

Body composition measurements using bioimpedance analysis in autosomal dominant polycystic kidney disease patients treated with tolvaptan.

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Introduction

- Tolvaptan is currently approved in Japan for treatment of Autosomal dominant polycystic kidney disease (ADPKD).
- Patients who received tolvaptan had a higher frequency of adverse events related to increased aquaresis and slight decrease eGFR¹.
- However, the change of body composition by analyzing with multiple-frequency bioelectrical impedance analyzer has not been reported.

Aim

1) Boertien WE. Kidney Int.2013 Dec;84(6):1278-86.

- To evaluate a volume status before and after administration of tolvaptan in ADPKD patients and association with renal function.

Method

- Seven ADPKD patients who started administration of tolvaptan in Hokkaido University Hospital since June 2014 were examined.
- Body weight(Wt), eGFR_{crea}, osmolarity(Osm) were measured before (baseline) and 2 days (day2) after initial tolvaptan administration.
- Height-corrected total kidney volume (htTKV) and rate of change TKV(RC TKV) were measured at baseline. (**Table 1**)
- Total body water (TBW), intracellular water (ICW), and extracellular water (ECW) in the whole body, limbs, and trunk were measured using the 8-electrodes multiple-frequency bioelectrical impedance analyzer (InBody720®, Biospace, Seoul, Korea) at baseline and day2. (**Figure 1**)

Figure 1 (Schedule)

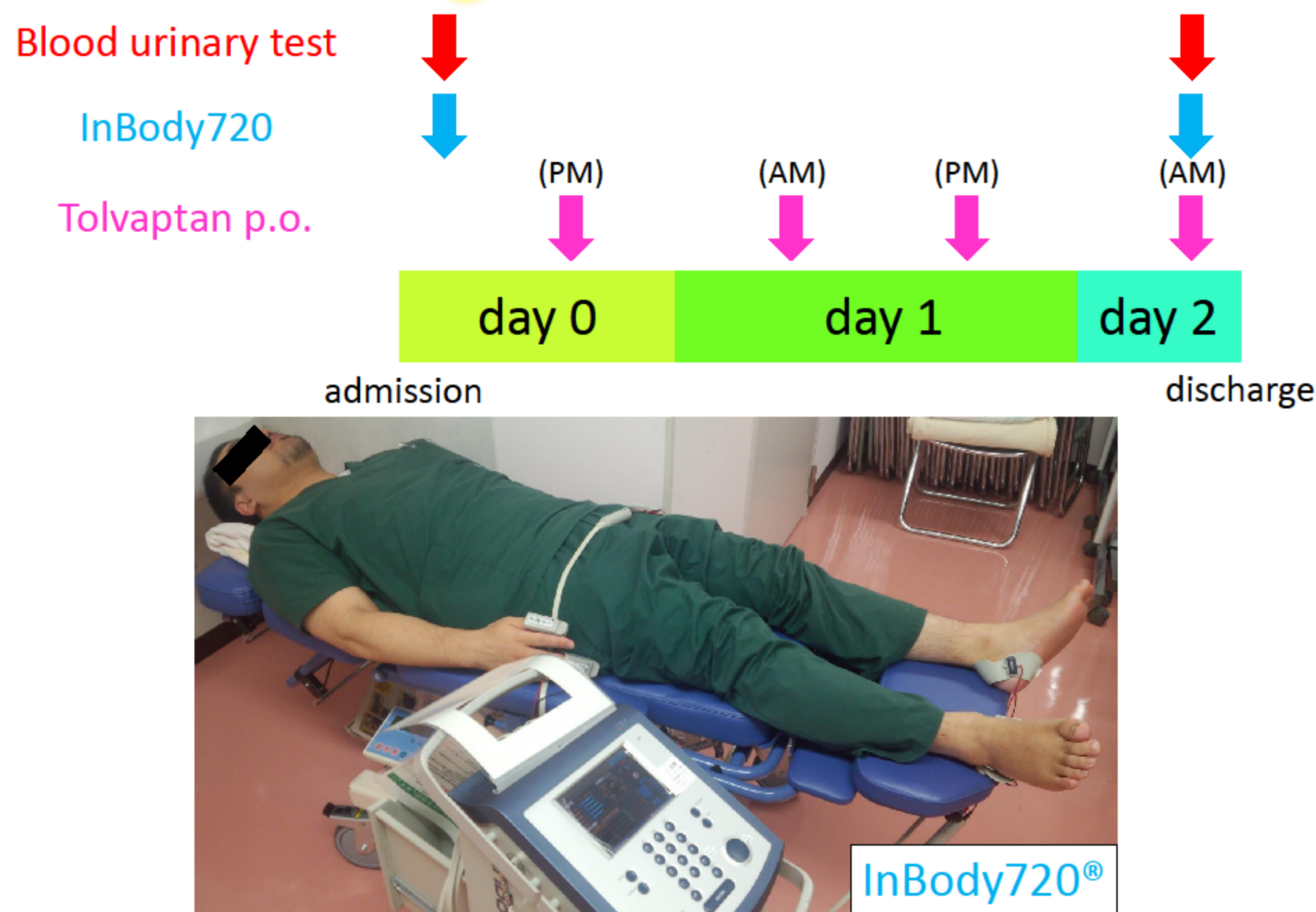


Table 1 (Patients characteristic)

Baseline	Ave ± SD [range]
Age(years)	44.6 ± 11.4 [33-64]
TKV(ml)	1828.5 ± 728.8
RC TKV(%)	5.7 ± 6.9
Height(cm)	166.6 ± 9.7
Weight(kg)	64.0 ± 12.5
sBP(mmHg)	123.7 ± 14.8
dBp(mmHg)	79.3 ± 9.5
Rate of HT	5/7 (74%)
Rate of ARB	6/7 (84%)

sBP/dBP: systolic/diastolic blood pressure
HT: hypertension, ARB: angiotensin II receptor blocker

Table 2 (Blood and urinary change)

	Baseline	day2	paired t-test
	Ave ± SD	Ave ± SD	p-value
U-NaCl(g/gCr)	9.04 ± 7.8	8.57 ± 2.4	0.786
FENa(%)	1.98 ± 2.1	1.65 ± 1	0.695
U-Osm(mOsm/L)	436 ± 149	122 ± 12	0.006
Hb(g/dl)	12.7 ± 0.9	13 ± 0.8	0.216
ALT(IU/L)	15.3 ± 7.4	17.1 ± 8.2	0.393
eGFR _{crea} (ml/min)	46.6 ± 31	44.7 ± 29	0.19
Na(mEq/L)	141 ± 2	142 ± 2	0.22
S-Osm(mOsm/L)	289 ± 5.9	289 ± 5.1	0.749

FENa: fractional excretion of sodium

Figure 2

(Baseline correlation)

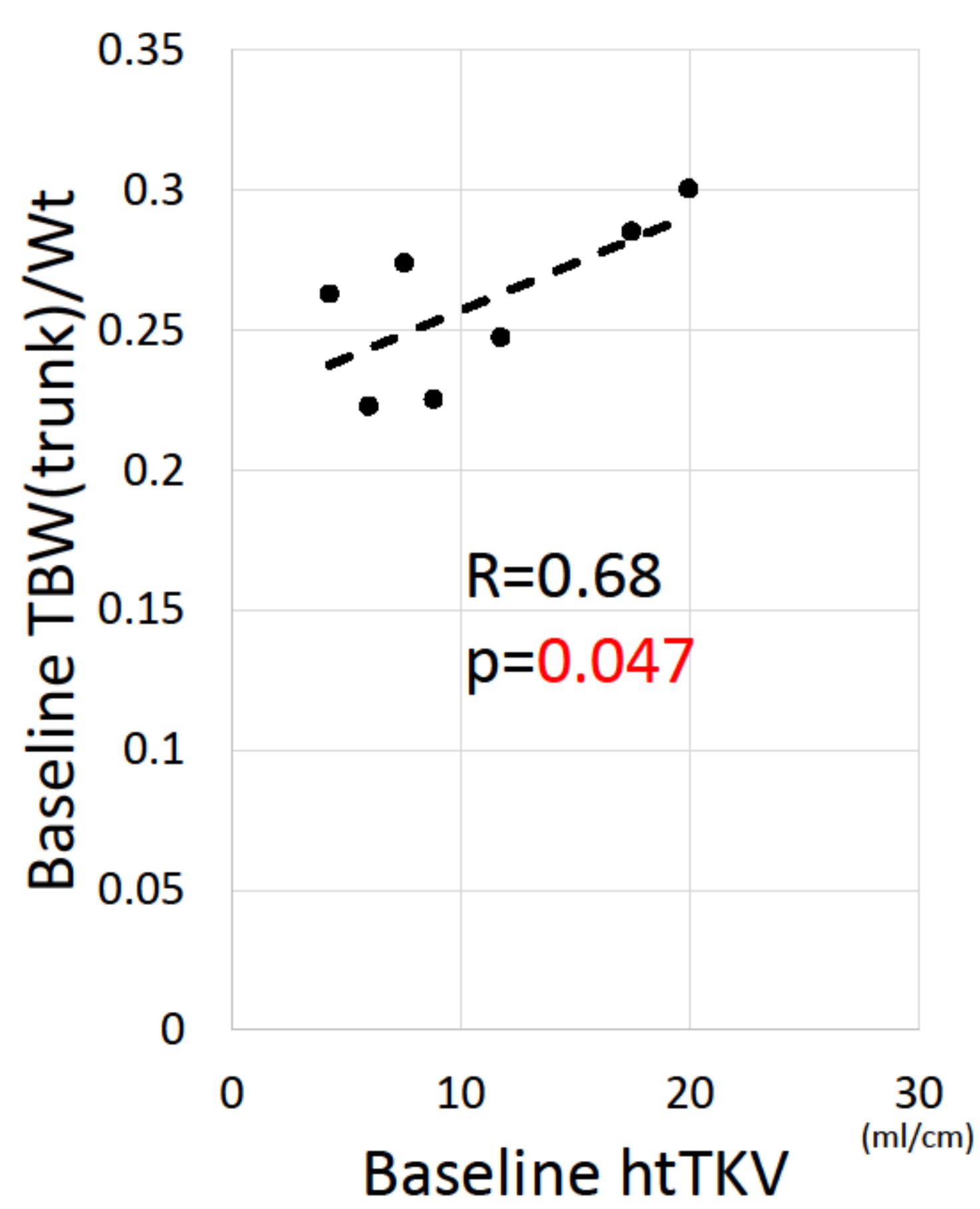
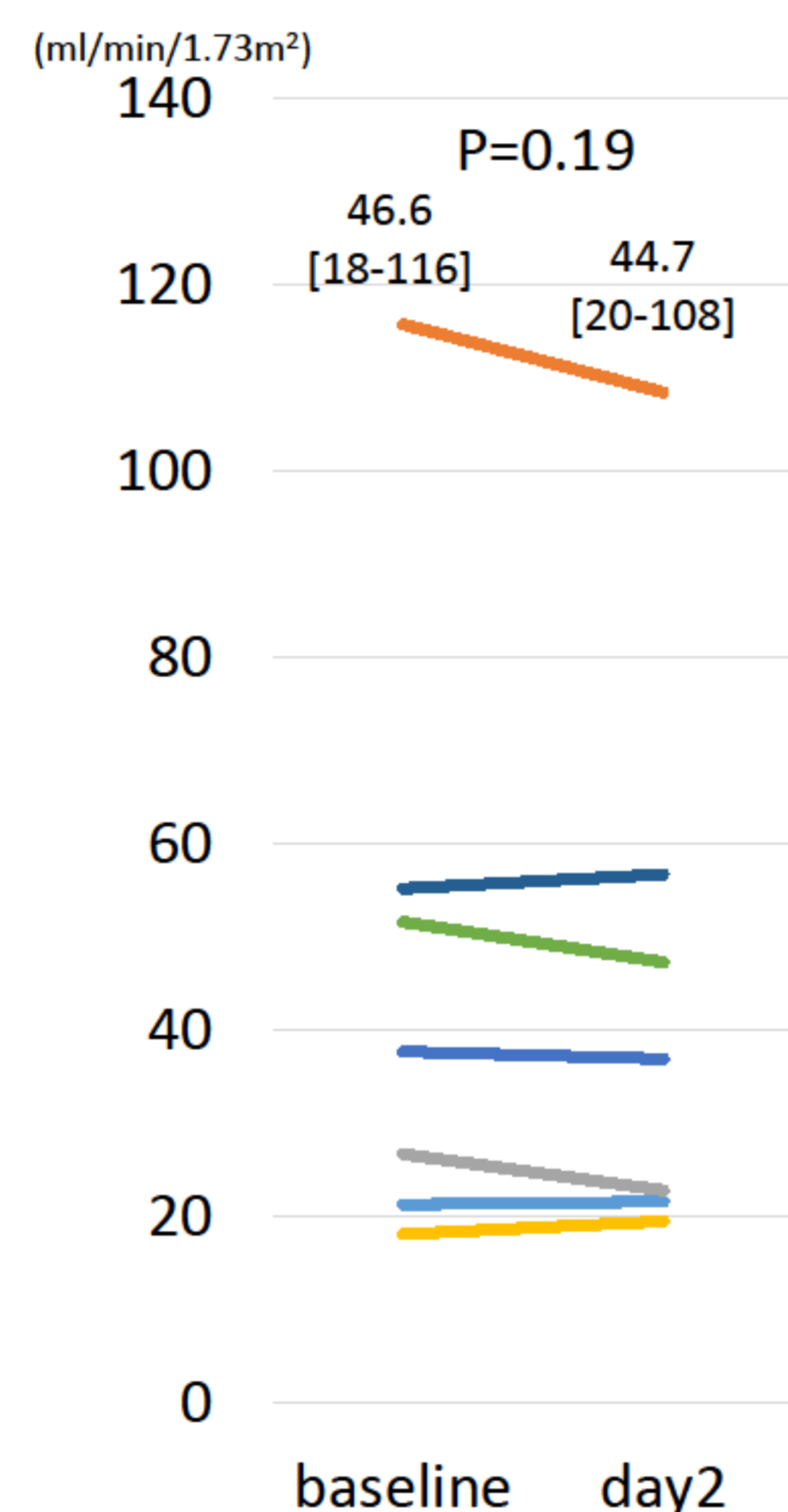


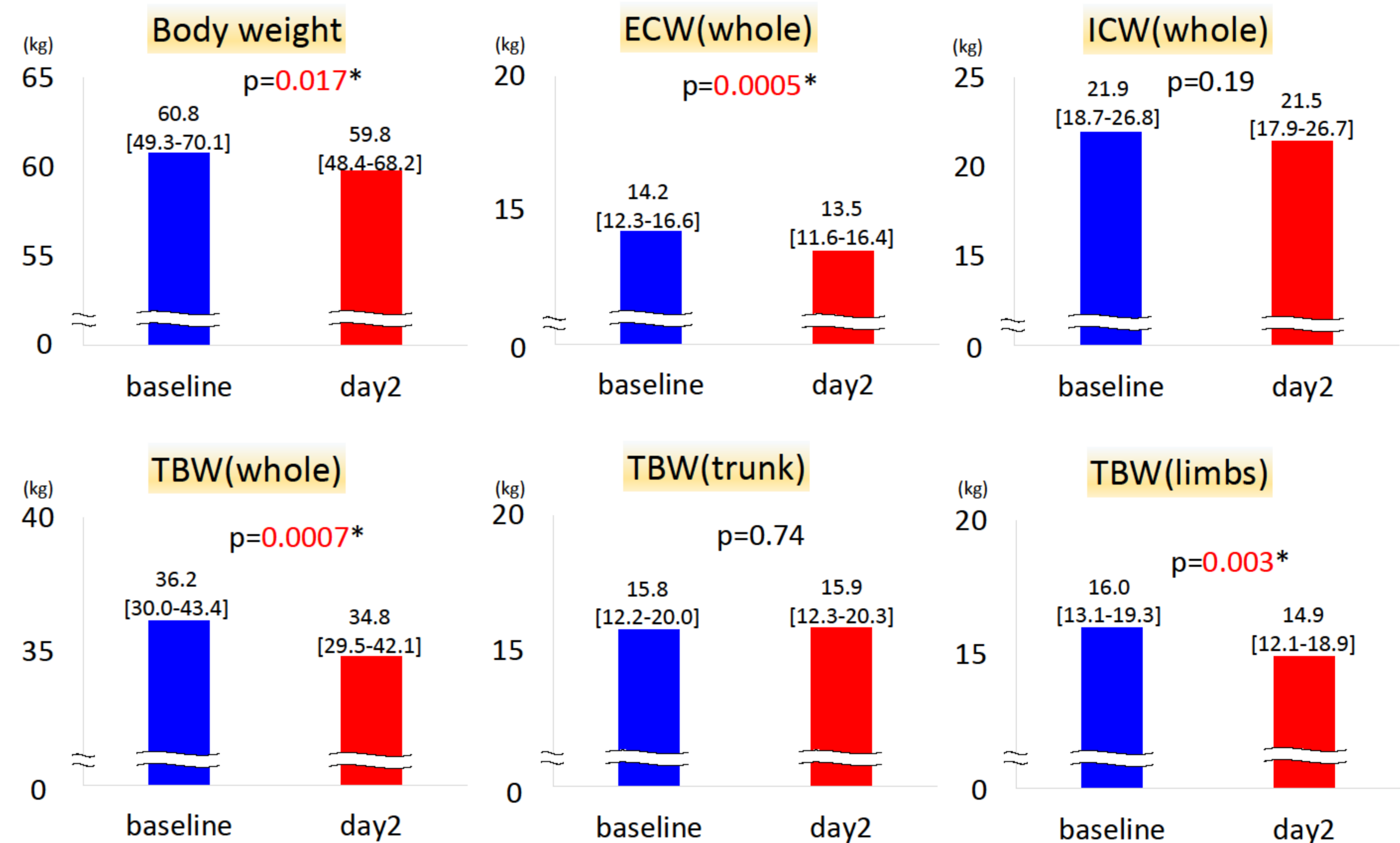
Figure 3

(Change of eGFR)



Data presented as average and range.

Figure 4 (Change in body water balance)



All data presented as average and range. *paired t-test, baseline vs day2.

Result

- Baseline htTKV was correlated with the ratio of TBW in the trunk and body weight. (**Figure 2**)
- The administration of tolvaptan reduced eGFR ($2.9 \pm 6.9\%$). (**Table 2, Figure 3**)
- Body weight(Wt), TBW, and ECW in the whole body, and TBW in limbs at day2 were significantly decreased compared with baseline. On the other hand, ICW in whole body and TBW in trunk did not significant change. (**Figure 4**)
- No correlation was found between rate of change in any part of body water and change in eGFR induced by tolvaptan.

Discussion

- The ratio of TBW in the trunk and body weight might be a predictor of htTKV in ADPKD patients.
- Changes of any of the evaluated water balance did not correlate with the rate of change in eGFR in this study. Our finding suggests that other factors may contribute to the reduction in eGFR after short-term administration of tolvaptan in ADPKD patients.

Conclusion

- ADPKD patients lose ECW and body water in limbs rather than ICW and body water in trunk after short-term administration of tolvaptan.

