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## Association between tongue coating thickness and clinical characteristics among idiopathic membranous nephropathy patients

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### ABSTRACT

**Ethnopharmacological relevance:** Tongue coating diagnosis is a useful tool to examine the changes of a human body in Chinese Medicine. Tongue coating varies in thickness in kidney disease. However, little information exists regarding the association between clinical characters and tongue coating thickness in CKD patients.

**Aim of the study:** This study was carried out to determine whether there is an association between tongue coating thickness and laboratory, histological variables in idiopathic membranous nephropathy patients: one group with thin tongue coating, the other with thick tongue coating.

**Materials and methods:** During July 2012–March 2014, idiopathic membranous nephropathy patients (CKD 1–2 stage) with tongue coating thickness Score  $\leq 7$ , or  $\geq 11$ , were enrolled as thin tongue coating group or thick tongue coating group, from Hangzhou Hospital of TCM. Laboratory variables (Hemoglobin (Hb), albumin (Alb); eGFR; alanine transferase (ALT); aspartate aminotransferase (AST); triglyceride (TG); total cholesterol (TC); high density lipoprotein (HDL); low density lipoprotein (LDL); immunoglobulin A, G, M; Complement 3, 4) and renal histological data (glomerular lesions; tubular-interstitial damage) were compared, between these two groups.

**Results:** 12 idiopathic MN patients (CKD 1–2 stage) with thin tongue coating (tongue coating thickness score  $\leq 7$ ) and 11 with thick tongue coating (tongue coating thickness score  $\geq 11$ ) were enrolled in our study. We found a significant lower level of TC and LDL, a significant lower level of AST, ALT in those thick tongue coating patients, compared with thin. No significant difference was observed in pathological lesion between thick and thin tongue coating patients.

**Conclusion:** Tongue coating thickness is associated with lipid metabolism in idiopathic MN patients (CKD 1–2 stages).

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### 1. Introduction

Tongue coating diagnosis is a useful tool to examine the physiologic function or pathologic changes of the human body in Chinese Medicine (Anastasi et al., 2009). The tongue coating, fur-like substances covering the surface of the tongue, is a very sensitive index that reflects the physiological and pathological status of the viscera, and the severity of the disease (Shi et al., 2008; Kim et al., 2012). Tongue coating varies in thickness in kidney disease (Xu et al., 2006; Ding et al., 1994).

Relatively little information exists regarding the association between clinical characters and tongue coating thickness in kidney diseases. Some studies (Xu et al., 2006; Ding et al., 1994; Ma et al., 2008) indicated that compared with patients with better renal function, chronic kidney disease (CKD) patients whose renal function decreased, were in higher prevalence of thick tongue coating. Our previous study (Lin et al., 2014) showed that CKD (1–3 stage) patients with greasy tongue coating were higher in serum high density lipoprotein (HDL) level than thin. However, that study found no difference in estimated glomerular filtration rates between these two groups. The literature appears to contain little, if anything, on association of clinical characters and tongue coating thickness in CKD patients.

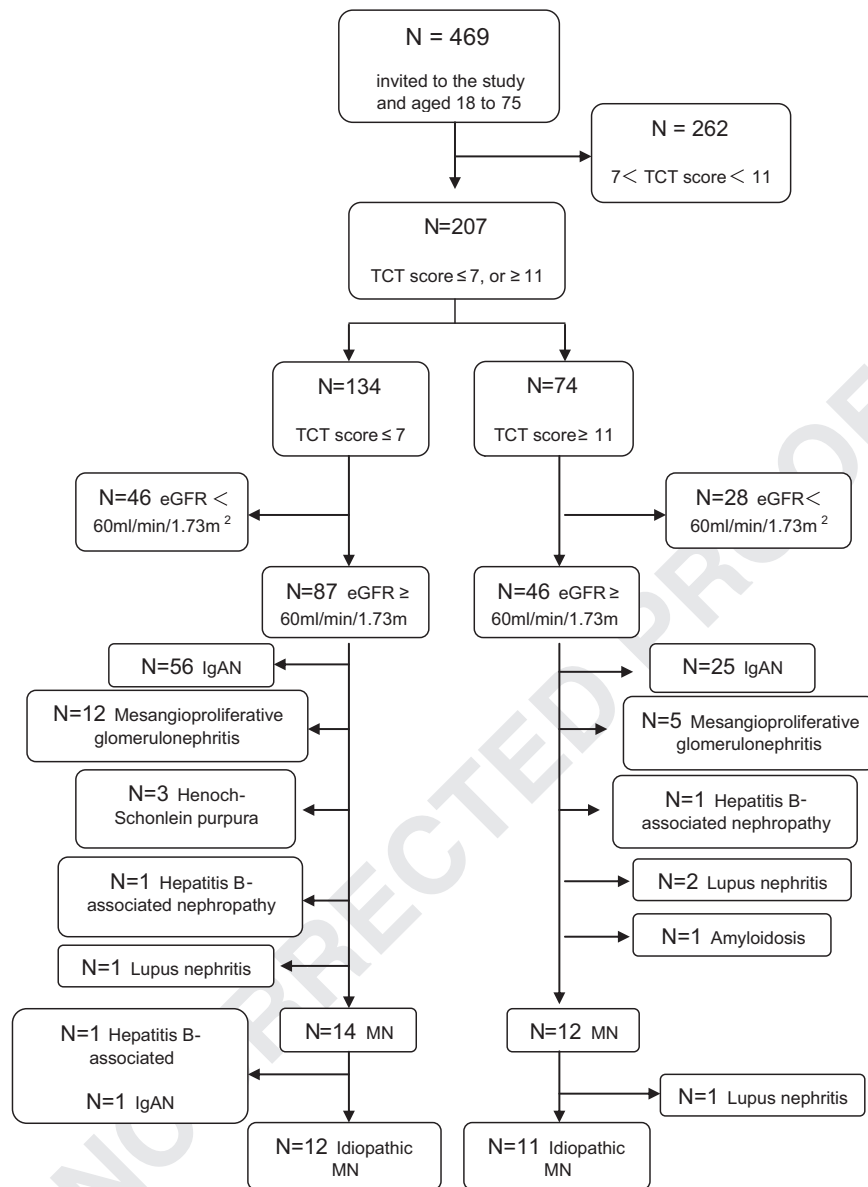
To help address these gaps, we compared laboratory and histological variables in idiopathic membranous nephropathy patients

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**Fig. 1.** Patients with tongue picture taken, included, and excluded in analysis. Abbreviation: TCT, Tongue Coating Thickness; eGFR, Estimated glomerular filtration rate; IgAN, Immunoglobulin A nephropathy; and MN, Membranous nephropathy.

(CKD 1–2 stages): one group with thin tongue coating, the other with thick tongue coating.

## 2. Results

### 2.1. Characteristics of the entire cohort

Of 469 patients invited, 207 (with tongue coating thickness score  $\leq 7$ , or  $\geq 11$ ) were approached for the study. 74 patients with eGFR  $< 60$  ml/min/1.73 m<sup>2</sup>, 81 diagnosed as IgA nephropathy, 17 mesangioproliferative glomerulonephritis, 3 Henoch-Schonlein purpura, 2 Hepatitis B-associated nephropathy, 3 lupus nephritis, 1 amyloidosis, were excluded (Fig. 1). After 2 MN patients (1 with Hepatitis B-associated, 1 with IgAN) with thin tongue coating and 1 patient (with Lupus nephritis) with thick excluded, 23 idiopathic MN patients were enrolled in this study (Fig. 1). Mean age in the 23 participants was  $54.65 \pm 11.23$  years. More than half patients were women, and all were typical ethnic groups of China with no introduced ethnic groups. About one-half

were evaluated as thick tongue coating (tongue coating thickness score  $\geq 11$ ). Prevalences of hypertension, hepatitis, diabetes mellitus and gastroenteritis were 43.48%, 13.04%, 8.70%, and 4.35%, respectively. Mean hemoglobin(Hb), uric acid (UA), and estimated glomerular filtration rate (eGFR) are all listed in Table 1.

### 2.2. Comparison of the cohort based on thick or thin tongue coating

Participants with thick tongue coating were half less likely to be employed as those thin tongue coating. 83.3% thin tongue coating participants were older than 50 years, while 72.7% in thick. Hypertension was prevalent in participants, but no significant difference seen between two groups. Only 1 Diabetes mellitus (DM), 2 hepatitis among thick or thin tongue coating participants respectively. There was a nonsignificant trend toward a greater proportion of participants with thick tongue coating (versus thin tongue coating) having nephritic syndrome (25% versus 45%,  $P=0.28$ ) or hematuria (33% versus 55%,  $P=0.27$ ) (Table 2).

Table 3 lists laboratory values, and there was a trend toward a lower aspartate aminotransferase (AST), alanine transferase (ALT),

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