The gustatory threshold for salty taste is negatively correlated with residual renal function in peritoneal dialysis patients.

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1. Introduction

1. In chronic kidney disease patients, it is reported that the gustatory threshold for salty taste is increased, and its increase is associated with excessive oral salt intake[1)].
2. Excessive oral salt intake result in high blood pressure or volume overload[2)].
3. However, little is known about the relationship between peritoneal dialysis (PD) patients and the gustatory threshold for salty taste.

2. Aim

We investigated the gustatory threshold for salty taste and clarify relevant factors in PD patients.

3. Methods

1. Study design and subject

In this cross-sectional study, we enrolled 17 patients who underwent PD in Nagasaki University Hospital in Japan.

2. Gustatory threshold for salty taste measurements

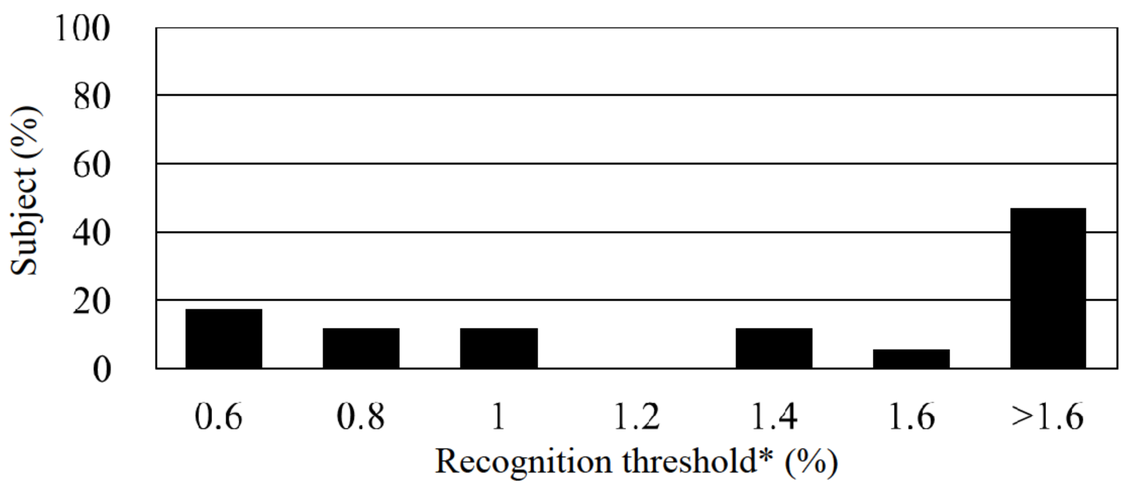
For the assessment of gustatory threshold for salty taste, we used a salt-impregnated taste strip, Salsave® (Advantech Tokyo Co, Tokyo, Japan) which are impregnated various salt concentrations (0.6, 0.8, 1.0, 1.2, 1.4 and 1.6%). Patients were placed a strip on their tongue, and the lowest concentration at which patients identified the salt taste was taken as the recognition threshold.

3. Statistical analysis

We analyzed the relationship between recognition threshold and the clinical parameters. Results are expressed as mean ± standard deviation. All statistical analyses were performed using StatView v5.0 software (Systat Software, Chicago, USA).

4. Results

1. Gustatory threshold for salty taste in PD patients



- Approximately 71% of PD patients presented with a recognition threshold above 0.8%.
  *The normal range is 0.6 to 0.8 %

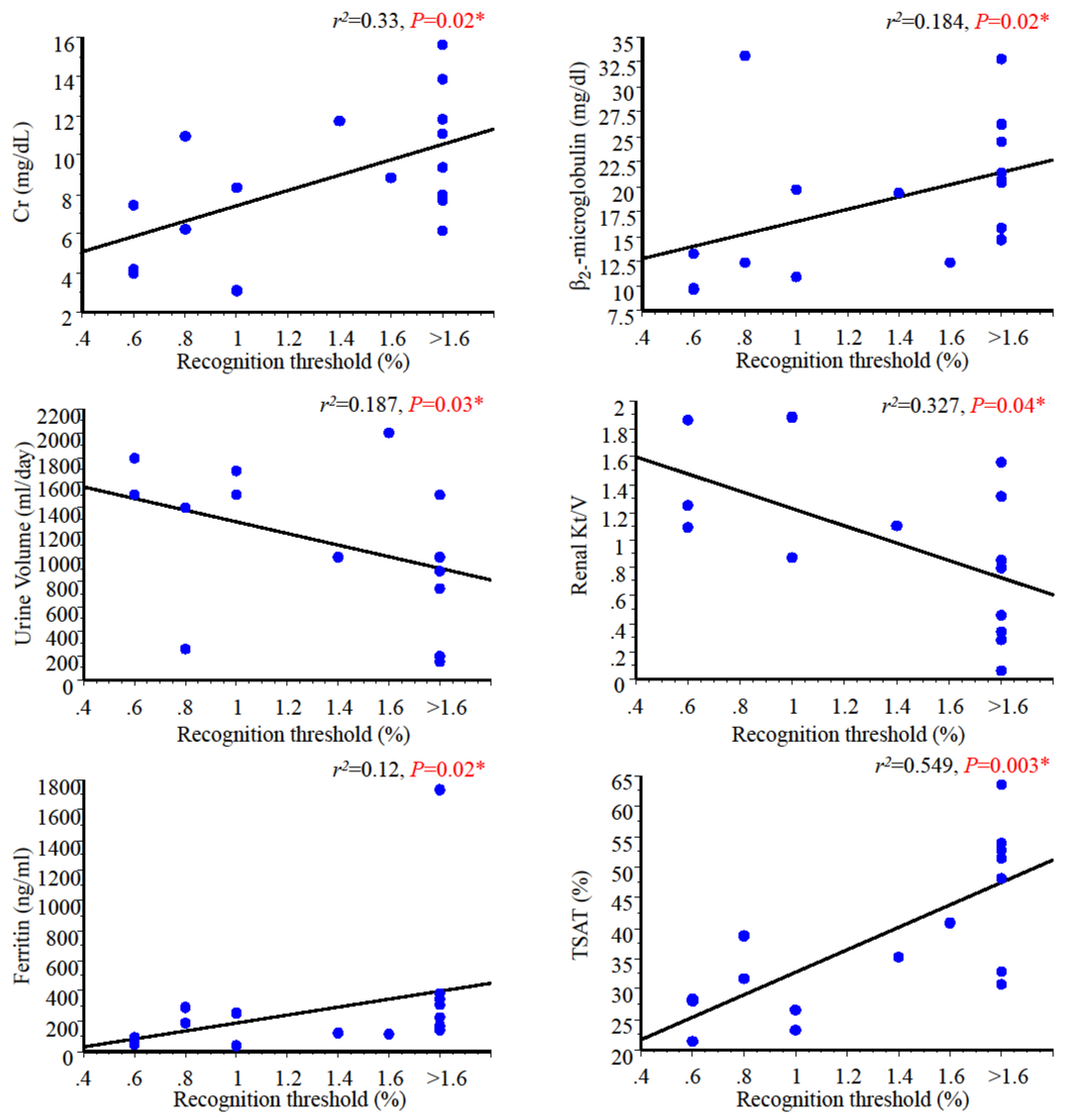
2. Characteristics of study population

	All (n=17)	≦1.6% (n=9)	>1.6% (n=8)	*P*-Value*
Age (years)	62.2±14.3	66.2±14.0	57.8±14.0	0.09
Gender (M:F)	7:10	4:5	5:3	>0.99
Duration of PD (months)	40.6±26.9	35.8±31.3	46.1±21.7	0.44
Body Weight (kg)	59.9±9.3	60.2±12.6	59.7±4.4	0.77
systolic-BP (mmHg)	133.9±17.8	134.1±20.4	133.8±15.7	0.81
diastolic-BP (mmHg)	70±14.7	67.6±14.6	72.6±15.3	0.53
Number of antihypertensive drugs	3.3±1.3	3.0±1.2	3.6±1.4	0.43
Sodium excretion (g/day)	9.9±2.5	10.4±2.4	9.6±1.3	0.61
Urine Volume (ml/day)	1125.3±560.4	1405.6±515.0	810±447.3	0.0149
TP (g/dL)	6.5±0.7	6.6±0.8	6.3±0.5	0.27
Alb (g/dL)	3.4±0.5	3.3±0.3	3.4±0.7	0.36
Na (mEq/L)	137.8±3.8	138.0±3.9	137.6±3.8	0.81
K (mEq/L)	4.2±0.8	4.4±0.8	3.9±0.6	0.19
Cl (mEq/L)	101.0±5.4	102.1±6.3	99.8±4.3	0.36
Mg (mg/dL)	2.5±0.7	2.4±0.8	2.5±0.4	0.39
Zn (μg/dL)	67.9±13.5	66.9±15.2	69.2±12.0	0.56
Cr (mg/dL)	8.7±3.5	7.2±3.1	10.5±3.3	0.08
UA (mg/dL)	6.7±1.3	7.0±1.6	6.3±0.8	0.44
β_2-microglobulin (mg/mL)	18.6±7.4	15.6±7.6	22.1±5.8	0.0209
Ferritin (ng/mL)	276.2±390.8	135.2±90.3	434.9±534.3	0.016
TSAT (%)	38.9±12.8	30.5±6.7	48.5±11.2	0.0053
CRP (mg/dL)	0.3±0.6	0.1±0.7	0.5±0.8	0.77
Urine Protein (g/g・Cr)	2.2±1.4	2.5±1.6	1.8±1.3	0.42
CTR (%)	51.8±6.7	53.7±6.1	49.6±6.9	0.29
Total Kt/V	2.3±0.8	2.5±1.0	2.1±0.4	0.35
Peritoneal Kt/V	1.3±0.6	1.3±0.8	1.4±0.5	0.37
Renal Kt/V	1.0±0.6	1.4±0.4	0.7±0.5	0.0389

* ≦1.6% vs >1.6% : Fisher's exact test for categorical variables, and Mann-Whiteny U test for continuous variables

Conflict of interest: We have no conflicts of interest.

3. Relationship between clinical parameter and recognition threshold



- There was a positive and significant correlation between serum Cr, β_2-microglobrulin, ferritin, TSAT and the recognition threshold. There was a negative and significant correlation between urine volume, renal Kt/V and recognition threshold.
  *Spearman's rank correlation

5. Conclusions

1. Our results demonstrated that the gustatory threshold for salty taste was increased in PD patients, and negatively correlated with residual renal function. It suggested uremic toxins, particular high molecular weight, may be involved in salt taste impairment.

2. In addition, iron overload negatively correlated with the gustatory threshold for salty taste. However, its mechanism is not clear. Further study is needed to investigate its mechanism.

6. References

1) Kusaba T et al. *Kidney International 2009;76: 638–643.*
2) Intersalt Cooperative Research Group. *BMJ 1988; 297: 319–328.*

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