

The Status and Prospective Study of Tongue Diagnostic in Traditional Chinese Medicine

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Abstract

The diagnostic method of Traditional Chinese medicine (TCM) consists of inspection, smelling, listening, inquiry, pulse taking and palpation. Among these, tongue diagnosis from the TCM inspection diagnosis has become one of the most important elements especially during the COVID-19 pandemic period, where TCM physicians diagnose based on tongue inspection through online consultation. This is a preliminary study and objective of this research is to review on the changes of the tongue condition correspondence with the five visceral organs disease and analyse about the tongue diagnosis for enhancing the ability of physicians to differentiate the tongue images effectively. The research data were collected by searching the keywords in China National Knowledge Infrastructure (CNKI) and PubMed from year 2000 to 2021. By choosing the journal articles that analysed tongue diagnosis only in diagnosing the diseases and excluding articles that analysed with the pulse taking or other diagnostic methods. The results showed that different stages of disease are having different manifestation of tongue condition, which reflected with the changes of the pathogenic factor in visceral organs. In conclusion, through the guidance of TCM tongue diagnosis method with the assists of digital technology, it will be performing a huge database to establish a more comprehensive tongue diagnosis theory and unified the diagnostic criteria in a more objective view.

Keywords

Tongue diagnosis, Four diagnosis methods, hepatocirrhosis, gastritis

Introduction

Traditional Chinese medicine (TCM) belongs to the study of human physiology, pathology and pharmacology as well as introducing its relationship with the natural environment. The basic feature of Traditional Chinese medicine is the syndrome differentiation, which included the techniques of inspection, smelling and listening, consultation as well as pulse taking (Sihan, et al., 2020). Through this method, a proper diagnosis will be given based on the guidance of the fundamental theory of TCM (Sihan, et al., 2020).

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However, as the time passes by, some modern physicians have gradually derived their attention to one of the four diagnosis methods to diagnose diseases. For example, some physicians will only be focusing on tongue diagnosis for syndrome differentiation and treatment. This is because traditional Chinese physicians are aware that the theory of external appearances of the body will be changed if the patient is having pathological disease inside the body (Linli, Jingmin, & Qinghua, 2019). Therefore, it can be seen that this theory is somehow related to the theory of “inspecting the exterior to understand the interior” in the TCM tongue diagnosis. In this case, tongue diagnosis can be known as one of the important diagnostic methods to understand the physiological functions and pathological changes of the body by observing the changes of the tongue even in recent days (Yu, et al., 2020). The objective of this research is to review on relationship between the changes of the tongue condition with the five visceral organs disease and analyse about the tongue diagnosis for enhancing the ability of physicians to differentiate the tongue images effectively.

Methodology

This study was done by studying on ancient TCM classical literature books, National TCM Textbooks for College and Universities such as “Yellow Emperor Classics” and “Diagnostics in Chinese Medicine (International Standard)”.

The research data were also collected from multiple online databases by searching the keywords in China National Knowledge Infrastructure (CNKI) and PubMed from year 2000 to 2021. The inclusion criteria is choosing the journal articles that published about the information of tongue diagnosis only in diagnosing the diseases. Meanwhile the exclusion criteria is excluding articles that combine with the pulse taking or other diagnostic methods.

This research process was first started with collecting and studying the research journals, which was mainly targeting in the information of traditional tongue diagnosis. Besides, the selection process of journal was mainly based on the information about the relationship between the changes of the tongue condition with the five visceral organs disease such as hepatocirrhosis and gastritis were being focused on the research process.

Table 1. Caption for the table

Table	Caption
2	Result of analysis on tongue condition in 51 patients with hepatocirrhosis
3	Relationship between tongue coating and types of gastritis in 178 patients
4	Relationship between tongue colour and types of gastritis in 178 patients

Results and discussion

TCM physicians are often using tongue diagnosis to identify the diseases, which originated from the five visceral organs. This will be providing an accurate diagnosis in the disease and accurate treatment and prescriptions can be given to the patients.

For instance, liver disease such as cirrhosis, is known a common chronic liver disease caused by long-term or repeated damage to the liver parenchyma. It is mainly manifested as declining of liver function as well as having serious complications such as liver cancer and ascites that will seriously threaten human health (Schuppan & Afdhal, 2008).

Table 2. Result of analysis on tongue condition in 51 patients with hepatocirrhosis

Tongue Condition	Pale red tongue with light white coating	Pale tongue with white greasy coating	Red tongue with light white coating	Red tongue with light yellow coating	Dull red tongue with light coating	Purple tongue with light coating	Red tongue with less coating	Crimson tongue with less coating
Cirrrosis patient with ascites (22 cases)	1 (5%)	-	2 (9%)	1 (5%)	1 (5%)	-	6 (26%)	11 (50%)
Cirrrosis patient without ascites (29 cases)	1 (3.5%)	2 (7%)	3 (10%)	3 (10%)	10 (35%)	7 (24%)	1 (3.5%)	2 (7%)
Total: 51 cases	2 (4%)	2 (4%)	5 (10%)	4 (8%)	11 (21%)	7 (14%)	7 (14%)	13 (25%)

(Lifang, Fengzhen, & Junfu, 2008)

Ascites syndrome is developed on the basis of liver cirrhosis due to the severity of the disease. According to the Table 2, the tongue colour is showing a different change between the hepatocirrhosis patients accompanied with ascites and hepatocirrhosis patients without ascites. 50% of hepatocirrhosis patients accompanied with ascites are mostly having crimson colour of tongue body. Meanwhile, 35% of hepatocirrhosis patients without ascites are having dull red tongue with thin coating in majority. (Lifang, Fengzhen, & Junfu, 2008)

Liver disease such as liver cirrhosis is belonged to the category of “accumulation” in TCM. The function of the Liver in Chinese Medicine perspective is storing the blood and controlling the tendons (Huaiping, 1998). Based on Table 1, it can be seen that majority cirrhosis patients accompanied with ascites are having crimson red dark with less coating, followed by dark red tongue. Meanwhile, the cirrhosis patients without ascites are mainly having dark red tongue with thin coating.

It was believed that the formation of ascites is mainly due to the dysfunction in the liver, spleen, kidney in the theory of TCM which causing accumulation of qi, blood and body fluid inside the abdominal region. The accumulation of water failed to be transformed and transported by the spleen, and thus leading to the transforming of fluid into fire and scorching the yin fluid essence (Lifang, Fengzhen, & Junfu, 2008). As a result, this causes deficiency of the liver and kidney’s yin element, thus leading to insufficiency of yin essence to nourish the tongue body and eventually, resulting in the cirrhosis patients to have crimson red tongue with less coating as shown in the Table 2. Overall, the liver disease such as cirrhosis are having a close relationship with the changes of the tongue. Therefore, by observing the manifestations of tongue condition will be able to provide a certain basis for physicians to identify the condition of patients.

In addition, another example of Spleen and stomach disease such as chronic gastritis is one of the most common life-long, serious and insidious illnesses in human beings. Chronic gastritis is a long-term condition in which the mucus lined layer of the stomach, also known as the gastric mucosa, is inflamed or irritated over a longer period of time (Sipponen, Maaros, & H.-I, 2015). On that account, tongue is also closely related to the spleen in TCM as the manifestation of the tongue can determine the condition of the spleen.

Table. 3 Relationship between tongue coating and types of gastritis in 178 patients

Tongue Type	Tongue Coating							
	Light white	Light yellow	Thick white	Thick yellow	White greasy	Yellow greasy	Less coating	Without coating
Superficial gastritis (102 cases)	35 34.3%	23 22.5%	8 7.8%	2 2.0%	26 25.5%	5 4.9%	2 2.0%	1 1.0%
Atrophic gastritis (45 cases)	2 4.4%	3 6.7%	1 2.2%	1 2.2%	2 4.4%	1 2.2%	25 55.6%	10 22.3%
Reflux gastritis (31 cases)	1 3.2%	1 3.2%	9 29%	6 19.4%	4 12.9%	10 32.3%	0 0%	0 0%
Total: 178 cases	38 21%	27 15%	18 10%	9 5%	32 18%	16 9%	27 15%	11 7%

(Yaqin & Xizhi, 2003)

Based on Table 3, atrophic gastritis patients are divided into three types of gastritis such as superficial gastritis, atrophic gastritis and reflux gastritis. Superficial gastritis patients are mostly having light white tongue coating with the percentage of 34.3%. Atrophic gastritis patients are having less tongue coating with 55.6% in majority. Meanwhile, reflux gastritis patients are mostly having yellow greasy tongue coating with 32.3%.

Table. 4: Relationship between tongue colour and types of gastritis in 178 patients

Tongue Type	Tongue Colour				
	Light white	Light red	Red	Dark red	Purple
Superficial gastritis (102 cases)	31 (30.4%)	46 (45.1%)	15 (14.7%)	7 (6.9%)	3 (2.9%)
Atrophic gastritis (45 cases)	2 (4.4%)	3 (6.7%)	18 (40%)	16 (35.6%)	6 (13.3%)
Reflux gastritis (31 cases)	3 (9.7%)	3 (9.7%)	6 (19.4%)	11 (35.5%)	8 (25.7%)
Total: 178 cases	36 (20%)	52 (29%)	39 (22%)	34 (19%)	17 (10%)

(Yaqin & Xizhi, 2003)

According to the Table 4, superficial gastritis patients are mostly having light red tongue colour with 45.1%. Meanwhile, atrophic gastritis patients are having red tongue colour with 40% in majority and reflux gastritis patients are mostly having dark red tongue colour.

In this case, it can be seen that the different types of the atrophic gastritis can be having different traits as well as having different manifestations on the tongue. Table 3 and Table 4 had shown that the superficial gastritis patients are mainly showing light red tongue with light white coating, which indicating the syndrome is mild if compared to other types of gastritis. This is because the evil pathogens are still remaining at the exterior part of the body and yet to invaded into the human body deeply. Therefore, the tongue condition remained as light red tongue with light white coating. Meanwhile, atrophic gastritis patients are mainly having red or dull red tongue accompanied with less coating, which is showing the degree of gastric mucosal damage is more severe. Reflux gastritis patients are mostly having thick and greasy coating with dark red tongue, which is also indicating a long disease onset and having severe condition. According to TCM theory and “Shang Han Lun Ben Zhi” (伤寒论本旨), which described that the production of the tongue coating is mainly due to the upward steaming of the gastric qi to the surface of the tongue (Qun & Xuejuan, 2006). In this case, this indicates that the changes in the thickness of the tongue coating and its colour are closely connected to the spleen and stomach disease, especially for the case of having stomach disease. Thus, reflux gastritis patients are mostly having yellow and thick greasy coating due to the invasion of evil pathogenic qi into the body. Meanwhile, atrophic gastritis is mainly caused by the deficiency of stomach yin, which leads to malnourishment of tongue body and causing the tongue body to be manifested in red colour and less coating on the tongue.

The study had shown that different types of chronic gastritis would be manifesting with different appearance of the tongue according to their syndromes, which verifies the theory of "the tongue coating is the fumigation of the stomach qi" in TCM. However, the casual relationships between the tongue coatings with the disease still need to be further explored and observed in the research in future.

The five viscera in TCM which are liver, spleen, heart, lung and kidney, they were not referring to the organ in anatomy, but a holism concept of dynamic function system, for example liver is connected to the eyes, tendons and internal organs via meridians, with unique physiological functions and pathological manifestations. However, the liver in the Western medicine only refers to the organ in anatomy, not containing the functions of the remaining systems and organs (Liu, Shu, Tu, Zhang, & Hong, 2017). In recent years, more studies have proven that these 2 concepts have something in common, and the visceral disease will be shown in manifestation of tongue color and coating.

Undoubtedly, tongue diagnosis is an important diagnosis method in TCM. However, the information that collected through tongue diagnosis may easily be affected by the physicians' subjective factors such as their own experiences. At the same time, the environment condition also might be leading to a certain degree of discriminant difference. Therefore, the use of AI technology, which applied in tongue diagnosis, started to emerge to break the conventional method and follow the principles of objectivity in current days. Through the collision and integration of AI technology with TCM tongue diagnosis, it will not only be covering the bias that caused by physicians or environment, but also will be laying a good foundation for the diagnosis and objective clinical application of Chinese medicine. In 2019, the international organization for standardization had officially introduced an international standard (ISO20498-5) which is related to TCM tongue diagnosis (Xiangyu, Songhua, Hua, & Yuying, 2020). It is a standardized digital representation method for tongue diagnosis and can be objectively showing the colour of the tongue without being affected by the collection equipment.

Therefore, it can be seen that TCM tongue diagnosis is started to be valued by the world organization to ensure the quality of the tongue picture.

However, the current methods of tongue diagnosis in TCM still have certain limitations in the clinical research. For example, most of the sample size in the experiments are too small or the instruments, methods and techniques are different in collecting the information of tongue images. Furthermore, the most difficult part in the development of the tongue diagnosis instrument is that the researchers not only need to record the information of complex tongue picture such as tongue body or tongue colour, but it is also necessary to achieve a full-scale three-dimensional display of the tongue images as well as integrating graphics rendering technology to improve the accuracy of the tongue image for recognition and classification. Thus, there are still many gaps in the study of the correlation between tongue diagnosis and various and need to be investigated more detailed in current stage.

In summary, as the integration of AI and the medical field continues to deepen, it will eventually break through the conceptual barriers between traditional medicine and modern technology. Through the guidance of TCM tongue diagnosis method with the assistance of digital technology, a huge database will be constructed to establish a more comprehensive tongue diagnosis theory and unified the diagnostic criteria in a more objective view. This will somehow promote the opening of a new area for the modernization of TCM diagnosis in future.

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