

ORIGINAL ARTICLE

Cost-effectiveness analysis of sensor-augmented pump therapy with low glucose-suspend in patients with type 1 diabetes mellitus and high risk of hypoglycemia in Spain



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KEYWORDS

Type 1 diabetes mellitus;
Continuous subcutaneous insulin infusion;
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Hypoglycemia;
Cost-utility;
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Abstract

Objective: To compare the cost-effectiveness of sensor-augmented pump therapy (SAP) [continuous subcutaneous insulin infusion (CSII) plus real-time continuous glucose monitoring (RT-CGM)] with low glucose suspend (MiniMed™ Veo™) and CSII alone in patients with type 1 diabetes mellitus (T1DM) at high risk of hypoglycemia in Spain.

Methods: The IQVIA CORE Diabetes Model was used to estimate healthcare outcomes as life-years gained (LYGs) and quality-adjusted life years (QALYs), and to project lifetime costs. Information about efficacy, resource utilization, and unit costs (€2016) was taken from published sources and validated by an expert panel. Analyses were performed from both the Spanish National Health System (NHS) perspective and the societal perspective.

Results: From the NHS perspective, SAP with low glucose suspend was associated to a €47,665 increase in direct healthcare costs and to increases of 0.19 LYGs and 1.88 QALYs, both discounted, which resulted in an incremental cost-effectiveness ratio (ICER) of €25,394/QALY.

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From the societal perspective, SAP with low glucose suspend increased total costs (including direct and indirect healthcare costs) by €41,036, with a resultant ICER of €21,862/QALY. Considering the willingness-to-pay threshold of €30,000/QALY in Spain, SAP with low glucose suspend represents a cost-effective option from both the NHS and societal perspectives. Sensitivity analyses confirmed the robustness of the model.

Conclusions: From both the Spanish NHS perspective and the societal perspective, SAP with low glucose suspend is a cost-effective option for the treatment of T1DM patients at high risk of hypoglycemia.

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PALABRAS CLAVE

Diabetes tipo 1;
Infusión subcutánea
continua de insulina;
Sistema integrado
con suspensión en
hipoglucemia;
Hipoglucemia;
Coste-utilidad;
España

Análisis coste-utilidad del sistema integrado con suspensión en hipoglucemia en pacientes con diabetes tipo 1 y alto riesgo de hipoglucemias en España

Resumen

Objetivo: Evaluar la relación coste-utilidad del sistema integrado (MiniMed® Veo®) con suspensión en hipoglucemia frente a la infusión subcutánea continua de insulina (ISCI) en el tratamiento de pacientes con diabetes tipo 1 (DM1) y alto riesgo de hipoglucemias en España.

Métodos: Se utilizó el modelo de diabetes IQVIA CORE para estimar los resultados en salud expresados como años de vida ganados (AVG) y años de vida ajustados por calidad (AVAC) y los costes a lo largo de la vida de los pacientes. La información sobre la eficacia, el consumo de recursos y los costes unitarios (2016€) fue obtenida de fuentes publicadas y validadas por un panel de expertos. En el escenario principal se consideró la perspectiva del Sistema Nacional de Salud (SNS) y, en un escenario alternativo, la de la sociedad en general.

Resultados: Bajo la perspectiva del SNS el tratamiento con el sistema integrado con suspensión en hipoglucemia se asoció con mayores costes sanitarios directos (47.665€) y un incremento de 0,19 AVG y 1,88 AVAC, resultando en un ratio coste-utilidad incremental (RCUI) de 25.394€/AVAC. Considerando la perspectiva de la sociedad, los costes totales (sanitarios directos e indirectos) se incrementaron en 41.036€, siendo el RCUI resultante de 21.862€/AVAC. Los análisis de sensibilidad confirmaron la robustez de los resultados en todos los escenarios evaluados.

Conclusión: Considerando el umbral de máxima disposición a pagar para España de 30.000€/AVAC, el sistema integrado con suspensión en hipoglucemia representa una opción eficiente en comparación con la ISCI tanto desde la perspectiva del SNS como de la sociedad en su conjunto.

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Introduction

Costs associated with the treatment of diabetes mellitus and its complications constitute a substantial proportion of total healthcare expenses in Spain. Thus, there is an urgent need for measures to achieve complete control of this disease and to prevent progression of the related complications.¹ Optimal glycaemic control is associated with reduced chronic complications and consequently lower diabetes-related costs; however, approximately 75.8% of patients with type 1 diabetes mellitus (T1DM) are not reaching their glucose control target.²

Among patients with chronic poor glycaemic control and patients whose control escalation is limited by hypoglycaemia, continuous subcutaneous insulin infusion (CSII) therapy is usually more effective than multiple daily insulin injections (MDI). A Spanish study conducted over a five-year

period revealed that CSII therapy can reduce hypoglycaemic events, and showed long-term maintenance of this clinical benefit without increasing glycosylated haemoglobin (HbA_{1c}) levels.³ From an economic perspective, a budget impact analysis conducted in Spain demonstrates that the increased costs associated with CSII vs. MDI therapy in patients with T1DM and recurrent severe hypoglycaemia are completely counterbalanced by the reduction of severe hypoglycaemic events, with CSII even generating savings for the Spanish National Health System (NHS).⁴

Intensive insulin treatment needs frequent blood glucose testing to enable adequate adjustment of insulin dosing to achieve near-normoglycaemia in patients with T1DM.⁵ However, intermittent blood glucose measurements do not provide information regarding the extent of fluctuations or the speed or and direction of the changes over time. Technological advances over the last 15 years have led to

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