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LETTER TO THE EDITOR:

Treating diabetic ketoacidosis with subcutaneous insulin?

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A 24-year-old woman with a past medical history of type 1 diabetes and frequent reoccurrences of diabetic ketoacidosis (DKA) presented to the emergency department with symptoms of another episode of DKA. One of the rounding team asked if it would be appropriate for her DKA to be treated by subcutaneous (SC) insulin. Currently, the widely-accepted guidelines and protocols for the treatment of DKA recommend initiating treatment with IV insulin until the resolution of DKA, then transitioning to subcutaneous insulin as outlined in *Diabetic Ketoacidosis: A Review and Update.*[1]

I found an article[2] that suggested that subcutaneous insulin, as a treatment for DKA, had no difference in outcome than IV insulin treatment. In a prospective, randomized open trial of 45 subjects, 15 patients each were randomly assigned to three study groups: one receiving IV regular insulin, another receiving subcutaneous insulin every hour, and the third receiving subcutaneous insulin every two hours. Those receiving IV insulin were treated in the ICU and those treated with SC insulin were treated in the step-down unit. Patients were included in the study if they met the following requirements for the diagnosis of DKA: plasma glucose >250mg/dl, serum bicarbonate level <15, venous pH <7.3 and a positive serum ketone level >1:4 by nitroprusside reaction. Patients with persistent hypotension, pregnancy, acute MI, end-stage renal or hepatic failure, anasarca or dementia were excluded from the study. The study found no statistically significant difference in the length of hospital stay, duration of treatment, or amount of insulin received among the study groups.

These findings were supported by another article with a smaller sample size[3], and a 2016 Cochrane Review[4] of this topic concluded that, on the basis of low quality evidence, treatment of DKA with subcutaneous insulin was neither superior nor inferior to IV insulin.

The number of studies on this topic is sparse, and the articles available have small sample sizes and are preliminary. More research must be done before the data can be used to change the standard of care. Diabetes is a common disease, and if DKA could be treated with SC insulin as this study suggests, SC insulin treatment could reduce ICU admissions for DKA. This might happen in the age of value-based reimbursement. If larger studies can demonstrate the same findings as these preliminary studies, SC insulin could become an accepted first line treatment for uncomplicated cases of DKA. In the case of our patient, we followed the current standard protocol for treating DKA using IV insulin.

I wonder if during my residency I'll find a patient for whom subcutaneous insulin for diabetic ketoacidosis is appropriate? I wonder, if I find that patient, will I be able to convince my colleagues to try this alternative management based on the evidence cited above?

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