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Research Article

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The Future of Insulin Pump Therapy in India and Developing Countries Resale and Recycle – A New Vision

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Abstract

Diabetes tsunami has hit India in a very devastating way in last decade. There is no doubt that CSII with Insulin pump Therapy has proved superior to MDI (multiple Dose Injection) therapy in Type1DM as well as Type2DM patients. Economics has been a very important issue while advocating the Pump to either patients, type 1 or type 2 Diabetes Mellitus patients. Out of 9 (Nine) patients using Insulin Pumps in our centre GANDHI CLINIC, PUNE, INDIA there are 5 Type 2 patients and 4 Type 1DM patients. Two Pumps are deposited at my Clinic due to the sad demise of the Type2DM patients. The relatives of these patients do wish to sell these pumps with some depreciation price i.e. at lower price than the new one. One patient (type2DM) has stopped using the Insulin pump due to the adverse advice from another healthcare provider who also wants to sell the pump at some discounted price. As per my survey in the Metro city of Pune (INDIA) approximately 700 insulin pumps are sold, out of these at least 5-7% of total pumps are not being used anymore. The unused pumps are at least 50 in number. Therefore revenue in terms of PUMPS in one region of INDIA is about 70000 US Dollars. Total number of pumps used in INDIA is 70000-72000 pumps approx. The total unused pumps by the patients could be about 3000 to 5000 pumps in total and thereby the revenue loss in this resource constrained country could be in millions of Dollars. This scenario is probably the same scene in many developing countries wherein the healthcare budgets are limited. In INDIA, Insulin Pump Therapy is not yet covered by Insurance policy of the patients. Since the pumps are usually purchased thru pocket expenses or with Loan or selling some assets like land or Gold, the relatives of the patients are not wrong in expecting some financial recovery after losing the most important thing i.e. the PERSON or even if patient does not want to continue the use of pump due to any reason. We do see refurbished cars sold and there are eligible and deserving candidates available who cannot purchase a new model of the Car. I am sure INDIA is an important market of Diabetes Technology related Products like Insulin Pump, similar to the many developing countries. This article is aimed at KOLs in Dialectology and Economists in the world for a basic policy change in favour of the patient care.

Keywords: Insulin Pump; Economics; Resale

Introduction

The prevalence of Diabetes in India is 9.09% and the Death due to Diabetes is 1.06 million as per 2012 statistics. Newer figures are rising at alarming pace inspite of developments and research in newer and safer treatment modalities in pharmacology and technological advances in Insulin therapy and the monitoring of glycaemic profile viz. sensors.

Type 1 DM patients do require insulin as mainstay but many of Type2 DM patients would require insulin after oral hypoglycaemic agents fail to control the blood sugars.

The modalities of insulin delivery can be syringes and vials, insulin pens or the Insulin Pump Therapy.

INDIAN GUIDELINES for Insulin Pump Therapy:

- The use of insulin pump in diabetes is likely to increase with recent advances in technology.
- Although the evidence for the superiority of pumps over multiple daily injections (MDI) is inconsistent, data from accumulating uncontrolled studies indicate greater reductions in glycated haemoglobin in patients switching to continuous subcutaneous insulin infusion (CSII) from MDI therapy.
- Practice of self-monitoring of blood glucose and glycated haemoglobin levels are essential to adjust insulin dosage for the management of diabetes. Recently various glucometers and sensor technologies like Ambulatory Glucose Profile, Sensors from Dexcom or Medtronic or Roche has made monitoring a lot more easy for the patients.
- Insulin is the optimal therapy for the management of hyperglycaemia in patients with Diabetes.
- The aim of CSII is to try to mimic endogenous insulin delivery

profile more closely to the pattern of insulin delivery from pancreas, by providing continuously infused, low-volume basal insulin for fasting periods and delivery of increased rate boluses to cover meals [1-3].

- Insulin delivery via CSII pump is more consistent and precise in providing patient's individual insulin requirements with low risk of severe hypoglycaemia than conventional delivery devices.
- Evidence from several studies indicate that CSII provides equal or better glycaemic control, lower hypoglycaemic episodes, better quality of life, improved psychosocial functioning and more flexibility with lifestyle when compared to MDI therapy [4,5].

Recommendations:

- Pump therapy should be considered in - any patient (age no bar) on insulin therapy who can afford and is seeking improved quality of life (Grade A; EL 1) [6-12].
- Patients requiring better exogenous insulin therapy, provided, they are finding it difficult to achieve age specific optimised glycated haemoglobin with MDI therapy (Grade A; EL 2) [13, 14].
- Patients whose insulin requirement is high, to control insulin doses compared to MDI (Grade A; EL 3) [15, 16].
- Patients with diabetes related complications (e.g. neuropathy, nephropathy) (Grade A; EL 3) [17].
- Patients experiencing frequent episodes of severe hypoglycaemia (Grade A; EL 2) [18].
- Patients with unpredictable fluctuations in blood glucose levels (Grade A; EL 1) [12, 19].
- Women with diabetes during pregnancy (Grade A; EL 2) [20].
- Moreover, rapid acting insulin has the lowest intra-patient variability compared to intermediate or long-acting insulin.
- CSII using an external pump offers both better blood glucose stability as compared to multiple daily injections (MDI) and broader flexibility with lower rates of severe hypoglycaemia [17, 18].
- Pump therapy can achieve better glycaemic control compared with insulin analogue-based MDI [19, 20].
- CSII is a convenient and effective alternative for patients with type 2 diabetes mellitus (T2DM) unable to achieve the ADA recommended HbA1c target of < 7% with MDI [6].
- However, NICE guidelines do not recommend use of CSII in patients with T2DM. Although available clinical evidence on CSII for T2DM is not yet consistent, large RCTs have consistently shown that CSII is equivalent to MDI, whereas smaller trials have concluded that CSII is superior [17].
- CSII pump offers both better glucose stability and broader flexibility and freedom resulting in a better quality of life for the patient.

AIM

Can we change the Economics of insulin pump Therapy in India and other developing countries? We want to find the answer to this question, thereby making the pumps available to the needy T1DM and T2DM patients at much lower prices than the present costs.

Methods

We have studied the total nine patients using the Insulin Pumps at our centre, GANDHI CLINIC in Pune, India [9]. Out of nine patients four are IDDM and others are T2DM. We have also tried IPT in a lady retired teacher who is 72 years old (T2DM).

Out of 9 patients, three Insulin Pumps are lying at our clinic, two pumps due to sad demise of the patients and one pump due to the adverse advice by another doctor. These pumps are bought by the patients through out of pocket expenses.

In cases of the death of the patients (total two) the relatives of the patients are at double loss, moneywise and person loss. The relatives have also spent from pocket during the last hospitalisation of these patients. To recover from the financial loss the relatives of the patients are expecting some money recovery from the sale of these pumps.

Patients Using Pump At Our Centre

SR NO	PATIENT NAME	AGE	SEX	DM YRS AND TYPE	DATE INSTALLED	INDICATION	JOB PROFILE	IN USE or NOT	WHY
1	Dr RBK	27	F	8 yrs. IDDM		H/O- accident, Hypoglycemia	Doctor	Yes	
2	JHK	10	F	6 yrs IDDM	02/10/2014	Brittle Diabetes	Student	Yes	
3	**RSP**	**38**	**M**	**5 yrs T2DM**	**04/11/2014**	**Uncontrolled DM**	**Business**	**No**	**Expired**
4	Dr RRR	26	F	3 yrs IDDM	23/11/2015	Uncontrolled DM	Doctor	YES	
5	**Dr NJN**	**64**	**M**	**23 Yrs T2DM**	**24/07/2015**	**Uncontrolled DM**	**Doctor**	**N0**	**Expired on 4-11-2015 IHD,DM, CKD,HTN, Foot infect.**
6	**PSM**	**56**	**M**	**23 Yrs T2DM**	**30/08/2016**	**Uncontrolled DM, taking insulin 3 times a day**	**Business**	**No**	**Advised by other doctor**
7	AVK	72	F	31 Yrs T2DM	27/07/2017	Fluctuating BSL	Retired	Yes	
8	SNG	64	F	24 Yrs T2DM	15/11/2018	Fluctuating BSL, hypoglycemia	House wife	Yes	
9	SYL	13	M	2 yrs IDDM	16/12/2018	16/12/2018	Student	Yes	

The patient who has stopped the use of the pump with advice from another healthcare provider also wants to sell the pump and recover some cost of the pump.

The manufacturer of the pumps have suggested to Donate the pumps to some needy patients, but repurchase of the pump and then resale after refurbishment is not possible at present date.

Results

Many healthcare professionals compare the CAR with PUMP. Frequently, we say if someone can afford a car then he would easily afford the Insulin Pump.

In India, we have a scheme to Buyback and refurbish the Used Cars by the Manufacturer and the Resale of the same car is possible at a much lower cost than the cost of the new car of same brand and the manufacturer. Manufacturer of the Insulin Pumps can repurchase the Insulin Pumps from these patients who have stopped the use of the pumps at some structured cost. These refurbished pumps can be available to the needy and willing T2DM or T1DM patients at lower price with assurance from the manufacturer.

Discussion

Since the fact prevails in India and developing countries that availability of Insulin is a difficult task at times, Insulin Pump Therapy is a farfetched dream. There must be more than few thousand Pumps in India which are resalable. These pumps can be refurbished by the Manufacturer and can be made available to the needy and willing patients of T1DM as well as T2DM patients at a much lower cost in these resources constrained countries. We want the whole world brain volume to think on this sensitive issue. I want to describe the famous repurchase scheme from the Maruti Suzuki, India's largest car selling manufacturer being operated successfully presently. If some such scheme is not formulated by the manufacturer of the pumps, patients would be found selling their pumps and pacemakers on OLX and QKR.

- MARUTI SUZUKI TRUE VALUE
- Maruti Suzuki True Value is India's largest certified used car dealer network, with around 763 outlets spread across 550 cities. This system is operated by the manufacturer of the largest selling car in India i.e. MARUTI SUZUKI.
- Maruti Suzuki True Value system and process ensures that transactions made for used cars are fair and transparent.
- Every vehicle bought under Maruti Suzuki True Value is inspected and certified by Maruti Suzuki engineers. True Value category cars are refurbished in state of art workshops using Maruti Genuine Parts and by skilled technicians. These cars are then sold through Maruti Suzuki True Value outlets with one -year warranty and three free services.
- Simply put, it's the best place to buy, sell or exchange a used car.
- PLAN OF RESALE OF INSULIN PUMP
- Warranty offered By Company usually 3-4 years.
- If the Pump needs to be repurchased, calculate the X cost like reduced by 25% per year from First Sale of the Pump.
- After OFFICIAL REFURBISHMENT the PUMP can be resold at the REASONABLE premium, as the cost of refurbishment.
- ADVANTAGE: The refurbished pumps would be available to my needy and willing T1DM & T2DM pts at the much lower cost than the Present cost.
- Many of my T2DM pts can use pumps for shorter time like Day-care procedures and sick-Days care like chemotherapy days or the ophthalmic surgical interventions of shorter or longer duration and achieve good results with well controlled glycaemic variability.

Possible Implications and Conclusion

To improve the glycaemic variability in Type1 DM and Type 2 DM patients with use of Insulin Pump Technology, all healthcare provider should consider more and more use of this advanced technology. To increase the use of Pumps in DM patients the cost of the pumps should be in affordable range in INDIA and many developing countries. The dignitaries of various Diabetes Associations should unanimously discuss and plead the manufacturer with adequate evidence. The concept of Official Repurchase and Refurbishment need to be understood and implemented. After this only, many of T1 and T2 DM patients would be benefitted with use of this very wonderful and clinically satisfying technology. The Maruti Suzuki True Value is only a corollary which can act as a template.

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