

BUDGET IMPACT OF CONTINUOUS SUBCUTANEOUS INSULIN INFUSION COMPARED WITH MULTIPLE DAILY INSULIN INJECTIONS FOR THE TREATMENT OF TYPE 1 DIABETES IN SPAIN.

Giménez M¹, Elías I², Álvarez M², Quirós C¹, Conget I¹

¹ Diabetes Unit. Diabetes Unit. Endocrinology and Nutrition Department. Hospital Clínic i Universitari de Barcelona. IDIBAPS. Barcelona, Spain.

² Health Economics & Outcomes Research. Medtronic Ibérica, S.A., Madrid, Spain.

BACKGROUND

Despite efficacy and safety of continuous subcutaneous insulin infusion (CSII) is well-established, the number of patients benefiting from this therapy is relatively low compared to other European countries, being one of the main reasons a considerable initial investment.

OBJECTIVE

To estimate the budget impact (BI) of CSII compared with multiple daily insulin injections (MDI) for the treatment of patients with type 1 diabetes (T1D) presenting recurrent severe hypoglycaemic events in Spain.

METHODS

■ A BI model was developed from a Spanish healthcare system perspective to estimate direct healthcare costs for T1D patients over a four-year period.

■ Target population was defined based on a retrospective observational study evaluating the efficacy of CSII for the treatment of patients with T1D at Hospital Clínic i Universitari de Barcelona (2003–2008)¹:

■ One of the main indications for switching to CSII was recurrent severe hypoglycaemia episodes.

■ The mean number of episodes per year in the last 2 years before starting CSII was 1.33, being 0.08 in the last 2 years of follow up (p=0.003).

■ Estimation of total cost included:

- Therapy costs (MDI and CSII).
- Severe hypoglycaemic events.

■ Unit costs were obtained from different Spanish sources and expressed in € 2016 (Table 1)^{2,3}.

Table 1. Unit costs (€ 2016)

UNIT COST				
Therapy	Presentation	RRP _{VAT}	RRP _{VAT} -7.5% ⁴	Annual cost
MDI*				
Short acting insulin	NovoRapid Flexpen® 100U/ml 5 pre-filled pens 3ml	€46.97	€43.45 (€0.03/unit)	€190
Long acting insulin	Lantus Solostar® 100U/ml 5 pre-filled pens 3ml	€75.03	€69.40 (€0.05/unit)	€473
CSII*				
Reservoir+infusion set (MiniMed 640G®)	listed price			
Short acting insulin	NovoRapid Flexpen® 100U/ml 5 pre-filled pens 3ml	€46.97	€43.45 (€0.03/unit)	€359
Resources				
Event			Unit cost**	
Severe hypoglycaemia			€4,313.47	

RRP: Recommended retail price, VAT: value-added tax. *Posologies considered were 0.71 (0.28 for short acting insulin, 0.43 for long acting insulin) and 0.53 units/kg/day for MDI and CSII, respectively and an average body weight of 64kg. **Average cost estimated from: 251.0-Hypoglycemic coma: €5,391.13; 251.1-Other specified hypoglycaemias: €4,468.98; 251.2-Unspecified hypoglycaemia: €3,080.30.

Following principles of good practice for BI analysis a discount rate for costs and health results was not applied⁵.

Several sensitivity analysis (SA) were performed to assess the robustness of the base case results.

RESULTS

■ The BI for the Spanish healthcare system of treating a patient with T1D presenting recurrent severe hypoglycaemic episodes compared with MDI over a four-year period was -€9,821 (-€2,455 per patient per year).

■ Incremental therapy costs per patient with CSII compared with MDI was €9,509 (€11,902 versus €2,393).

■ €19,330 were estimated to be saved thanks to the reduction of severe hypoglycaemic episodes associated with CSII therapy compared with MDI (€1,371 versus €20,701).

Table 2. Budget Impact Results

RESULTS PER PATIENT		
Therapy	CSII	MDI
Therapy cost	€11,902	€2,393
Complication costs (severe hypoglycaemia)	€1,371	€20,701
Total cost	€13,274	€23,094
Total Budget Impact (percentage reduction)	-€9,821 (-43%)	
RESULTS IN A COHORT OF 100 PATIENTS		
Therapy	CSII	MDI
Therapy cost	€1,190,236	€239,295
Complication costs (severe hypoglycaemia)	€137,136	€2,070,100
Total cost	€1,327,372	€2,309,395
Total Budget Impact (percentage reduction)	-€982,023 (-43%)	

■ SA confirmed the consistency of the model in all scenarios, highlighting cost savings associated with the use of CSII.

Table 3. Sensitivity Analysis Results

SCENARIO	RESULTS PER PATIENT. TOTAL BUDGET IMPACT (PERCENTAGE REDUCTION)	RESULTS IN 100 PATIENTS. TOTAL BUDGET IMPACT (PERCENTAGE REDUCTION)
Monthly cost reservoir+infusion set (-10%)	-€10,868 (-47%)	-€1,086,762 (-47%)
Hypoglycaemia cost (€3,500)	-€6,175 (-32%)	-€617,489 (-32%)
Hypoglycaemia cost (-50%: €2,156.74)	-€155 (-1%)	-€15,543 (-1%)
Time horizon: 1 year	-€2,490 (-43%)	-€248,961 (-43%)
Time horizon: 2 years	-€4,933 (-43%)	-€493,315 (-43%)
Time horizon: 3 years	-€7,377 (-43%)	-€737,669 (-43%)
Hypoglycaemia rate (+10%)	-€11,518 (-46%)	-€1,151,790 (-46%)
Hypoglycaemia rate (-10%)	-€8,087€ (-38%)	-€808,662 (-38%)

LIMITATIONS

■ Parametres of quality of life and indirect costs were not considered in the analysis, and thus the full value of both therapies has not been captured thoroughly.

CONCLUSION

The higher therapy costs associated with CSII for the treatment of patients with severe recurrent hypoglycaemic episodes compared with MDI are totally offset by the reduction of severe hypoglycaemic events and result in cost savings contributing to the clinical value of CSII therapy.

REFERENCES

- Quirós C et al. Long-term outcome of insulin pump therapy: reduction of hypoglycaemia and impact on glycaemic control. DiabetMed.2016Feb.
- Bot PLUS 2.0. Accessed Mar 2016. Available at: <https://botplusweb.portalfarma.com/botplus.aspx21>.
- Ministry of Health. Accessed Mar 2016. Available at: <http://www.msssi.gob.es/estadEstudios/estadisticas/sisInfSanSNS/home.htm>
- Royal Decree-Law 8/2010. Accessed Mar 2016. Available at: www.msssi.gob.es/profesionales/farmacologia/pdf/Deduccionesmarzo2016.pdf
- Mauskopf JA et al. Principles of good practice for BI analysis: report of the ISPOR-Task Force on good research practices-Value Health2007;10