

# Insulin pump therapy in Type 2 diabetes with empagliflozin improved glucose control

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**Aims:** Empagliflozin, a selective inhibitor of sodium-glucose cotransporter 2 (SGLT2), has been shown to improve glycaemic control, insulin resistance and insulin-associated weight gain in type 2 diabetes mellitus (T2DM) patients. Here the efficacy of insulin pump treatment with empagliflozin therapy is evaluated in this population.

**Methods:** This was a single-center retrospective observational study. A total of 138 patient, whose T2DM was controlled by insulin pump, was assigned to receive 10mg/day of empagliflozin. The primary end point was change from baseline in HbA1c after insulin pump treatment and empagliflozin therapy, respectively. Secondary end points were changes from baseline in insulin dose, BMI, creatinine and c-peptidogenic index after insulin pump treatment and empagliflozin therapy, respectively.

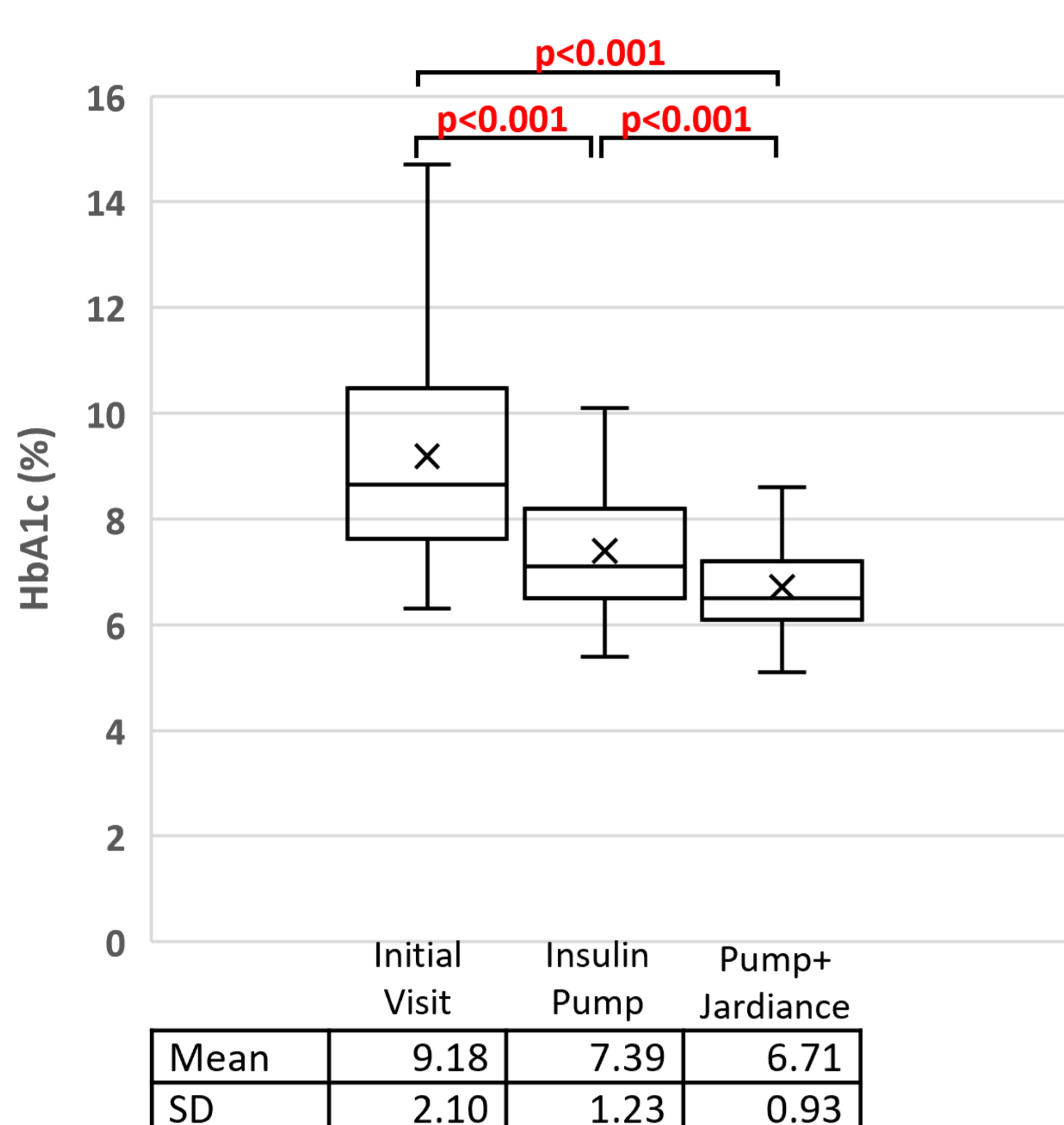


Figure 1. HbA1c was decreased ( $p < 0.001$ ) during insulin pump treatment and empagliflozin therapy.

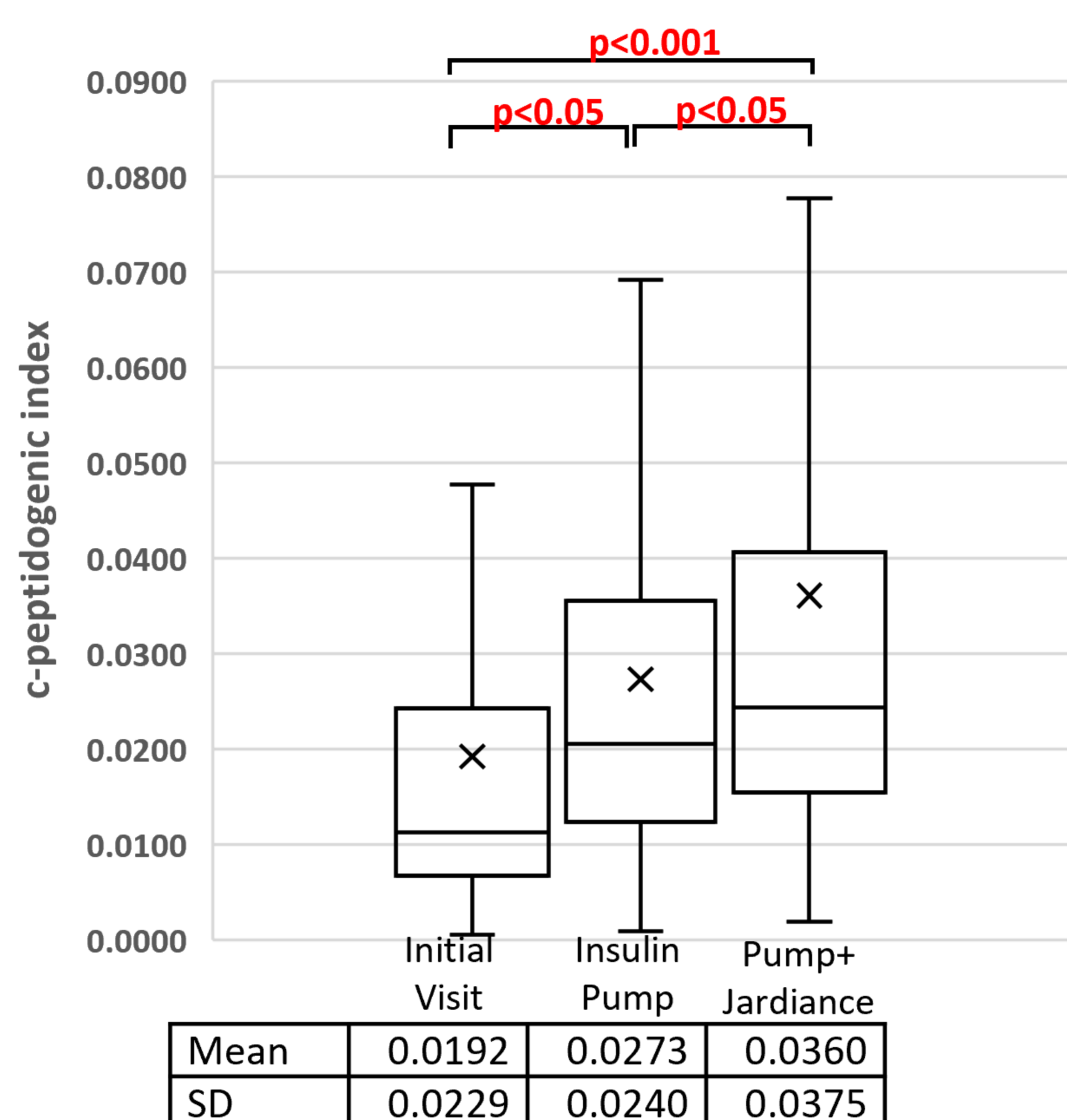


Figure 2. c-peptidogenic index was increased ( $p < 0.001$ ) during insulin pump treatment and empagliflozin therapy.

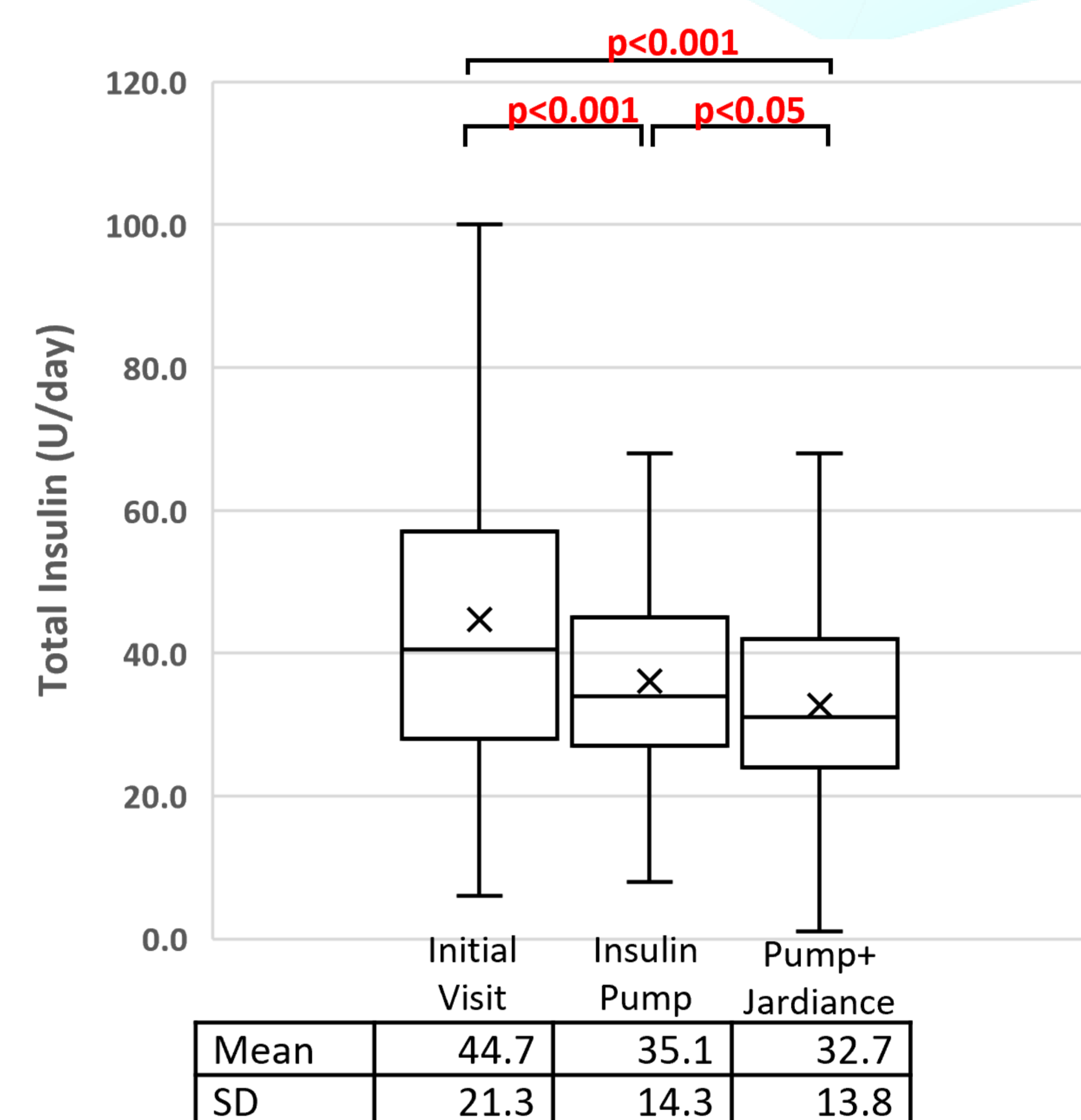


Figure 3. Insulin dose was decreased ( $p < 0.001$ ) during insulin pump treatment and empagliflozin therapy.

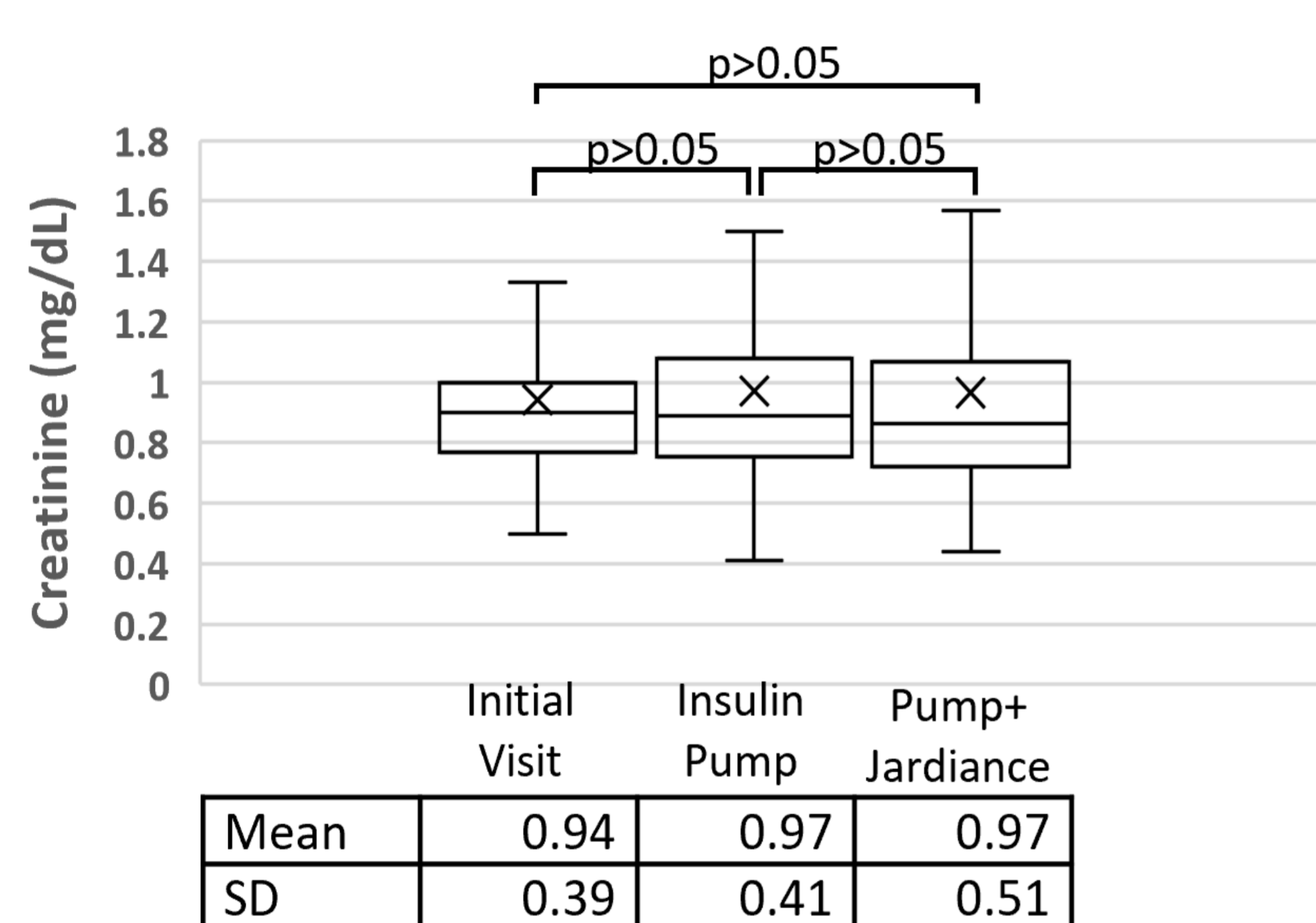


Figure 4. Creatinine was stable during insulin pump treatment and empagliflozin therapy.

Table 1. Result summary

	Initial Visit	Insulin pump	Pump + Jardiance
HbA1c (%)	9.18(2.10)	7.39 (1.23)	6.71 (0.93)
c-peptidogenic index	0.0192 (0.0229)	0.0273 (0.0240)	0.0360 (0.0375)
Total Insulin (U/day)	44.7 (21.3)	36.1 (14.3)	32.7 (13.8)
Creatinine (mg/dL)	0.94 (0.39)	0.97 (0.41)	0.97 (0.51)
BMI	24.6 (3.2)	25.0 (3.3)	24.3 (3.3)

Table 2. Significance summary

	Initial visit vs. Insulin pump	Insulin pump vs. Pump+Jardiance	Initial visit vs. Pump+Jardiance
HbA1c (%)	**	**	**
c-peptidogenic index	*	*	**
Total Insulin (U/day)	**	*	**
Creatinine (mg/dL)	-	-	-
BMI	-	-	-

Table 3. Study population demographics

	Number of Subjects = 138
<b>Age (years)</b>	
N	138
Mean (SD)	62.4 (7.5)
Median	63
Min, Max	25, 77
<b>Gender N (%)</b>	
Female	45 (32.6)
Male	93 (67.4)
<b>Height (cm)</b>	
N	138
Mean (SD)	164.8 (8.8)
Median	165
Min, Max	145, 186
<b>Weight (kg)</b>	
N	138
Mean (SD)	66.9 (11.0)
Median	66
Min, Max	43, 93
<b>Type of Diabetes (%)</b>	
N	138
Type 1	0 (0.0)
Type 2	138 (100.0)
<b>Duration of the disease (years)</b>	
N	138
Mean (SD)	12.6 (8.1)
Median	10
Min, Max	0, 35
<b>Duration of the insulin pump treatment (years)</b>	
N	138
Mean (SD)	3.7 (3.2)
Median	2
Min, Max	0, 13
<b>Duration of the Jardiance treatment (months)</b>	
N	138
Mean (SD)	5.8 (0.5)
Median	6
Min, Max	4, 6

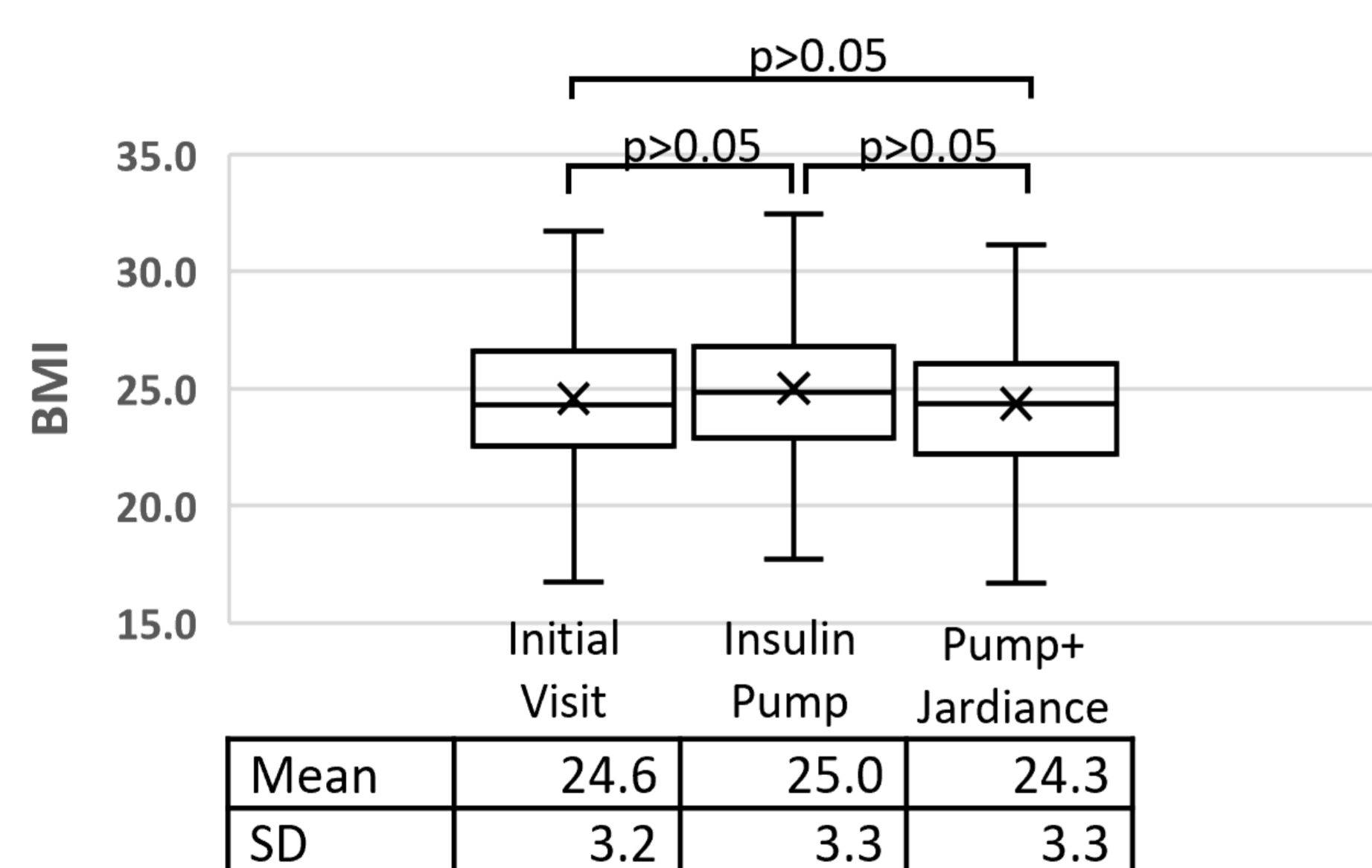


Figure 5. BMI was stable during insulin pump treatment and empagliflozin therapy.

**Results:** Data from 138 patients were analyzed. For the population, mean±SD of T2DM duration was 12.6±8.1 years, mean±SD of insulin pump treatment duration was 3.7±3.2 years and mean±SD of empagliflozin therapy duration was 5.8±0.5 months. Mean±SD of HbA1c was changed from 9.18±2.10% at initial visit to 7.39±1.23% after insulin pump treatment ( $p < 0.001$ ) and 6.71±0.93% after empagliflozin therapy added to insulin pump treatment ( $p < 0.001$ ). Furthermore, the c-peptidogenic index was increased ( $p < 0.001$ ) and insulin dose was decreased ( $p < 0.001$ ) after empagliflozin therapy added to insulin pump treatment. The BMI and creatinine were stable during insulin pump treatment and empagliflozin therapy.

**Conclusions:** Empagliflozin added to insulin pump treatment improved glycaemic control, c-peptidogenic index and insulin dosing in T2DM patients. Also, this therapy stabilized BMI and creatinine.