Delivery of Naturally Occurring Hormone (Insulin) Via Insulin Pens and Pumps - A Way Forward for Diabetes Treatment

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Abstract: Diabetes treatment is associated with different costs depending upon the type of curative approach used. Most of the time, insulin is administered by two main techniques: cartridges and vials. Insulin pens have emerged as alternative devices for insulin administration. In 2009, the consumption of insulin through insulin pens/cartridges in high-income countries is about 90% while in low-income countries is around 10%. Insulin pens are the main insulin delivery devices utilized approximately 75% and 67% in Japan and Europe, respectively. Better patient comfort and most advantageous glycemic control have lead to the extensive use of insulin pens. Preparation of insulin dose is the major limitation associated with insulin injection using vial and syringe delivery. Additionally, there may be chances that incorrect dose can be administered by mistake. This makes the discovery of insulin pens to overcome such problems. Administration of insulin is mainly carried out by numerous means. Various literatures presented for verification that supports the use of insulin pens over traditional insulin vials because of to lower overall costs. This article highlights the benefits and advancements of insulin delivery devices in controlling and treatment of diabetes.

Key words: Diabetes • Insulin Cartridge • Insulin Pens • Insulin Pumps

INTRODUCTION

Among insulin delivery approaches the use of insulin pens is strongly favoured due to several attractive attributes, for example, convenience of use, greater accuracy in dosing, provide patient satisfaction and adherence because of less pain due to smaller needle gauge [1-6]. Additionally, insulin pens allow precise dosing with maximum dose [7, 8]. In market insulin pens are available with different designs (For example, durable or prefilled designs, with interchangeable cartridages). In terms of cost, insulin cartridages are more expensive than insulin vials [3]. But the extra cost of insulin pens doesn’t matter for young and psychotic patients (Who feel fear by using syringes), insulin pens are beneficial. In a study, it was suggested that utilization of insulin pen reduce diabetes treatment cost when compared with using insulin vials [5].

Factors considered for selection of insulin injection pens include ease of administration, ease of dose-setting dial and ease of cartridge fitting. And the most important point to be considered is prominence of audible clicks that give cues to patients (Especially blind and neuropathy patients). Insulin pens include NovoPen®5, NovoPen®3 Demi, NovoPen®4, NovoPen Junior, ClikSTAR®, HumaPen®Luxura, i Tango®, Biosulin®, Flex Pen®, HumanPen®MEMOIR.

In selecting insulin pens, the force required to screw the cartridge in pen body is considered first. As screwing and fitting of cartridge requires strength and motor control, which is an important factor to be considered for polyneuropathy patients. NovoPen® 4 and ClikSTAR insulin pens require less cartridge rotation. There are also various pens which require many cartridge rotations for screwing, including Biosulin, HumaPen®Luxura, i Tango®.

In future, there is need to develop and design insulin cartridages that require less rotation to fit in pen body. Self-injections by pens is easy and helps neuropathic patients to inject insulin dose with less or negligible discomfort [2]. Insulin pens have been refined, with several new features providing advantages over older models. For example, NovoPen Echo® which provides a
A study suggested that insulin pumps are safe and effective for treating diabetes [15, 16]. MiniMed Paradigm® Revel Insulin Pump was first introduced in year 2010. It is considered as second generation of Medtronic insulin pump [17, 18]. It provides more flexibility by allowing patients to modify their insulin delivery to meet their therapy requirements. This pump also has Continuous Glucose monitoring system which allows patient to monitor the glucose level [19, 20]. Guardian REAL-Time System display patient glucose level continuously without an insulin pump. A recent development in the design of insulin pumps is the tubing-free “patch” pump. OmniPod is an example of available patch pump. OmniPod consists of reservoir, infusion set and inserter. This device is adhered to skin for delivery of insulin and easy to use. This OmniPod control delivery of insulin by wireless system. Deci-unit dosing provides the inexpensive alternative to insulin pumps for children and is safe. It provides effective treatment [8, 21].

CONCLUSION

The insulin pens are more useful than vial and syringes. In selecting insulin delivery devices the factors such as force required to screw the cartridge in pen body, should be considered first for polynieropathy patients. This review support the worldwide advancements in the insulin delivery devices, by highlighting important features associated with their convenient utilization. Insulin delivery device is so designed such that it meets the requirements of patients.

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REFERENCE