

# Clinical Relevance of Insulin Delivery Devices in Patients of Type 1 and Type 2 Diabetes

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## Commentary

Management of diabetic patients requiring insulin treatment is cumbersome because of the dearth of published guidelines governing its use in patients. To overcome this drawback, expert endocrinology panel of India devised consensus guidelines based on evidence – based research to guide its pragmatic use. The following recommendations are made in congruence with the characteristics of an ideal insulin delivery device, which are widely agreed upon by all HCPs [1].

## Recommendation 1: Choice of Right Insulin Delivery System

Insulin pen devices have been more largely commended by the expert panel for patients with type 2 diabetes mellitus (T2DM) because of the higher rates of patient compliance (54 % versus 45.2 % with vial / syringe) and lower discontinuation of treatment observed with its use. With the use of a pen device, patients are 38 % less likely to discontinue the treatment than with other types of insulin dosages [2]. This is because pen devices are considered to be faster to use, easier, more flexible and discreet as reported by approximately 80 % of the patients. Pen devices can be preferred both in elderly patients, who have a 58 % lesser chance of treatment discontinuation with its use; and insulin – naïve patients who have a 10.5 % lower chance, in addition to patients who are already comfortable with its use [3]. It not only manages hyperglycemia in the short – term, but also, aids in overall glycemic control as evident by the lower HbA1c levels of patients making the use of pen devices regularly. This implies that insulin pen devices can be used in diabetic patients to lower their risk of macrovascular complications. In those with a history of hypoglycemia, it can be safely chosen since it lowers the risk of hypoglycemia (5.7 % versus 7.8 % with vials and syringe) and patient hospitalization (4.8 % in patients using pen) when compared with the use of syringe devices [4]. The reports of hypoglycemic events are 64 % lower in patients shifting to the use of insulin pen device after making the use of syringes / vials. Thus, the use of insulin pen device is recommended over vials and syringes because of higher patient compliance as well as a higher safety in elderly patients, insulin – naïve patients and patients with hypoglycemia.

## Recommendation 2: Choice of Right Disposable Insulin Device

Pre-filled insulin pen devices can be easily used by patients without the need for loading. In this regard, FlexPen has demonstrated greater accuracy and dose precision when compared with other pre-filled devices. Next generation Flexpen is more patient perceptive while being significantly more accurate than SoloStar in delivering 10 and 30 IU of dosages. When compared with Kwikpen, Next generation

Flexpen had a 37 to 41 % lower dose force when fitted with the same needle ( $P < 0.05$ ) [5]. Further, it was associated with higher rates of patient adherence and has been rated as the easiest pen to use by 84 % of the patients. Comparing newer insulin with old insulin devices, patient confidence and comfort was 50 % higher with the use of next generation Flexpen when compared with conventional Flexpen. A greater preferability for FlexTouch was also found when compared with Solostar and other types of insulin delivery systems. As high as 91 % patients claimed it was easier to use as per the results of three multi-center open label studies and it also had a lower injection force [6]. This makes it more preferable and easier to use by both patients and HCPs when compared with Solostar and Kwikpen. Thus, the use of Flexpen over newer generation Flexpenis recommended over Solostar and Kwikpen because of higher dose precision and lower dose and injection forces.

## Recommendation 3: Choice of Right Durable Insulin Device

NovoPen 4 (Novo Nordisk) has additional gains for patient use over other types of pre-filled insulin types because of its larger dose setting window (4 x), readable dose scale, lesser injection force, confirmation click sound at the end of dose, durable metallic body and child lock facility [7]. Dose accuracy of Novopen is unaffected by its storage conditions such as variations in heat and temperature and influence of other weather conditions and freefall. This implicates that Novopen can be safely used in patients with travel needs who cannot adhere with the stringent insulin storage demands as necessary for other insulin formulations. Thus, Novopen is recommended to be used because of its patient sensitive characteristics and fewer storage requirements.

## Recommendation 4: Practical Considerations Affecting these Choices

Patient considerations are essential in managing side effects with the use of insulin such as pain / bleeding / infection, which can straightforwardly result in discontinuation of treatment. Along with the prescription of right insulin drug delivery system, regular patient education, counseling and insistence on non – sharing of insulin pen devices must be made. During transition to the use of insulin pen device from vials / syringes, careful attention must be made and a 100 IU backup syringe must be provided to patients in case of device failure [8]. Compared with standard needles, the use of thin – walled needles is associated with lower pain, lesser skin irritation and bleeding cases as depicted by the results of a multi – center open label single – arm study of diabetic patients. So, their use must be prescribed. NovoFine 32G 4 mm reduces the risk of side effects such as pain and bleeding due to lower risks of needle breakage and bending

[9]. Its thinner needle size has corresponded with fewer incidents of patient trauma and discomfort. Automatic injectors, magnification devices, needle – free injectors, insulin ports, needle safety guards, cooler bags and other dosing aids are said to aid patient comfort in drug delivery. Dosing aids are essential to be used in visually impaired diabetic patients on the use of insulin in order to prevent any side effects due to the improper dosage administration. They must also be prescribed in patients who are at a risk of microvascular damage to the eye. In those at a high risk of infections due to poor healing at the site of infection, insulin patches can be used to avoid repeated needle entry [10]. Thus, it is recommended that along with necessary patient education, the insulin delivery system of the patient must be tailored to their specific needs so that side effects are not faced and treatment is not discontinued.

### Overall Recommendations

The expert panel conclusively recommended that insulin pen devices can be initiated in patients who seem to be non – compliant with their current insulin regimens. The use of pen devices is recommended over syringes and vials because of the lower chance of patient risks, higher rates of compliance and the comparable cost benefits. Among all types of insulin pen devices, the use of Flexpen, new generation Flexpen and Novopen is recommended over other types of insulin delivery systems because of higher accuracy, lower injection force (Flexpen), better patient confidence (new generation Flexpen) and greater patient sensitivity, durability and higher accuracy (Novopen). Pen devices can be safely recommended in elderly patients and those with a history of hypoglycemia and infections in combination with efficient patient education. It can also be prescribed in patients with microvascular complications, or visual damages, with the use of dosing aids.

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