The effect of drinking green tea on diabetic nephropathy.

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Summary

There is a report which suggests that green tea catechines prevent the progress of diabetic renal disease in streptozotocin-induced diabetic rats. So, the aim of this study was to elucidate whether daily intake of green tea prevents the progress of diabetic nephropathy.

413 diabetic patients were studied. 410 diabetic patients(204 male and 206 female ,mean age 63 years) excluding 3 patients of dialysis were studied. The questionnaire asked about the amount of green tea normally drank. There were significantly fewer complications of nephropathy in the group which drank green tea (37%) when compared to the group which did not (53%, $p<0.05$). In multiple logistic regression analysis, significant predictors of nephropathy were duration of diabetes ($p<0.05$), HbA1c ($p<0.05$), green tea ($p<0.05$), smoking ($p<0.005$) and hypertension ($p<0.001$). There were significantly fewer diabetic nephropathy ($p<0.05$) in smoker who drank green tea compared not green tea. These findings suggested that the custom of consuming green tea prevented the progress of diabetic nephropathy.

Keywords

1.Diabetic nephropathy **2.**Green tea **3.**catechins **4.**Questionnaires **5.**Smoking

Introduction

Recently, the number of patients with diabetic nephropathy initiated dialysis is dramatically increasing in Japan and this now poses a difficult problem. Although there is a report which suggests that green tea catechins prevent the progress of diabetic renal disease in streptozotocin-induced diabetic rats, there is no clinical report of the influence of drinking green tea on diabetic nephropathy. We investigated whether daily intake of green tea prevents the progress of diabetic nephropathy.

Subjects

413 diabetic patients were studied .410 diabetic patients(204 male and 206 female ,mean age 63 years) excluding 3 patients of dialysis were studied.

The questionnaire consisting of both written and oral parts asked about daily consumption of green tea.

Method

Patients were assigned two groups,

patients without nephropathy: without proteinuria.

patients with nephropathy: intermittent or persistent proteinuria.

Then a comparison was done using clinical chart data such as duration of diabetes , BMI, HbA1c, treatment, smoking, complication of hypertension or hyperlipdemia.

Statistical analysis: Unpaired t-tests or Fisher's exact tests were used for comparison between patients without and with nephropathy.

Predictors for complications of diabetic nephropathy were examined using multiple

logistic regression analysis.

Results

(1) No significant differences were found in age, gender, BMI and hyperlipdemia between two groups. Factors such as the duration of diabetes , HbA1c, treatment, smoking, green tea and hypertension showed a significant difference between the two groups ($p<0.05$ or $p<0.01$)(Table 1).

Table 1

Clinical characteristics of the subjects

		without nephropathy (n=245)	with nephropathy (n=165)	
Age	(years)	63.6 ± 10.7	63.2 ± 10.9	
Gender(M/F)		116 / 129	90 / 78	
	(%)	(47.3) / (52.7)	(53.0) / (46.4)	
Duration of	(years)	11.9 ± 8.6	13.7 ± 8.2	*
BMI	(kg/m^2)	22.7 ± 3.5	23.2 ± 4.1	
HbA1c	(%)	7.3 ± 1.4	7.7 ± 1.7	**
Treatment	D/O/I*	132 / 84 / 29	70 / 65 / 33	*
	(%)	(53.9)/ (34.3) /(11.8)	(51.7)/ (38.7) /(19.6)	
Smoking		185 / 60	111 / 54	*
No/Yes	(%)	(75.5) / (24.5)	(67.3) / (32.7)	
Green tea		36 / 209	40 / 125	*
No/Yes	(%)	(14.7) / (85.3)	(24.2) / (75.8)	
Hypertension		94	96	
	(%)	(38.4)	(57.1)	
Hyperlipidemia		179	127	
	(%)	(73.3)	(63.7)	

*D/O/I = Diet / Oral hypoglycemic agent / Insulin

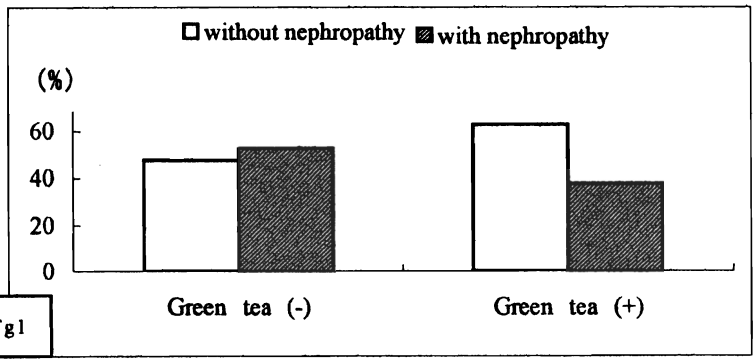
Valus are mean ± SD *p<0.05 **p<0.001

(2) There were significantly fewer complications of nephropathy in the green tea consumed group (nephropathy 37.4%) compared to the group which consumed no green tea(nephropathy 52.6%) ($p<0.05$)(Table 2,Fg 1).

Table 2

Relations between complication of nephropathy and consuming green tea.

	Green tea (-)	Green tea (+)
without nephropathy(%)	36(47.4)	209(62.6)
with nephropathy (%)	40(52.6)	125(37.4)
		Fisher's exact test p<0.05



Fg1

(3) In univariate logistic regression analysis, significant predictors of nephropathy were duration of diabetes ($p<0.05$),HbA1c($p<0.05$),green tea($p<0.05$), Smoking($p<0.05$) and hypertension($p<0.001$)(Table 3).

Table 3

Relation of the Diabetic Nephropathy and Background , (Treatment, Green tea, Smoking and Hypertension.)

	Odds ratio	95%CI	p value
Gender (male)	1.27	0.856-1.888	0.235
Duration of diabetes			
～ 9.9	1		
10 ～ 19.9	1.779	1.123-2.818	0.014
20 ～	1.997	1.187-3.357	0.009
HbA1c			
～ 6.9	1		
7.0 ～ 8.9	1.698	1.088-2.645	0.0198
9.0 ～	2.375	1.300-4.341	0.0049
Tretment			
Insulin	1		
Oral hypoglycemic agent	0.748	0.409-1.369	0.3465
Diet	0.510	0.283-0.918	0.0248
Green tea	0.538	0.326-0.889	0.0156
Smoking	1.704	1.097-2.645	0.0176
Hypertension	2.127	1.423-3.178	0.0002

(4) In multiple logistic regression analysis, significant predictors of nephropathy were duration of diabetes ($p<0.05$), HbA1c ($p<0.05$), green tea ($p<0.05$), smoking ($p<0.005$) and hypertension ($p<0.001$)(Table 4).

Table 4

Relation Between of Diabetic Nephropathy and Background (Treatment, Green tea, Smoking and Hypertension)

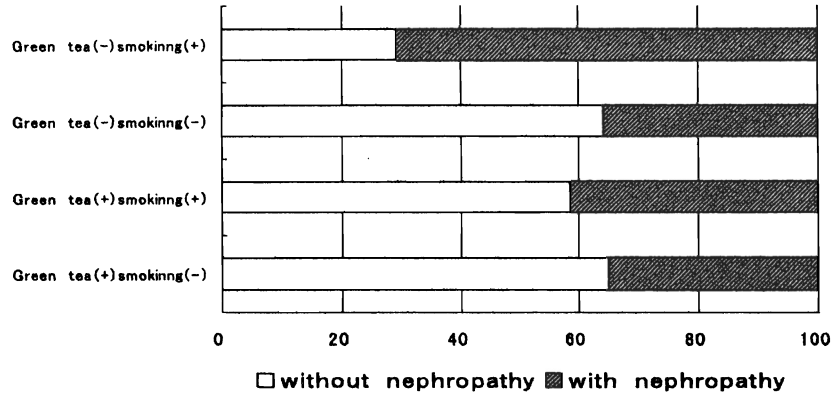
	Odds ratio	95%CI	p value
Duration of diabetes	1.348	1.005-1.808	0.0465
HbA1c	1.484	1.035-2.127	0.0316
Treatment	1.023	0.715-1.463	0.9022
Green tea	0.556	0.311-0.995	0.0479
Smoking	2.226	1.366-3.628	0.0013
Hypertension	2.449	1.555-3.857	0.0001

(5) The effects of green tea and smoking on diabetic nephropathy showed that the green tea group(smoking or no-smoking) and the no-intake of green tea + no-smoking groups showed significantly fewer diabetic nephropathy.
The no-intake of green tea and smoking group showed significantly higher incidents of diabetic nephropathy(Table 5,Fg 3).

Table 5
The influence of green tea and smoking on diabetic nephropathy

	green tea(-)smokinng(+)	green tea(-)smokinng(-)	green tea(+)smokinng(+)	green tea(+)smokinng(-)
without nephropathy	7 (29.2%)	27 (64.3%)	52 (58.4%)	156 (65%)
with nephropathy	17 (70.8%)	15 (35.7%)	37 (41.6%)	84 (35%)
total	24	42	89	240

Fisher's exact test $p<0.05$



Fg 3

Conclusion

After examination of consumption of green tea by diabetic patients, those who consumed green tea had fewer complications of diabetic nephropathy.
These findings suggested that the custom of consuming green tea prevented the progress of diabetic nephropathy.