Clinical reviews

Our panel of GPs review recent research papers in their specialist areas that may influence the way you practise

Reviewers

Addiction
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Diabetes

Insulin pumps vs multiple injections in adults with type 1 diabetes

A randomised controlled trial comparing insulin pump use with multiple daily injections suggests that when patients are engaged with intensive self-management, insulin pump therapy may not add significant extra benefits in adults.

The REPOSE study is a multicentre, parallel group, cluster randomised trial conducted in eight UK secondary care centres. The study population consisted of 317 patients, of whom 156 were randomised to insulin pump therapy and 161 to multiple daily insulin injections. The participants underwent Dose Adjustment for Normal Eating (DAFNE) group training courses.

The primary outcomes, after two years' follow-up, were percentage change in HbA_{1c} in patients with a baseline $HbA_{1c} \geq 7.5\%$ (58 mmol/mol) and the proportion of participants achieving an $HbA_{1c} < 7.5\%$. Other outcomes included hypoglycaemia and quality of life measures.

Overall, 267 participants attended DAFNE courses and 260 were included in the intention to treat analysis. A total of 235 patients (119 in the pump group and 116 in the multiple injections group) had a baseline $HbA_{1c} \geq 7.5\%$, and at two years both groups showed improved HbA_{1c} levels, with mean decreases of 0.85% in the pump group and 0.42% in the multiple daily injection group. After adjusting statistically for variables such as DAFNE course, centre, and baseline HbA_{1c} values the final difference between the groups was -0.24% in favour of the insulin pump group. However, this change did not achieve statistical significance (P = 0.1).

The pump group did show some improvements in satisfaction with treatment, and quality of life measures such as dietary freedom and daily hassle. Rates of hypoglycaemia were no better than in the multiple injection group and improved in both groups.

In continuous subcutaneous insulin infusion, a pump delivers insulin continuously under the skin through a small plastic tube and cannula. Pumps are filled with quick acting insulin to supply both background insulin and insulin replacement after meals. Potential advantages include more precise insulin delivery and the ability to adjust basal insulin levels.

In the UK, pump use is approved in adults with type 1 diabetes who have high HbA_{1c} values (> 8.5%) or an inability to achieve reasonable control without disabling hypoglycaemia.

The use of insulin pumps in adults with type 1 diabetes has been proposed to improve control and reduce episodes of hypoglycaemia in high-risk patients. Observational studies have reported improved glucose control, reduced risk of hypoglycaemia, and enhanced quality of life with insulin pump therapy.

In children with type 1 diabetes, a large population-based case control study has shown that insulin pumps improve control and reduce diabetic ketoacidosis and hypoglycaemia.[1] In contrast, the adult patients in this study did not show significant benefits from pump therapy when compared with patients on multiple insulin injections. However, a large observational study from the Swedish diabetes register did show improved cardiovascular mortality in pump users compared with multiple insulin injections.[2]

The findings of the present study might suggest that the UK criteria for selecting insulin pump patients may need to be reviewed.

The study authors conclude: 'People with type 1 diabetes might be better served by ensuring far greater availability of high quality, structured self-management training, which is currently only accessed by around 10% of adults in the UK.

'Participants might only recognise the limitations of insulin delivery by multiple daily injections if they start actively managing their diabetes after training. Those individuals could then be offered pump treatment to help them reach the stringent glucose targets necessary to achieve an HbA_{1c} of 6.5% or to overcome problematic hypoglycaemia.'

DR MATTHEW LOCKYER

The REPOSE Study Group. Relative effectiveness of insulin pump treatment over multiple daily injections and structured education during flexible intensive insulin treatment for type 1 diabetes: cluster randomised trial (REPOSE). *BMJ* 2017;356:j285

REFERENCES

1 Johnson SR, Cooper MN, Jones W, Davis EA. Long-term outcome of insulin pump therapy in children with type 1 diabetes assessed in a large population-based case-control study. *Diabetologia* DOI 10.1007/s00125-013-3007-9

2 Steineck I, Cederholm J, Eliasson B et al. Insulin pump therapy, multiple daily injections, and cardiovascular mortality in 18 168 people with type 1 diabetes: observational study. *BMJ* 2015;350:h3234

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