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Title **Subcutaneous Insulin Pump Therapy: Systematic Review Update and Economic Evaluation for the New Zealand Setting**

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Aim

To provide a summary of the recent evidence pertaining to the relative effectiveness, safety, and cost effectiveness of continuous subcutaneous insulin infusion (CSII) in patients with insulin treated diabetes, when compared to optimized multiple daily injections (MDI).

Conclusions and results

Data from literature search (9 randomized controlled trials and 2 systematic reviews) show that CSII results in a modest but potentially worthwhile improvement in glycosylated hemoglobin levels in all patient groups assessed (including adults, children, adolescents, and pregnant women with preexisting diabetes), compared with optimized MDI. Generally, these findings support those of the original NHS assessment report, ie, improvement in glycemic control that is of small magnitude and borderline statistical significance. The short duration of the clinical trials did not enable evaluation of longer term benefits of such a difference in glycosylated hemoglobin levels – but the expectation is that it would be reflected by fewer long-term complications. Although more immediate primary benefits from CSII may be associated with an impact on the incidence of severe hypoglycemic events and improved quality of life, the studies identified offer limited evidence to support this.

Although not supported by the evidence, it is postulated that CSII may reduce the number of severe hypoglycemic attacks a patient experiences compared with MDI. The cost-effectiveness analysis suggests that if every patient who changed from MDI to CSII therapy were able to avoid one severe hypoglycemic attack every 2 years (ie, an improvement of 0.5 events per annum), the incremental cost per severe hypoglycemic event avoided would be approximately 6000 New Zealand dollars (NZD). The total incremental cost associated with the introduction of CSII compared to MDI for a patient with type 1 diabetes is approximately NZD 16 000 over 6 years.

Methods

The systematic review update was based on the NHS technology assessment report (Colquitt et al, 2004), which informed the National Institute for Health and Clinical Excellence (NICE) recommendations on the use of CSII in diabetes. Randomized clinical trials and systematic reviews published since January 2002 were identified using electronic databases and references of relevant articles. One reviewer used predefined criteria to assess the studies for inclusion in the systematic review update. One reviewer, with full tabulation of all eligible studies, extracted the data and assessed quality. Data on clinical effectiveness were tabulated, using meta-analysis where appropriate.

Relevant economic evaluations were identified using electronic databases. An economic analysis was undertaken to examine the cost effectiveness of CSII versus MDI for a patient with Type 1 diabetes. The economic model was based mainly on the method and approach presented in the NHS assessment report (Colquitt et al, 2004), modifying inputs to populate the model with New Zealand data wherever available. Other published economic evaluations informed the cost-effectiveness interpretations.

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