



# Human insulin vs insulin aspart and incidence of hypoglycemia in the management of hyperkalemia

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## Introduction

Hypoglycemia is a complication following the use of insulin and glucose for hyperkalemia with an incidence ranging between 8.7-75%. AKI, CKD and ERSD patients are at higher risk of hypoglycemia. There is no consensus on which type of insulin is the safest in the treatment of hyperkalemia. We aimed to compare the incidence rate of hypoglycemia when using insulin aspart with that of human insulin in patients with hyperkalemia and impaired renal function.

## Materials and Methods

Retrospective case-control study including 60 adult subjects who received 40 mg furosemide and a 4-hour iv infusion of 500 ml 10% dextrose plus 10 IU of either insulin aspart or human insulin to treat an episode of hyperkalemia. Groups were matched for age, sex and diabetes status. Quantification of blood glucose and K<sup>+</sup> 4 hours after the end of the infusion was done in all patients, plus additional blood glucose and K<sup>+</sup> values measured at the discretion of clinicians during the first 8 hours after the infusion. Anthropometric and analytical data was obtained from hour hospital's database. Chi-square test and student t-test were used to compare different categorical and continuous variables. Statistical analysis was performed using IBM SPSS Statistics 22.

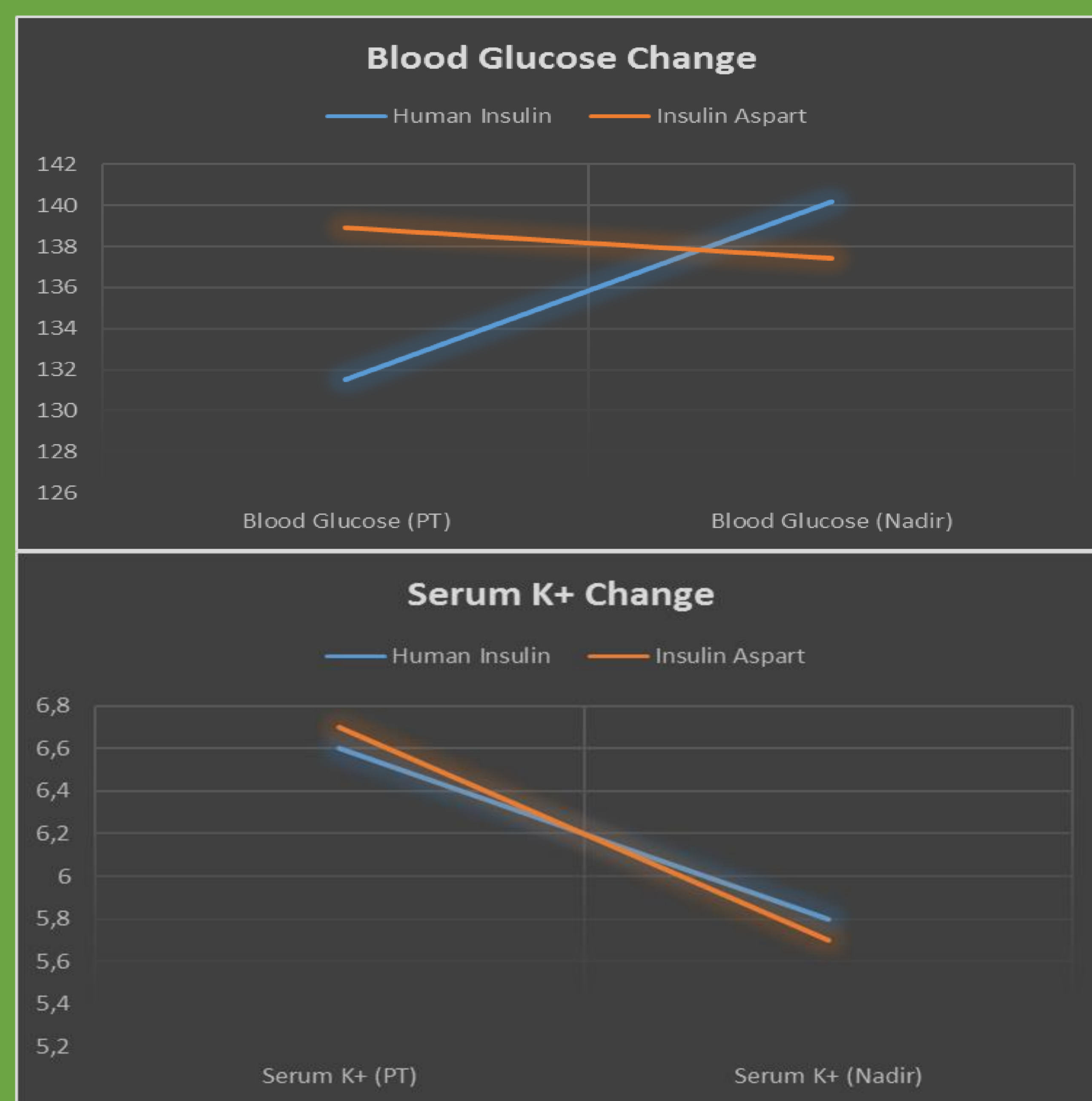
## Results

Table 1 summarizes clinical and analytical data. There were no differences in preadmission treatment between groups. Both groups presented similar preadmission kidney function. Both regimens attained similar efficacy in reducing serum K<sup>+</sup> levels. The human insulin group presented a marginally higher percentage of patients with hypoglycemia.

Table 1

	Human Insulin	Insulin Aspart	Statistical Test
N	30	30	0,99
Age (years)	75,6±10	75,7±10,3	0,97
Males, n (%)	18(60)	18(60)	0,99
Diabetes, n (%)	12(40)	12(40)	0,99
PA insulin, n (%)	8(26,7)	6(20)	0,54
PA oral ADAs, n (%)	5(16,7)	7(23,3)	0,52
PA ACEI or ARB, n (%)	13(43,3)	19(63,3)	0,12
PA β-blocker, n (%)	10(33,3)	12(40)	0,59
PA loop diuretic, n (%)	13(43,3)	16(53,3)	0,44
PA K <sup>+</sup> sparing diuretic, n (%)	4(13,3)	4(13,3)	0,99
PA NSAID, n (%)	10(33,3)	8(26,7)	0,57
Serum Cr (PA), (mg/dl)	2,62±1,51	2,38±1,89	0,59
eGFR (PA), (ml/min/1,73m <sup>2</sup> )	30,9±20,6	38,8±25,6	0,19
Serum Cr (PT), (mg/dl)	5,52±3,82	5,75±4,59	0,83
eGFR (PT), (ml/min/1,73m <sup>2</sup> )	14,8±11,4	16,8±13,8	0,54
BG (PT), (mg/dl)	131,5±56,9	138,9±66,5	0,64
Serum K <sup>+</sup> (PT), (mmol/l)	6,6±0,7	6,7±0,8	0,72
BG (nadir), (mg/dl)	140,2±89,6	137,4±58,5	0,88
Serum K <sup>+</sup> (nadir), (mmol/l)	5,7±0,8	5,8±1,2	0,7
BG (mean decrease), (mg/dl)	-8,7±66,2	-2±51,6	0,66
Serum K <sup>+</sup> (mean decrease), (mmol/l)	0,86±0,75	0,82±1,28	0,88
BG (nadir) <70 mg/dl, n (%)	3(10)	1(3,3)	0,3
BG (nadir) <50 mg/dl, n (%)	0(0)	0(0)	-

PA: Preadmission; PT: Pretreatment; BG: Blood Glucose



## Conclusions

In this retrospective case-control study both types of insulin presented a similar efficacy in lowering serum K<sup>+</sup> levels. The group treated with insulin aspart tended to develop fewer episodes of hypoglycemia. This difference might be caused by the shorter duration of action of insulin aspart compared to human insulin.

