



BMH Medical Journal 2014;1(4):64-65 **Editorial**

## Inhale The Insulin

Raju A Gopal MD, DM

Baby Memorial Hospital, Kozhikode, Kerala, India. PIN: 673004

**Address for Correspondence:** Dr. Raju A Gopal MD, DM, Consultant Endocrinologist, Baby Memorial Hospital, Kozhikode, Kerala, India. PIN: 673004. E- mail: [drrajugopal@gmail.com](mailto:drrajugopal@gmail.com)

**Key Words:** Insulin, Inhaled

Insulin is the most potent hypoglycemic agent available to the date. Also it is the final resort to all type 2 Diabetes mellitus (DM) patients and the only one for type1 DM patients. Major drawback of insulin in long term treatment is the mode of delivery, ie subcutaneous injections. Lot of research and thoughts were there for development for alternate mode of delivery of insulin.

The concept of inhaling insulin has been around for decades. However, only in the late 1990 s could researchers make it into a powder which can be inhaled through a device. The FDA approved the first inhaled insulin, called Exubera, in September 2006. Exubera was approved for both type 1 or type 2 DM. Pfizer, the drug manufacturer took Exubera off the market in October 2007 for financial reasons. The drug was expensive and did not become popular with patients.

Quest for inhaled insulin continued, MannKind Corporation, came out with Afrezza and FDA approved Afrezza in April 2014.

AFREZZA is rapid acting inhaled insulin indicated to improve glycemic control in adult patients with diabetes mellitus. Administration is using a single inhalation per cartridge. It should be given at the beginning of a meal. AFREZZA is available as single-use cartridges of 4 units and 8 units. Dosing must be individualized. As this is prandial insulin, basal insulin need to be continued.

The clinical data of Afrezza is from exposure of 3017 patients which include 1026 patients with type 1 diabetes and 1991 patients with type 2 diabetes. The mean exposure duration was 8.17 months for the overall population

Afrezza has a Boxed Warning advising that acute bronchospasm has been observed in patients with asthma and chronic obstructive pulmonary disease (COPD). Afrezza should not be used in patients with chronic lung disease, such as asthma or COPD because of this risk. It is contraindicated in active lung cancers. The most common adverse reactions associated with Afrezza in clinical trials were hypoglycemia, cough, and throat pain or irritation.

Assessment of pulmonary function (e.g., spirometry) before initiating, after 6 months of therapy, and annually, even in the absence of pulmonary symptoms is recommended. Great caution should be exercised in patients with a history of lung cancer or at risk for lung cancer. Preferably avoid the use in diabetic ketoacidosis. Careful monitoring for other adverse reactions common for any insulin like

hypoglycemia, hypokalemia, and fluid retention is required.

The FDA has asked for following post-marketing studies for Afrezza to evaluate pharmacokinetics, safety and efficacy in pediatric patients, a clinical trial to evaluate the potential risk of pulmonary malignancy with Afrezza (also assess cardiovascular risk and the long-term effect of Afrezza on pulmonary function) and euglycemic glucose-clamp clinical trials.

Prospects of inhaled insulin as an alternate route of drug delivery are exciting; however real test of this molecule would be the acceptance by patients and cost effectiveness.