

# Effect of tolvaptan on a body water balance in patients with autosomal dominant polycystic kidney disease.

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## Introduction

- Tolvaptan is firstly 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 eGFR<sup>1</sup>.
- However, the change of body composition by analyzing with multiple-frequency bioelectrical impedance analyzer has not been reported.

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

## Aim

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

## Method

- Forty-three ADPKD patients (23 male) who started administration of tolvaptan in Hokkaido University Hospital since June 2014 were examined.
- Body weight, serum creatinine and eGFR were measured before (baseline), 2 days (2D) and 6 months (6M) after initial tolvaptan administration.
- Total Kidney Volume (TKV) were measured at baseline and 6M. (23 patients were included in analysis at 6M.) (Figure. 1)
- Total body water (TBW) was measured using the 8-electrodes multiple-frequency bioelectrical impedance analyzer (InBody®, Biospace, Seoul, Korea) at baseline, 2D and 6M. (Figure. 1)

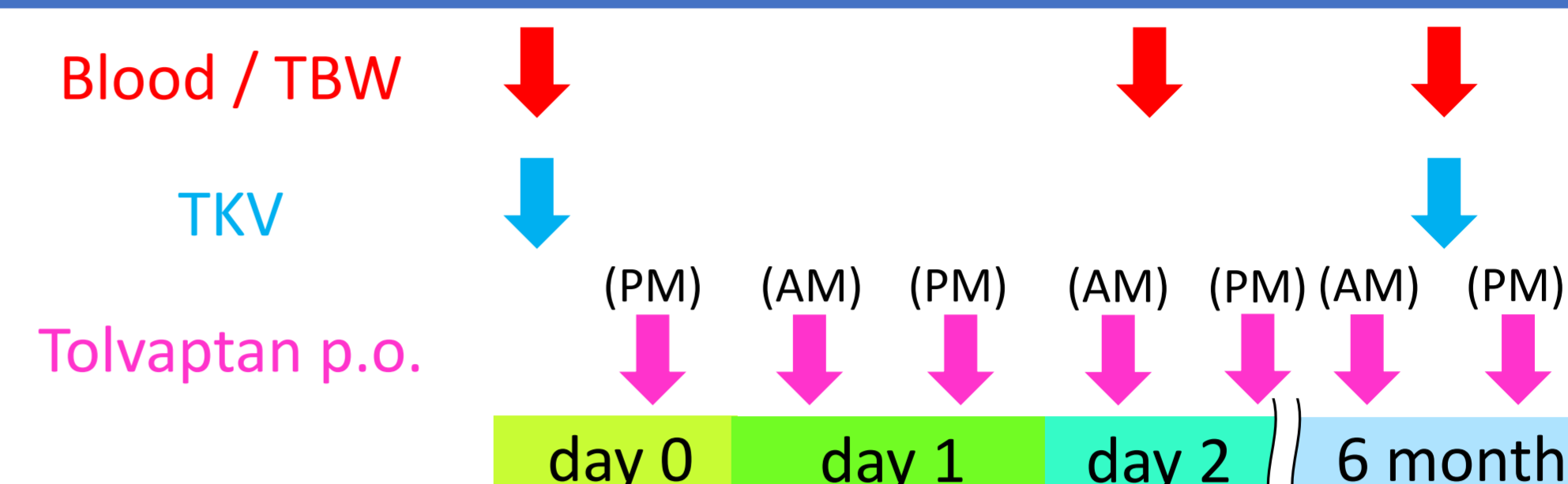


Figure 1. Schedule

## Result

Baseline(N=43)	Ave ± SD
Age(years)	46.2 ± 10.0
TKV(ml)	2182.2 ± 1212.8
htTKV(ml/m)	1296.2 ± 684.8
RC TKV(%)	16.5 ± 50.4
Height(cm)	166.7 ± 9.4
Weight(kg)	67.0 ± 14.7
sBP(mmHg)	127.4 ± 16.5
dBp(mmHg)	81.6 ± 11.6
HT(%)	77
ARB(%)	77

htTKV: height-adjusted TKV  
RC TKV: rate of change in TKV  
sBP/dBP: systolic/diastolic blood pressure  
HT: hypertension  
ARB: angiotensin II receptor blocker

Table 1. Patients characteristic

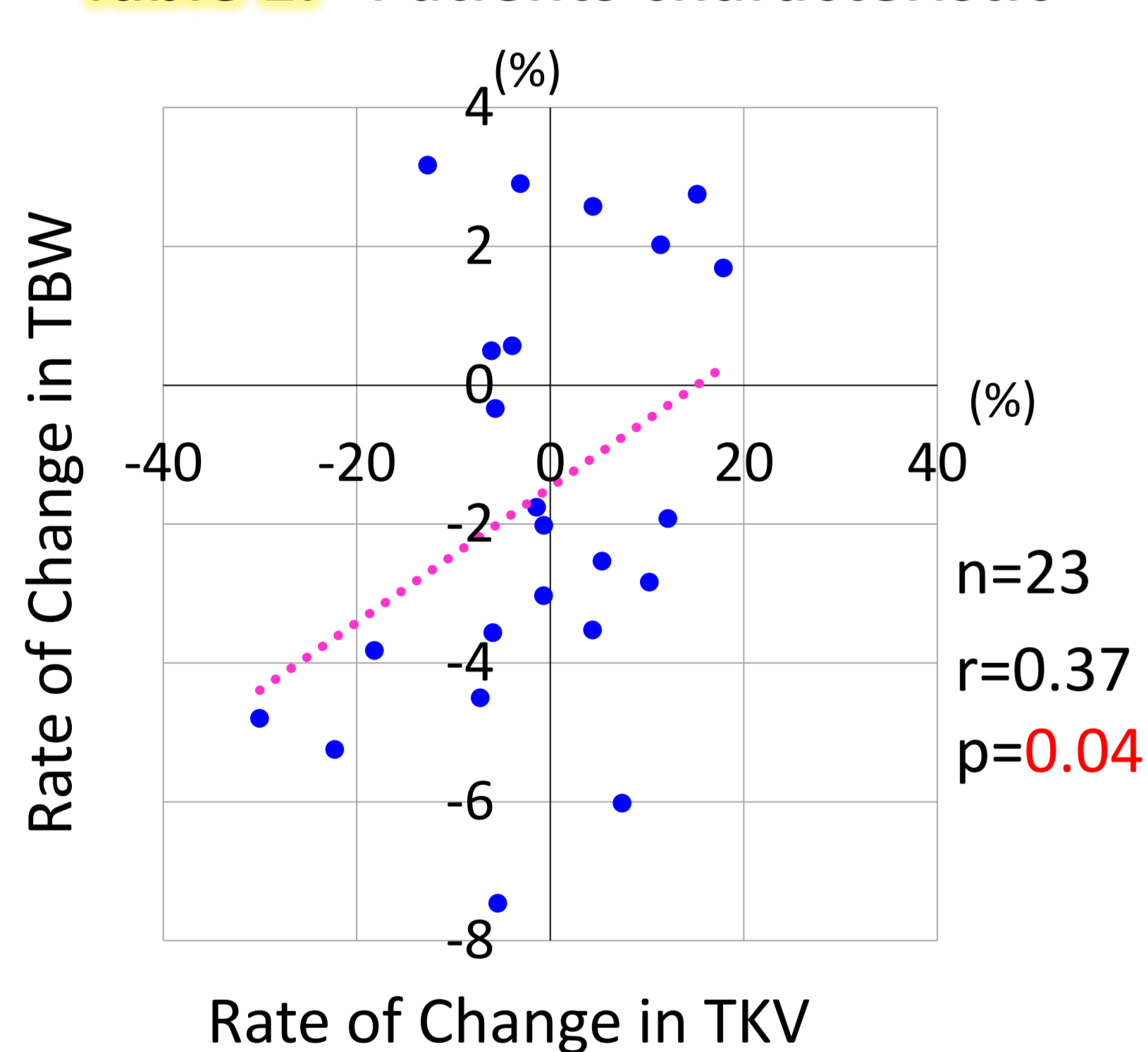


Figure 4. Rate of change in TBW and TKV  
TKV increased  $-1.5 \pm 11.6\%$  over a half-year period, and correlated with rate of change in TBW

N=43 (N=23)	Baseline	Day2 (2D)	6 months (6M)	p (2D vs baseline)	p (6M vs baseline)
Body weight(kg)	67.0 ± 14.7 (63.8 ± 11.7)	65.6 ± 14.3 (62.7 ± 11.4)	- (63.1 ± 12.4)	<0.001	(0.28)
eGFR(ml/min /1.73m <sup>2</sup> )	53.1 ± 28.7 (47.1 ± 22.3)	49.5 ± 25.8 (44.9 ± 20.3)	- (41.5 ± 19.9)	<0.001	(<0.001)
TKV(ml)	(1904 ± 804)	-	(1906 ± 834)	-	(0.95)
TBW (kg)	38.2 ± 8.2 (37.2 ± 7.5)	36.5 ± 7.3 (36.0 ± 7.3)	- (36.7 ± 12.4)	<0.001	(0.039)
TBW/Wt	0.58 ± 0.06 (0.59 ± 0.05)	0.56 ± 0.06 (0.57 ± 0.05)	- (0.58 ± 0.06)	<0.001	(0.88)

TBW: total body water, Wt: weight Data presented as average ± SD.

Table 2. Change of body water, TKV, and eGFR

Compared with baseline, body weight and rate of TBW and body weight (TBW/Wt) were significantly decreased at 2D, but not at 6M

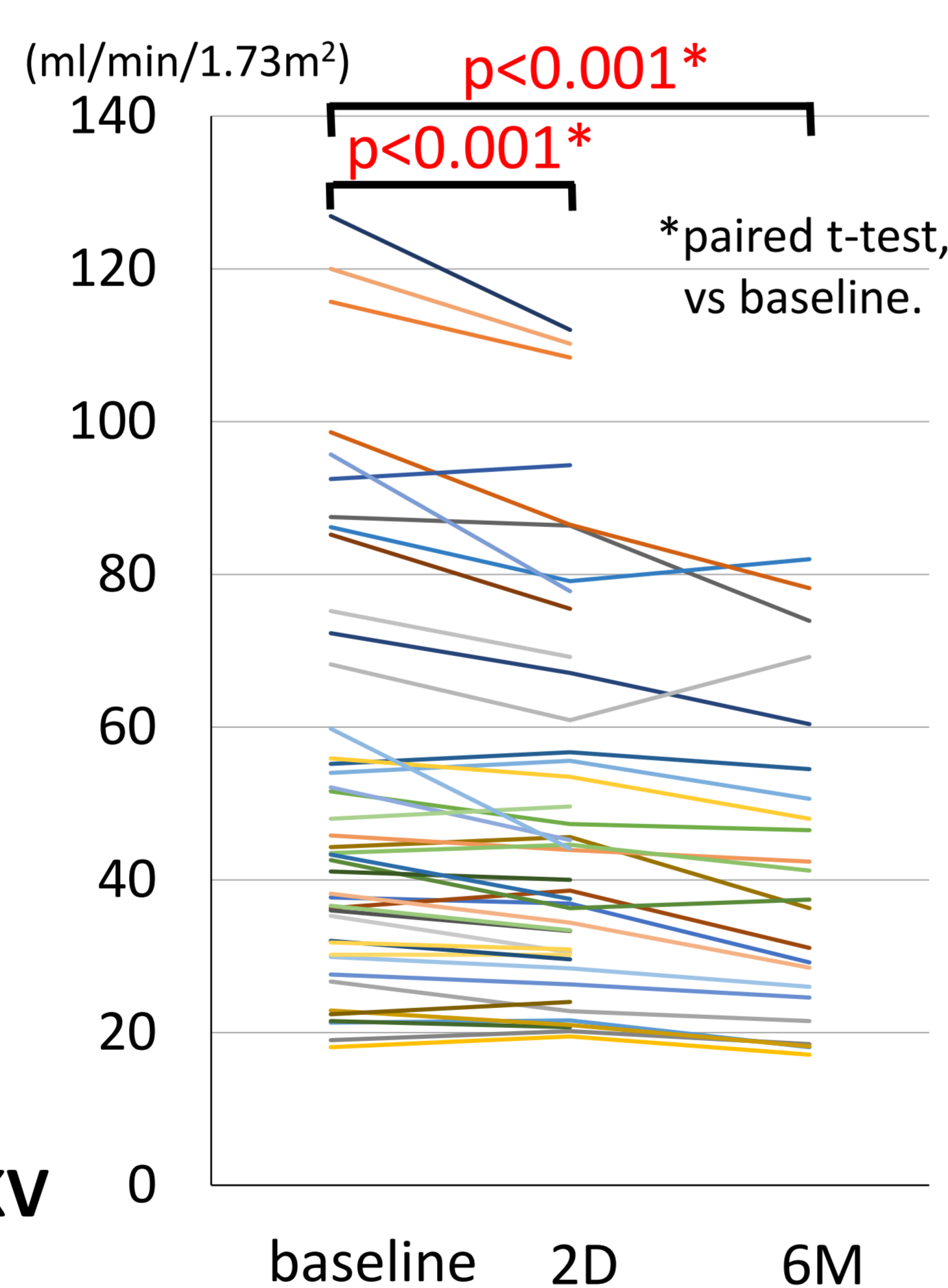


Figure 5. Change in eGFR  
eGFR decreased both at 2D and 6M compared with baseline

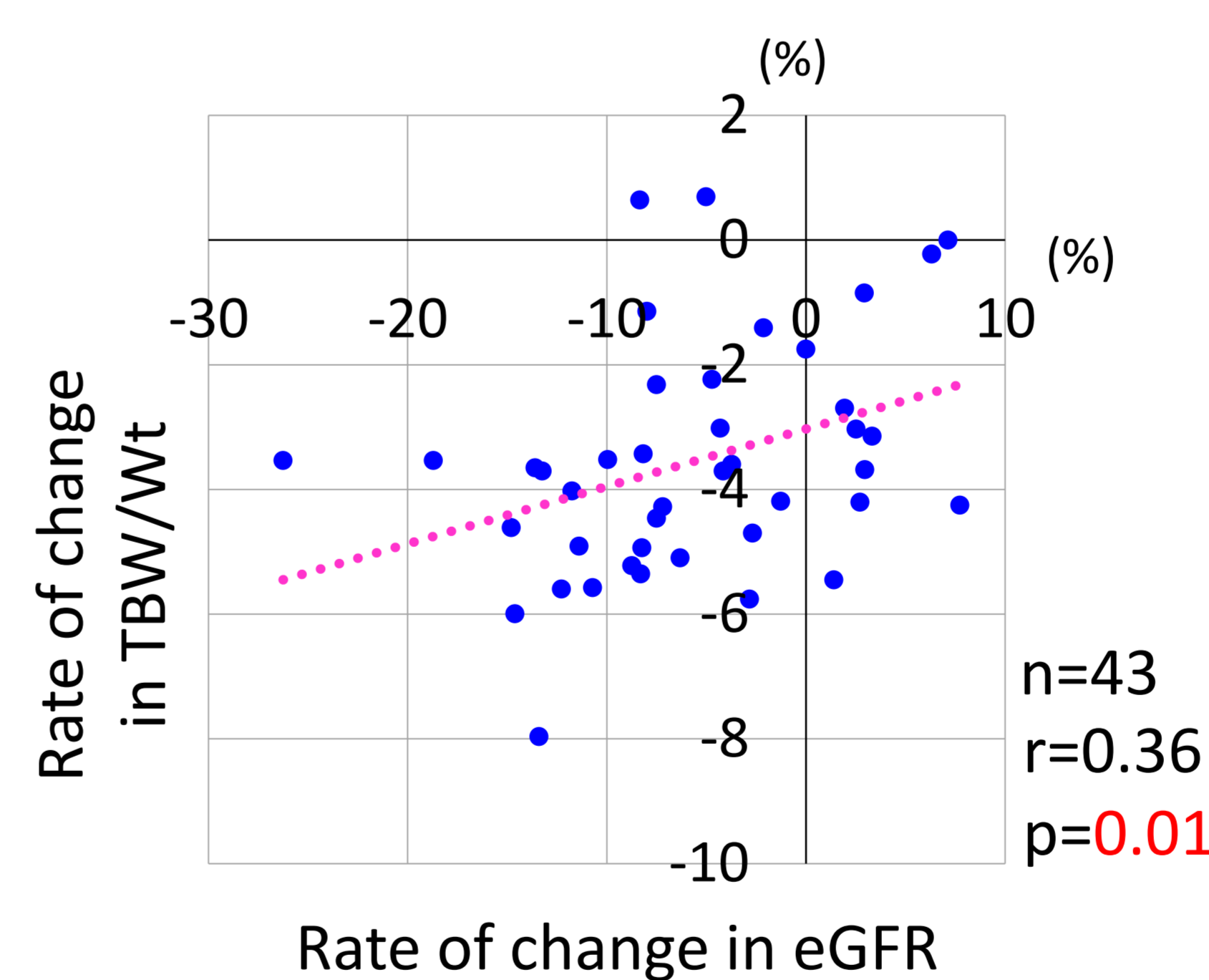


Figure 6. Rate of change in eGFR and TBW/Wt at 2D  
Percent change in eGFR was correlated with change in TBW/Wt at 2D

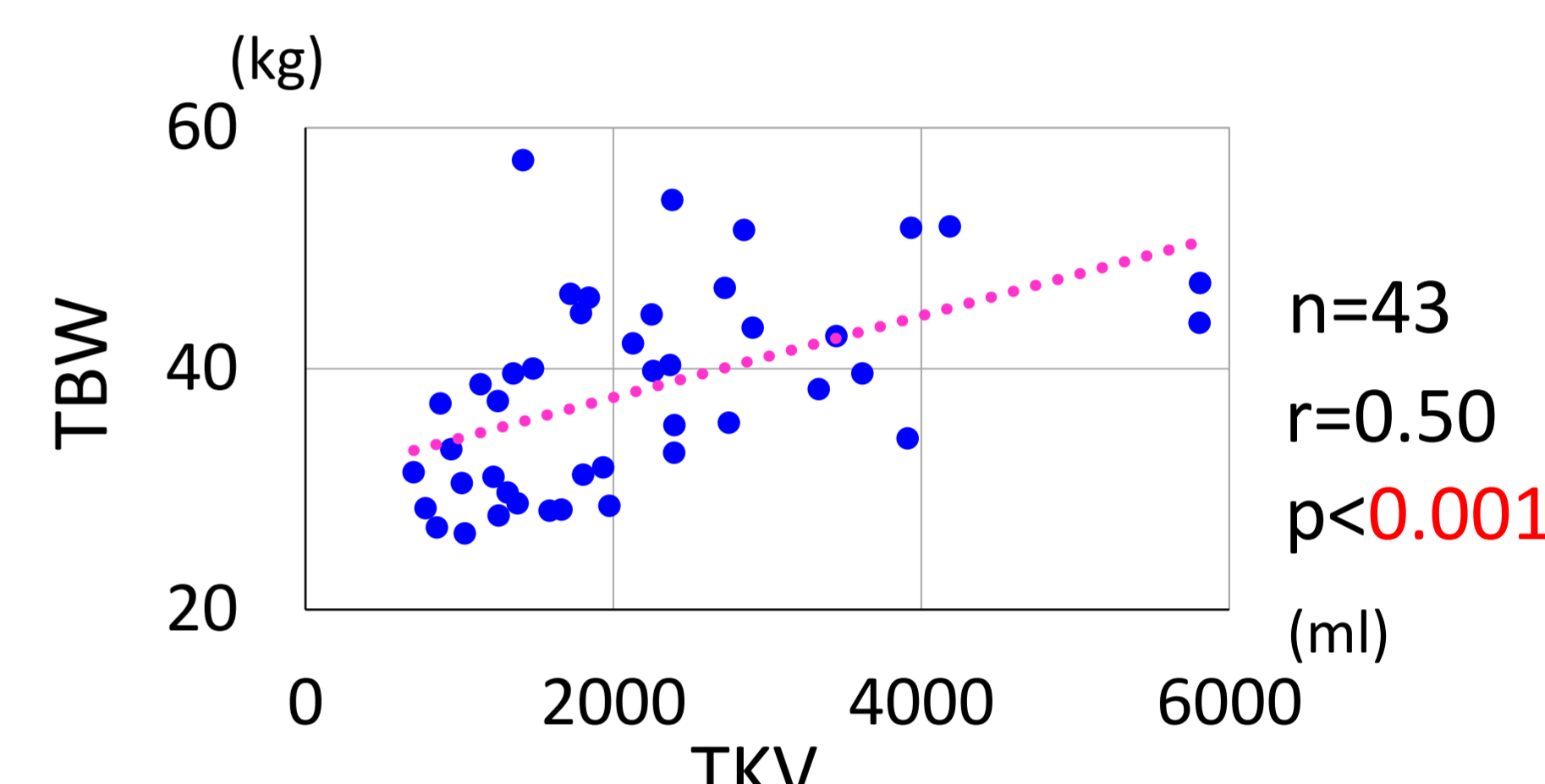


Figure 2. TBW and TKV at baseline  
TKV was correlated with TBW at baseline

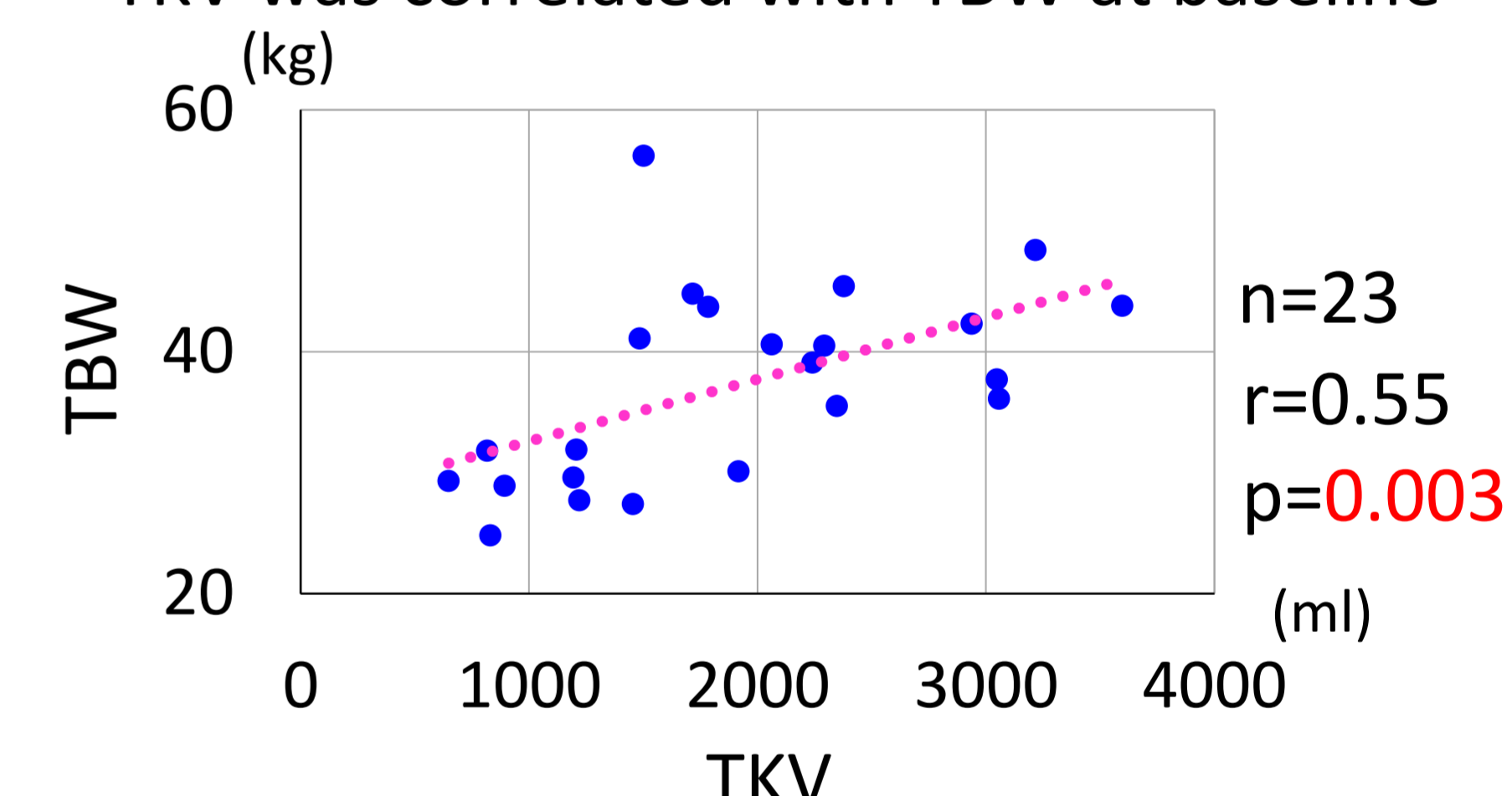


Figure 3. TBW and TKV at 6M  
TKV was correlated with TBW at 6M

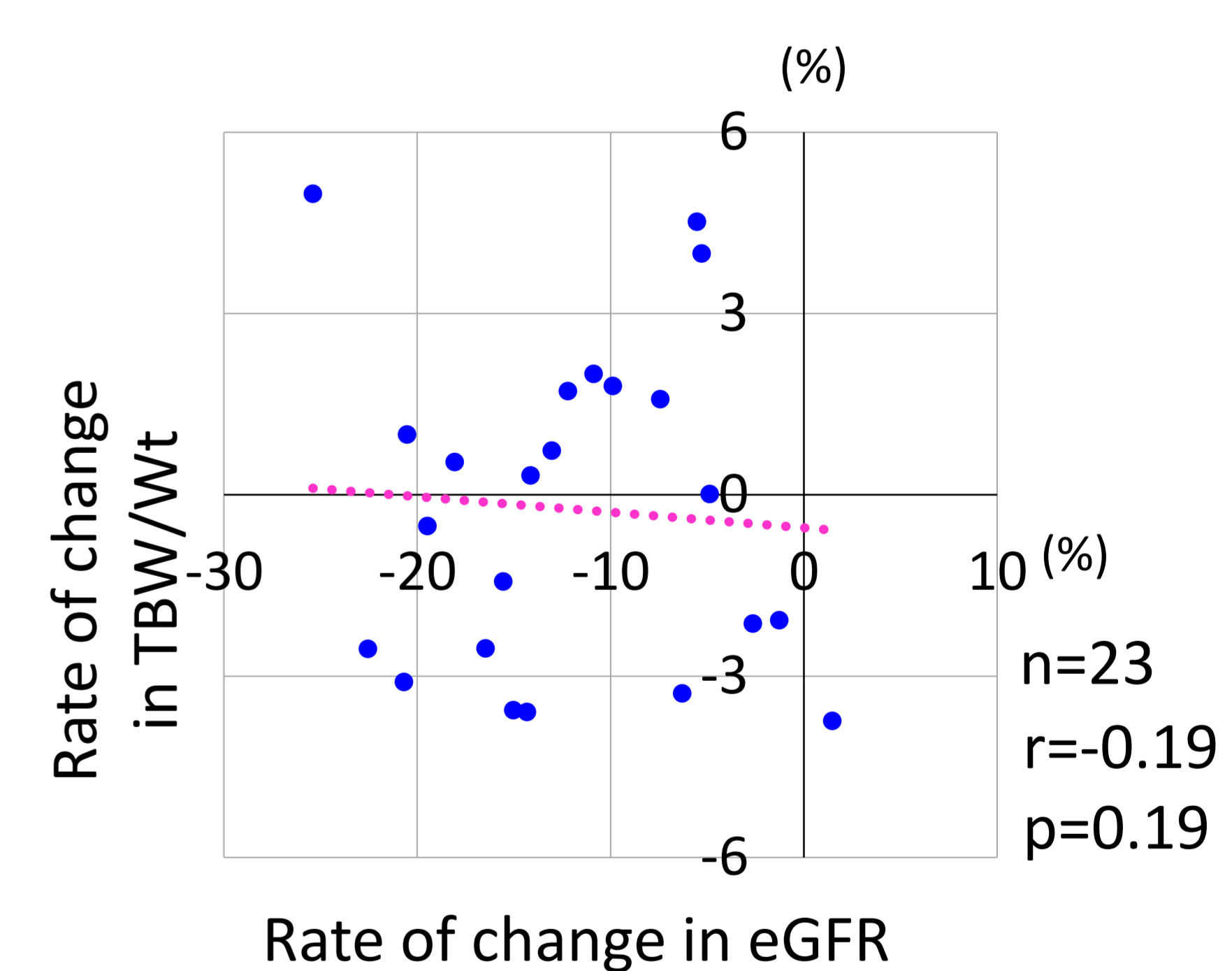


Figure 7. Rate of change in eGFR and TBW/Wt at 6M  
Percent change in eGFR was not correlated with change in TBW/Wt at 6M

## Discussion

- TKV was significantly correlated with total body water (TBW). This result suggests that cyst were detected as TBW by Inbody®, which is an easy noninvasive technique.
- TBW/weight (TBW/Wt) and eGFR were significantly decreased at 2D. These results suggest aquaretic effect of tolvaptan caused mild dehydration and eGFR reduction. There was no significant difference in TBW/Wt at 6M, however eGFR decreased at 6M. These results suggest that other mechanism may contribute to chronic eGFR reduction.

## Conclusion

- TBW might be a predictor of TKV in ADPKD patients.
- Tolvaptan-related dehydration may contribute to acute eGFR reduction, but not to chronic eGFR reduction in ADPKD patients.