

ECONOMIC IMPACT ON THE USE OF INSULIN PUMPS IN DIABETES TYPE I ANALYSIS ON PORTUGUESE REAL-LIFE RESULTS

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Objectives

In Portugal, the few percentage of patients that receive an insulin pump is integrated in a registry where HbA1c, number of severe hypoglycemia and ketoacidosis events are monitored, creating real-life data on this therapy. Using clinical results from this national registry, this work aimed to estimate the economic impact of using insulin pumps.

Results

In February 2014, there were 892 patients registered in the database, of which 57% were female. Mean HbA1c before using insulin pump was 8.6% and 90% of these patients had HbA1c levels higher than 7%. After using insulin pump, severe hypoglycaemia events dropped from 1.65 to 0.11 per patient-year and ketoacidosis events decreased from 0.07 to 0.02 per patient-year. In the short-term, average cost per patient-year on acute events reduce by 3,336€ after using of insulin pumps. Mean HbA1c decreased from 8.6% to 7.6% reducing the probability of developing chronic conditions such as retinopathy, nephropathy and neuropathy by 37%, 37% and 21%, respectively ^[1]. Other complications such as heart attack and stroke decrease by 14% and 12% respectively after HbA1c is reduced^[1]. In the long-term, average cost per patient reduce by 25,553€ due to lower probability of developing chronic conditions and complications. Considering a life-span of 30 years using insulin pump, there is a total difference of costs attributed to acute events and complications of 125,639€ which justifies an investment of 4,188€ per patient-year on this therapy. If depreciation is considered, total savings of using insulin pumps sum 58,754€ which means that break-even cost per patient per year is 3,585€.

Methods

It was considered that acute events have an economic impact in the short-term and that the decrease in average HbA1c reduces the probability of developing chronic conditions^[1] impacting the long-term. Mean acute events per patient-year were multiplied by the cost of the event (collected from literature). Chronic diseases were assumed to occur in the last 10 years of the patients and probability of occurring multiplied by 10 year costs.

Short-Term

	Cost per event	# events per patient-year Pre-Insulin Pump	# events per patient-year Post-Insulin Pump
Severe Hypoglycaemia	2,134€ ^[2]	1.65 ^[4]	0.11 ^[4]
Ketoacidosis	881€ ^[3]	0.07 ^[4]	0.02 ^[4]
Cost per patient-year	-	3,580€	244€

Long-term

	Cost per 10 years of disease	Prob. of disease Pre-Insulin Pump ^[1]	Prob. of disease Post-Insulin Pump ^[1,4]
Retinopathy	11,749€ ^[1]	22.8%	14.4%
Nephropathy	272,190€ ^[2]	22.8%	14.4%
Neuropathy	21,646€ ^[1]	4.0%	2.3%
Heart Attack	24,120€ ^[1]	30.0%	25.8%
Stroke	24,120€ ^[1]	7.4%	6.5%
Cost per patient	-	74,624.81€	49,072.18€

Analysis at 30 years

Short-term	Cost difference after 30 year	Break-even
3,336€ per patient-year		
Long-term		
25,553€ per patient	No-depreciation 125,639€	4,188€
	Depreciation (5%) 58,754€	3,585€

Conclusions

Real-life data is not always available. A national registry of patients using insulin pumps in Portugal demonstrates that insulin pumps are effective in reducing acute events and mean HbA1c in patients with Diabetes Type I. Cost estimation methods show that the difference in complication costs in the short and in the long-term justify an investment of 3,585€ per patient-year in this therapy. Only medical costs were considered meaning that all non-medical and indirect costs related to the acute events and complications can still increment the savings that can be achieved with this therapy.

References

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