciting area of research, funded by our donors, has huge potential to make pregnancy much safer for women with type 1 diabetes, and their babies.

“It’s a fantastic example of how existing technologies, in this case, insulin pumps and CGMs, can be adapted and developed to benefit as many people with diabetes as possible. We now need to see an extension of this study, one which tests larger numbers of women, and then take it out of the hospital and in to the home setting.”

If all goes well and funding is in place, Diabetes UK says the artificial pancreas for pregnant women could be available within five to 10 years.

Sources:

Diabetes UK.

Diabetes Care, manuscript received ahead of print.

NHS Choices: “Diabetes Type 1.”