Sir,

Insulin analogues are available for clinical use over the last two decades and have shown to be beneficial in reduction of hypoglycaemia, better control of post-prandial hyperglycaemia, less weight gain and possible little better overall glycaemic control in terms of reduction of HbA1C. A Good glycaemic control in hospital is expected to improve general well being, reduce the risk of infection (particularly in the post-operative period), hasten the resolution of infection, prevent acute metabolic decompositions (Diabetes ketoacidosis and hyperosmolar non-ketotic coma) and facilitate wound healing. Adverse outcomes like hospital mortality, infection, heart failure after myocardial infarction, need for ICU admission and hospital length of stay are more frequent among hospitalised patients with uncontrolled hyperglycaemia. Optimal glycaemic control is the recommended modality now to improve clinical outcomes. Despite our best effort using a standardised in-hospital diabetes protocol we have documented that getting a good control in patients admitted with diabetes for reason other than diabetes is not easy. Here in this study we wanted to see whether insulin analogue is better than conventional Insulin in managing diabetes in hospital.

Patients admitted to our hospital for both medical and surgical wards for reasons other than diabetes were included in the study and randomised in 1:1 ratio to use conventional and analogue insulin. Patient admitted for DKA, HONK, patient receiving steroid medications, gestational diabetes and hospital stay less than three days were excluded from the study. Patients with ketonuria on admission were also excluded from the study. The study was conducted in accordance with the declaration of Helsinki and good clinical practice guidelines. The protocol was approved by our institutional ethics committee.

Patients were started on GIK regimen when not eating and were switched to subcutaneous basal-bolus regimen with blood glucose monitoring six times per day when started eating orally. For the purpose of this study our target blood glucose was 80-140 mg/dl on GIK regimen and 80-120 mg/dl before meals while post meal and bedtime target range was 120-180 mg/dl. Glycaemic control was considered good when more than 80% of the glucose readings were in the target range, suboptimal when 40 – 80% of glucose readings were in the target and poor control when less than 40% of glucose readings were in the target range. While on SC insulin, if the control was good for two consecutive days the insulin regimen was down-titrated to two doses of premix insulin, be it conventional or analogue. If the control on SC insulin was poor or if any two blood glucose values in a day were above 300 mg/dL, insulin regimen was up-titrated to thrice-daily premix regimen.

A total of 244 patients were included in this study. 121 patients received conventional insulin and the rest analogue. The baseline characteristics of two treatment arms were similar. On GIK regimen, glycaemic control was identical in both treatment arms. With subcutaneous insulin, pre-meal and post-meal blood glucose was better with
analogue insulin (P < 0.001). Twenty three patients in the conventional arm were up-titrated as against six in the analogue group (P< 0.001). The requirement of basal insulin was significantly lesser with analogue insulin (P < 0.001) (Table 1). Significant difference in the incidence of severe hypoglycaemia were observed between analogue and conventional arm in SC regimen (P < 0.001). Duration of hospital stay was also less in the analogue arm (P < 0.001). Overall calculated cost was less with insulin analogue when cost hospital stay was taken into account. This study with a reasonable number of hospitalised patients shows that insulin analogues are safer, cost-effective and can achieve better control when used in hospital.

**Discussion**

Insulin is the most appropriate agent for a majority of hospitalised patients. Insulin as an infusion initially when the glucoses are very high or as GIK infusion when the patient is not eating followed by subcutaneous insulin is the most appropriate treatment strategy. Prevention of hypoglycaemia is equally important to patient outcomes and is a necessary part of any effective glucose control programme. Insulin analogues offer advantage over the regular human insulin because their time-action profiles more closely correspond to physiological basal and prandial insulin requirements and have a lower propensity for inducing hypoglycaemia. Rapid-acting analogues are more appropriate as prandial insulin for hospitalised patients because they can be administered either with meals or directly after meals if food intake is uncertain. Long-acting basal insulin analogues (glargine, detemir) are suitable and preferred for the basal component of therapy; rapid-acting insulin analogues (apart, lisper, glulisine) are recommended for bolus and correction doses.2

In a cohort of hospitalised patients at Kansas city, a retrospective study conducted over a three year period showed that analogue bolus insulin was associated with lower mortality, shorter duration of hospital stay, and modestly better blood glucose control compared with patients treated with human bolus insulin.3

In conclusion Insulin analogues are safer, cost-effective and can achieve better control with lesser hypoglycaemia in hospitalised patients. Data from a large prospective study will encourage us to use insulin analogues in hospitalised patients.

**References**