Comparison between Tongue Appearance and Gastroendoscopic Stomach Findings in 223 Cases

ISHIZAKI Naoto*, YAMAMURA Yoshiharu**, KIYOFUJI Shouhei*, EGAWA Masato*, NAKAGAWA Shuji**, HONGO Hitoshi**, MATSUMOTO Kiyoshi**, SHIMOO Kazutoshi**, NAMURA Kenji**, and KAJIYAMA Shizuo**

*Department of Oriental Medicine, Meiji College of Oriental Medicine
**Department of Internal Medicine, Meiji College of Oriental Medicine

Summary: To investigate whether tongue appearance has any relationship with gastric diseases, we compared photographic tongue appearance with gastroendoscopic findings in the stomach of 223 patients. The tongue surface was evaluated for thickness and color of the tongue coating, presence of tongue fissures, tongue color, and the presence of tongue swelling. Coating thickness was evaluated in small sections of nine areas of the tongue. The percentage of patients exhibiting thick coating of the lateral sections of the tongue was significantly greater in those who had gastric ulcer, as compared with those with no gastric ulcer. The differences became more significant between the patients with and without gastric ulcer when this relationship was further evaluated in terms of the presence of digestive symptoms in the patients. These results suggest that the inspection of tongue mucosa may become a useful physical examination for gastric diseases.

Key Words : tongue appearance, gastroendoscopic stomach findings, digestive symptoms

INTRODUCTION

In traditional chinese medicine, tongue inspection is a useful method for the diagnosis of various kinds of disease because it changes widely according to physical conditions in the patient[1]. However, it has not been clearly demonstrated whether tongue appearance is related with gastroendoscopic findings. In 1982, Tosa et al[2]. observed that thickness and color of the tongue coating had a specific relationship with some gastrointestinal diseases, such as superficial gastritis and erosive gastritis, in a comparison between tongue findings and gastroendoscopic findings. Since that report, several workers have shown similar results concerning this relationship[3, 4, 5, 6]. However, the relationship between tongue findings and gastric ulcer diagnosed by gastroendoscopy has not been satisfactorily investigated, and the distribution of the tongue coating has not yet been studied in these previous studies.

In the present study, the association between detailed tongue findings and stomach disease detected by gastroendoscopy is examined.

PATIENTS & METHODS

Patients

From May, 1988, to April, 1990, we studied 223 patients (132 males and 91 females; mean age 51.1 years, range 13−87 years) who underwent gastroendoscopic examinations after tongue inspection at the Hospital of Meiji College of Oriental Medicine. The tongues of those patients were observed and photographed just before the pretreatment of gastroendoscopic examination. For gastroendoscopic examination, gastroendoscope, GIF TYPE V10 (OLYMPUS®) or GIF TYPE Q20 (OLYMPUS®) was used. After the examination, we investigated the relationship between tongue mucosal findings and gastric mucosal lesions through comparison of tongue findings with gastroendoscopic findings. Tongue appearances were analyzed and evaluated as follows.

Classification of tongue appearance

Thickness of tongue coating. Coating thickness was classified into four groups as: no coating (−); thin coating through which the tongue color could be seen (+); thick coating completely covering the tongue (3+); coating of intermediate thickness (2+). We estimated the coating as thin when the evaluation was (−) or (+), and as thick when the evaluation was (2+) or (3+). This evaluation was performed on each section on the tongue which had been divided into 9 sections for the purpose of studying the distribution of the coating. Fig. 1 shows the 9 sections (A to I) of the tongue divided into equal parts distal from the vallate papilla.

Tongue fissures. Tongue fissures were classified into four types as follows: no fissure (0); shallow fissure in the center of the tongue (1); deep fissure in the center of the tongue (2); severe fissuring which was branched and widespread over the tongue (3).

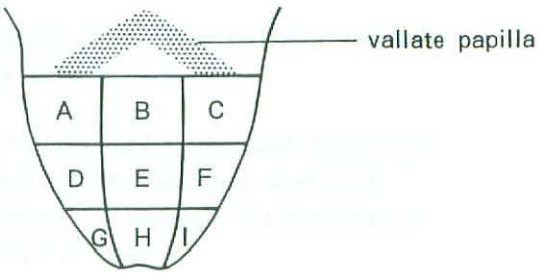

Fig. 1 TONGUE IN 9 SECTIONS

The tongue in all patients was divided into three equal parts both crosswise and lengthwise (9 sections) distal from the vallate papilla.

Color of tongue coating. Coating color of the tongue was classified into three colors as white, yellow, and brown.

Color of tongue. Tongue color was classified into four colors as pink, red, anemic, and cyanotic.

Swelling of tongue. The presence of tongue swelling was estimated by existence of tooth-marks at the edge of the tongue. The tongues with tooth impressions at the edge were classified as swollen (swelling +), while those without tooth-marks were classified as not swollen (swelling −)[7].

Several examples of tongue evaluated by the criteria described above are illustrated in Fig. 2.

Digestive symptoms

Furthermore, in 173 of the total subjects, we examined the relationship between tongue mucosal findings and gastric mucosal lesions in terms of the presence of digestive symptoms, including epigastralgia, abdominal pain, nausea, vomiting, abdominal fullness, hematemesis, melena, and anorexia.

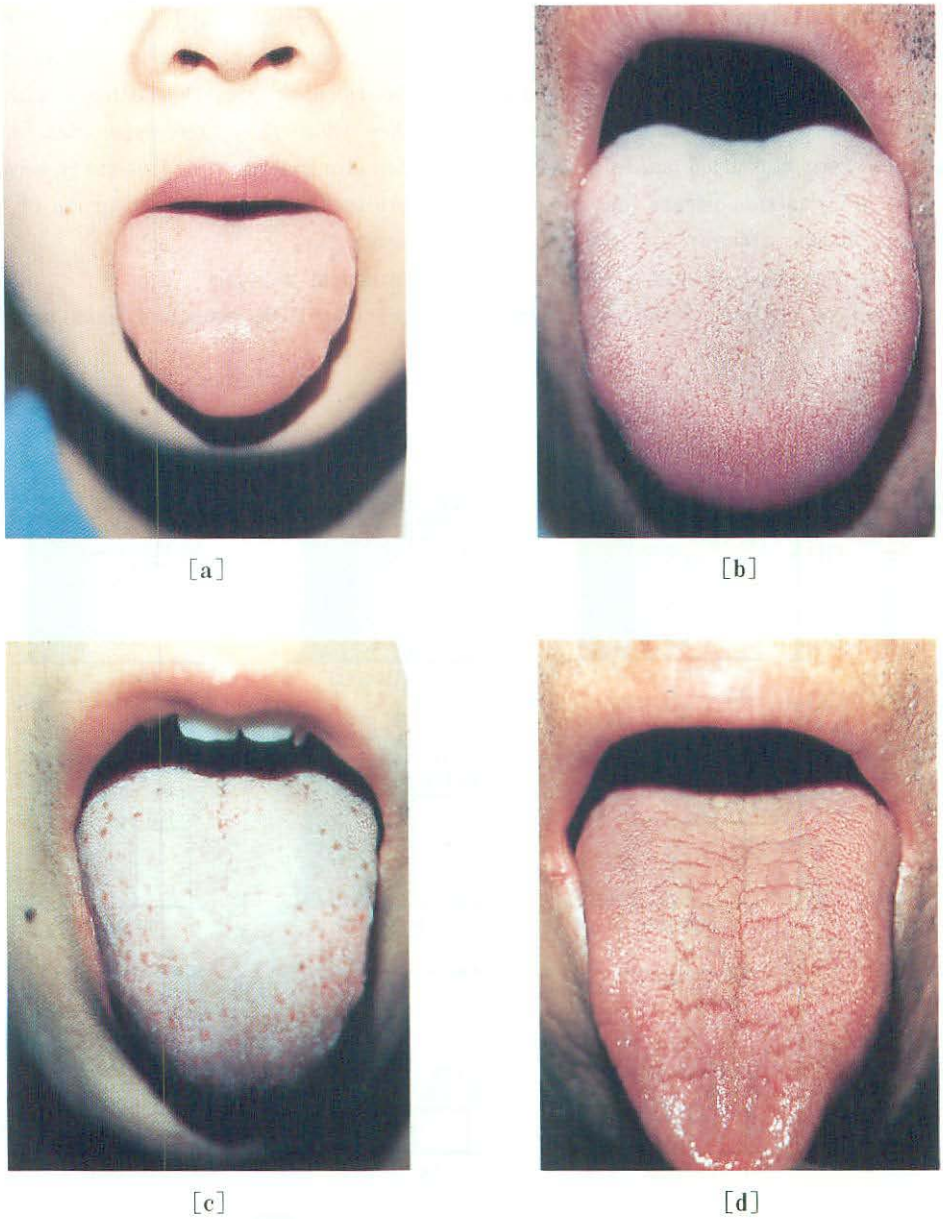

Fig. 2 EXAMPLES OF TONGUE EVALUATION

These tongues were evaluated as follows.

[a] coating thickness: section A(+), B(+), C(+), D(+), E(+), F(+), G(+), H(+), I(+). coating color: white. tongue fissure:(0). tongue color: anemic. swelling:(+). [b] coating thickness: section A(3+), B(3+), C(3+), D(2+), E(2+), F(2+), G(+), H(+), I(+). coating color: white. tongue fissure:(0). tongue color: red. swelling:(−). [c] coating thickness: section A(3+), B(3+), C(3+), D(3+), E(3+), F(3+), G(2+), H(2+), I(2+). coating color: white. tongue fissure:(1). tongue color: pink. swelling:(−). [d] coating thickness: section A(+), B(2+), C(+), D(+), E(2+), F(+), G(+), H(+), I(+). coating color: yellow. tongue fissure:(3). tongue color: red. swelling:(−).

Classification of gastroendoscopic findings of the stomach

All patients were also classified according to the differences in gastric mucosal lesions. The patients were classified as follows: patients with no gastric disease except mild redness and slight atrophy of the gastric mucosa (control group); patients with some erosions or severe redness of the gastric mucosa (gastritis group); patients with gastric ulcer diagnosed as either active or healing (gastric ulcer group). Patients with diseases other than the three types described above were eliminated from this study because there were so few cases in each group of the same disease type.

Statistical analysis

Results were expressed as a percentage of

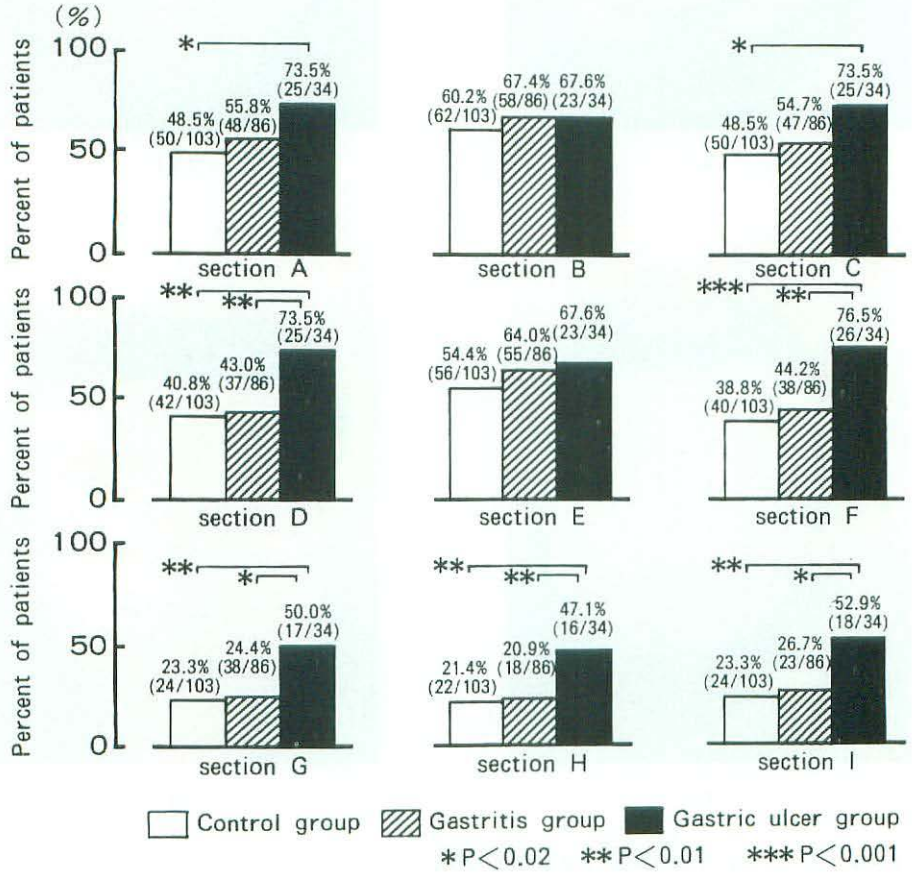

Fig. 3 PERCENT OF PATIENTS WITH THICK COATING IN THE THREE GROUPS BY TONGUE SECTION

The ratio of patients with thick tongue coating was significantly higher in the gastric ulcer group than in control group in tongue sections A, C, D, F, G, H and I; and than the gastritis group in tongue sections D, F, G, H and I.

the patients classified by tongue findings in each group. Differences between the three groups were evaluated by means of χ^2 test and were considered significant if p was less than 0.05.

RESULTS

Fig. 3 shows the percentage of patients with thick coating (evaluated as [2+] or [3+] by our criteria described above) at each tongue section in the three groups according to gastroendoscopic findings. The percentage with thick coating in the gastric ulcer group was significantly higher than that in the control group in tongue sections A, C, D, F, G, H and I, and than that in the gastritis group in tongue sections D, F, G, H and I. On the other hand, the percentage with thin

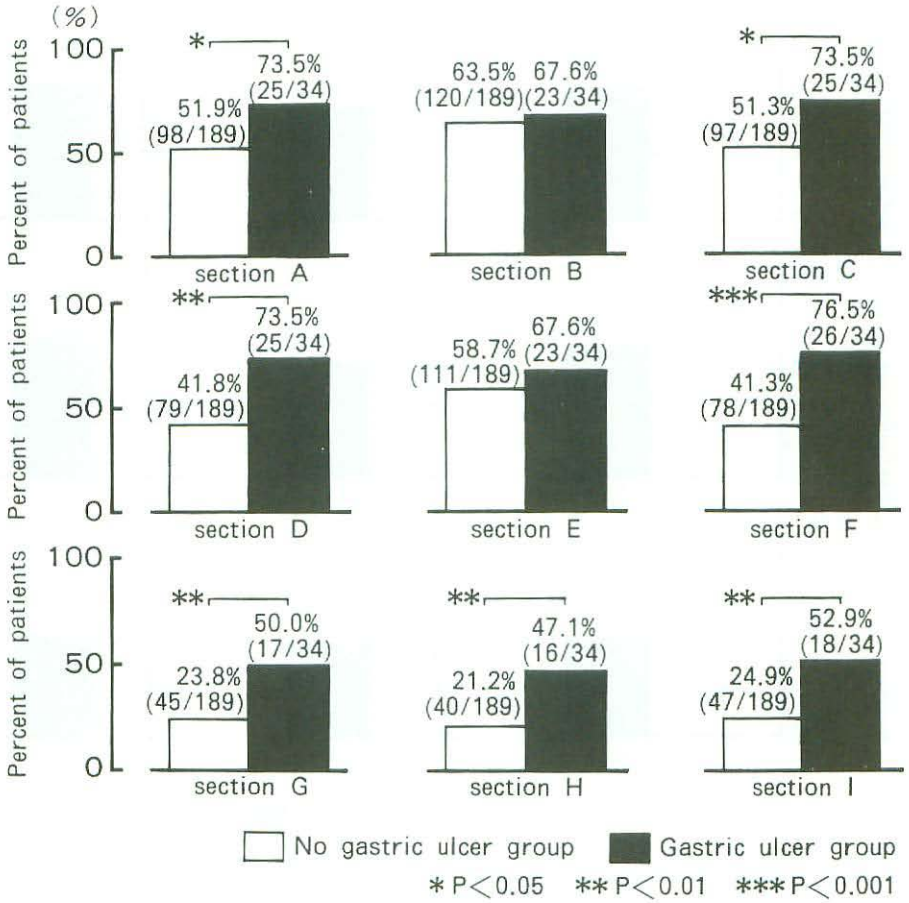

Fig. 4 PERCENT OF PATIENTS WITH THICK TONGUE COATING IN THE PRESENCE AND ABSENCE OF GASTRIC ULCER BY TONGUE SECTION

A significantly higher percentage was observed in the gastric ulcer group in comparison with the other patients(combined group of controls and gastritis patients).

coating (evaluated as [+]) in control group and gastritis group was higher than that in the gastric ulcer group, and there were so few cases of no coating in each group (Table I). A similar result was obtained in comparison between the gastric ulcer group and all others (combined controls and gastritis patients) (Fig. 4). A similar significant difference between the two groups (gastric ulcer group and no gastric ulcer group) was observed when the presence of digestive symptoms were considered along with tongue findings in this study.

Table II shows the symptoms of all patients. The percentage of patients with both any symptoms and thick coating was significantly higher in the gastric ulcer group than in the group without a gastric ulcer (Fig. 5).

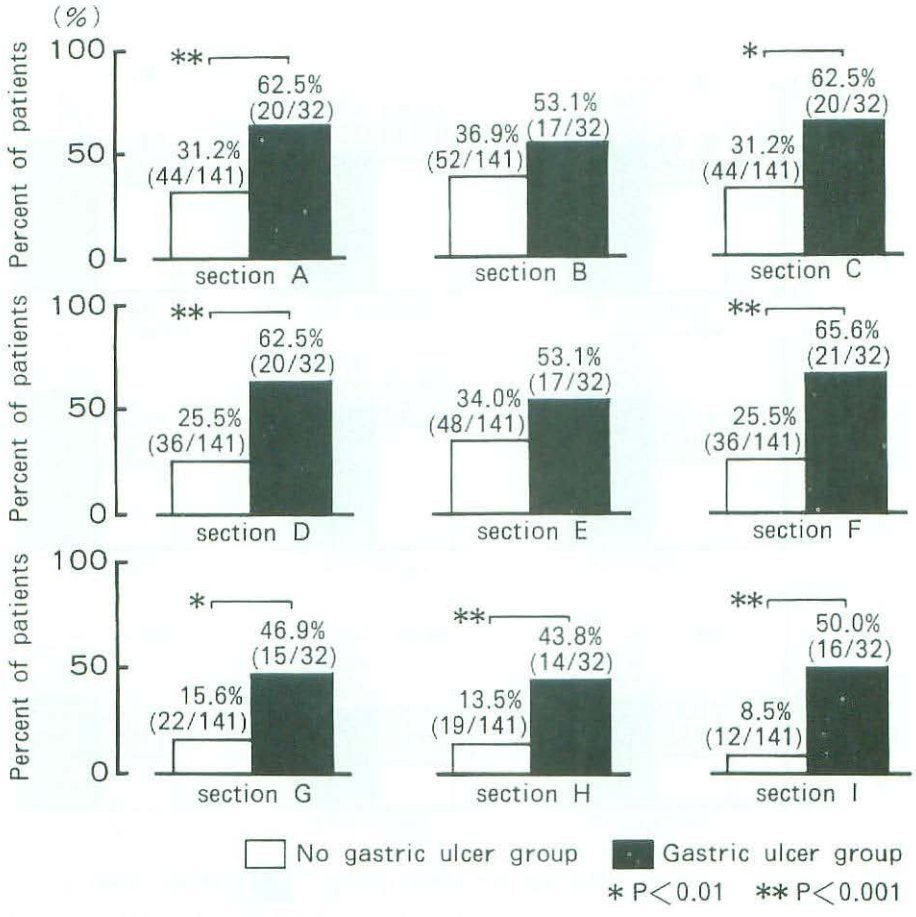

Fig. 5 PERCENT OF PATIENTS WITH BOTH SYMPTOMS AND THICK TONGUE COATING IN EACH TONGUE SECTION IN THE PRESENCE AND ABSENCE OF GASTRIC ULCER

A significantly higher percentage was observed in the gastric ulcer group than in patients with no gastric ulcer in tongue sections A, C, D, F, G, H and I.

TEBLE I -COATING THICKNESS OF THE PATIENTS IN EACH GROUP

	Coating Thickness	section A	section B	section C	section D	section E	section F	section G	section H	section I
		* **								
Control group (n = 103)	+	53 (51.5)	39 (37.9)	53 (51.5)	61 (59.2)	45 (43.7)	63 (61.2)	77 (74.8)	79 (76.7)	77 (74.0)
	−	0 (0)	2 (1.9)	0 (0)	0 (0)	2 (1.9)	0 (0)	2 (1.9)	2 (1.9)	2 (1.9)
Gastritis group (n = 86)	+	36 (41.9)	26 (30.2)	37 (43.0)	47 (54.7)	29 (33.7)	46 (53.5)	60 (69.8)	64 (74.4)	58 (67.5)
	−	2 (2.3)	2 (2.3)	2 (2.3)	2 (2.3)	2 (2.3)	2 (2.3)	5 (5.8)	4 (4.7)	5 (5.8)
Gastric ulcer group (n = 34)	+	9 (26.5)	9 (26.5)	9 (26.5)	9 (26.5)	9 (26.5)	8 (23.5)	16 (47.1)	16 (47.1)	16 (47.0)
	−	0 (0)	2 (5.9)	0 (0)	0 (0)	2 (5.9)	0 (0)	1 (2.9)	2 (5.9)	0 (0)

* Number of case

** %

TABLE II -PATIENT SYMPTOMS IN EACH GROUP

Symptom	Control group (n=78)	Gastritis group (n=63)	Gastric ulcer group (n=32)
Epigastralgia	29 (37.1%)	27 (42.9%)	19 (59.4%)
Abdominal pain	6 (7.7%)	1 (1.6%)	1 (3.1%)
Nausea	15 (19.2%)	6 (9.5%)	5 (15.6%)
Vomiting	7 (9.0%)	2 (3.2%)	1 (3.1%)
Abdominal fullness	8 (10.3%)	8 (12.7%)	2 (6.2%)
Hematemesis	———	1 (1.6%)	———
Melena	———	———	2 (6.3%)
Anorexia	8 (10.3%)	9 (14.3%)	3 (9.4%)

TABLE III -COMPARISON OF COATING COLOR IN THE THREE GROUPS

Coating color	Control group (n=103)	Gastritis group (n=86)	Gastric ulcer group (n=34)
White	63 (61.2%)	40 (46.5%)	21 (61.8%)
Yellow	40 (38.8%)	45 (52.3%)	13 (38.2%)
Brown	———	1 (1.2%)	———

The comparison of coating color in the three groups is shown in table III. There was a tendency for the percentage of patients with yellow tongue coating to be higher in the gastritis group (45/86 [52.3%]) than in the other two groups (40/103 [38.8%] in control group and 13/34 [38.2%] in gastric ulcer group), although these differences were not significant.

There were no statistically significant differences in tongue color, presence of tongue

TABLE IV -COMPARISON OF TONGUE FISSURES IN THE THREE GROUPS

Type of tongue fissure	Control group (n=103)	Gastritis group (n=86)	Gastric ulcer group (n=34)
Type 0	45 (43.7%)	26 (30.2%)	8 (23.5%)
Type 1	33 (32.0%)	32 (37.2%)	12 (35.3%)
Type 2	11 (10.7%)	12 (14.0%)	5 (14.7%)
Type 3	14 (13.6%)	16 (18.6%)	9 (26.5%)

TABLE V—COMPARISON OF TONGUE COLOR IN THE THREE GROUPS

Tongue color	Control group (n=103)	Gastritis group (n=86)	Gastric ulcer group (n=34)
Red	19 (18.4%)	13 (15.1%)	6 (17.6%)
Pink	59 (57.3%)	53 (61.6%)	22 (64.7%)
Anemic	20 (19.4%)	13 (15.1%)	4 (11.8%)
Cyanotic	5 (4.9%)	7 (8.2%)	2 (5.9%)

TABLE VI—COMPARISON OF TONGUE SWELLING IN THE THREE GROUPS

Tongue swelling	Control group (n=103)	Gastritis group (n=86)	Gastric ulcer group (n=34)
Present	8 (7.8%)	9 (10.5%)	———
Absent	95 (92.2%)	77 (89.5%)	34 (100%)

fissures, or tongue swelling between the three groups (Tables IV—VI).

DISCUSSION

The percentage of patients who had thick coating on the bilateral sides of the tongue was significantly higher in gastric ulcer patients than in other patients. This result is not consistent with the previous study by Tosa[6], who found that there was no relation between tongue coating thickness and gastric ulcer. This inconsistency may be due to differences in methods of evaluating coating thickness. In the previous study, Tosa evaluated the aggregate coating thickness in three sections of tongue (tongue root, apex, and central portion). However, we evaluated the coating thickness in each of 9 sections of the tongue to investigate the distribution of the thick coating. This result raises the possibility that the distribution of the thick tongue coating could became an important factor in anticipating the presence of a gastric ulcer. Tongue coating is generally known as filiform papillae of the tongue[8], and has been linked with smoking, respiratory diseases, fever, and oral infection[9]. Yamagata et al.[10] reported that changes in tongue coating were related to smoking, drinking, sleep, defecation, and fever. Tosa et al.[11] also reported on the relationship between coating thickness and various human physical conditions, while some of these physical conditions, such as smoking and respiratory diseases, have been reported to be related to formation of peptic ulcer[12,13,14]. There may therefore be a common etiological factor between formation of gastric ulcer and changes in tongue coating thickness. For confirmation of this suggestion, it may be necessary to investigate whether the patients with both gastric ulcer and thick tongue coating have these factors. The difference between the gastric ulcer group and the other patients became more significant when the presence of symptoms was added to the evaluation of tongue coating thickness. Digestive symptoms reported by patients are useful in the diagnosis of peptic disease, although these symptoms do not always reflect the presence of organic disorders in gastrointestinal disease[15]. In spite of rapid progress in gastrointestinal tract diagnostic methods[16,17], there are many patients who have not been examined by gastro-

endoscopy or radiography, although they have gastrointestinal disease. Therefore, the combined use of tongue inspection and digestive symptoms may be useful in the decision to undergo gastrointestinal examination.

In the comparison of coating color, there was a tendency for the percentage of patients with yellow coating to be higher in the gastritis group than in the other patients. This difference was not significant, but this result is similar to that found in the previous studies by Tosa[6] and Takahasi[5]. Therefore, yellow tongue coating may be related to the presence of gastritis. There was no relationship between tongue color, tongue fissure, and tongue swelling between the three groups. It is possible that these factors may become useful signs of gastrointestinal disease in combination with two or more factors. It is also possible that the relationship between tongue appearance and gastric ulceration may became more clear in combination with other traditional chinese medicine examinations, such as pulse reading or palpation of abdomen.

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舌所見と胃内視鏡所見との比較検討

*明治鍼灸大学東洋医学教室　**明治鍼灸大学内科学教室

石崎　直人*　山村　義治**　清藤　昌平*　江川　雅人*
中川　修史**　本郷　仁**　松本　圭**　下尾　和敏**
苗村　健治**　梶山　静夫**

要旨：東洋医学において舌診法は患者の状態を把握する上で重要な診断法の一つである．この舌診法と，現代医学的に診断された器質的な疾患との関連性について，1982年に土佐らは，舌苔の厚さ及び舌苔の色調と，胃びらんとの関係を示唆し，その後，高橋ら，あるいは殷らにより，同様の関連性が報告された．しかし，胃潰瘍の有無と舌所見との関連性についてはいまだはっきりした関連性は見出されていない．今回，我々は，舌所見と胃内視鏡所見との関連性について，特に舌苔について舌を9区分し，各部位で舌苔の厚さと特定の胃疾患の有無について検討した結果，胃潰瘍を有する患者群では，他の患者群と比較して，舌の辺縁部における舌苔が厚い症例が有意に多かった．また，舌苔の厚さと，患者の自覚症状の有無とを併せて検討したところ，厚苔で，しかも何らかの消化器症状を有する患者の割合を比較した場合，胃潰瘍群と他の患者群との相違がより顕著にみとめられた．また，舌苔の色調では，びらん性胃炎を有する患者群に黄色の舌苔を有する者が多い傾向がみられた．その他，舌質の色調，舌の裂紋，舌の腫大には，各疾患群で有意な差はみられなかった．今回の結果から，舌診法は胃疾患の有用な補助的診断法となり得ると考えられた．

キーワード：舌所見，胃内視鏡所見，消化器症状