In Commemorating One Thousandth Anniversary of the Avicenna's Canon of Medicine: Gastric Headache, A Forgotten Clinical Entity from the Medieval Persia

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Abstract- Although the connection between head and stomach and hence the condition known as "gastric headache" was well known to the ancients, it has received little attention since the early 20th century. Herein, we review the teachings of the medieval Persian physicians about the gastric headache along with the related signs, symptoms, types and causes. The medieval Persian scholars adopted the main ideas of the gastric headache from predecessors in the ancient Greece and Rome, added substantial sub-categories and details to the earlier descriptions and therapeutic options. The medieval Persian physicians' contributions to the concept of gastric headache influenced beyond doubt the later accounts of this condition.

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Introduction

Traditional medicine was established on knowledge transferred between medical practitioners throughout centuries (1). Medical traditions of ancient Greece, Egypt, India, China, and Persia greatly contributed to this knowledge (2). During the medieval period, Persian physicians of different religions such as Muslim, Christian or Jewish contributed to the evolution of the sciences through two phases; a period of translation and assimilation (ca. 750-900), and a second of assemblage, ingenious observations and expansion (ca. 900-1100) (3). The outcome of innovation, commentary and systematization by the medieval Persian scholars later influenced the rise of European sciences during the Renaissance (4). Throughout this period, three of the most outstanding medical figures were Muhammad Ibn Zakariya al-Razi or Rhazes (ca. 865-925), Ali Ibn al-Abbas al-Majusi or Haly Abbas (930-994), and Abu-Ali al-Husain Ibn Abdullah Ibn Sina or Avicenna (981-1037) (5,6). The medical books of the medieval Persia including the *Continens* by Rhazes, Liber Regius by Haly Abbas, the *Canon of Medicine* by Avicenna, and the Treasure of Hakim Esmail Jorjani (1042-1137) were of cardinal importance to western medical science between the 13th-18th centuries (7).

Many studies have focused at the history of the headache and migraine throughout the centuries (2,8-11). Although the connection between head and stomach and hence the condition known as "gastric headache" was well known to the ancients, it has received little attention since the early 20th century. Campbell has reviewed the history of this particular type of headache with a little touch to the history of the gastric headache in the medieval Persia (12). Herein, we review the teachings of the medieval Persian physicians about the gastric headache along with the related signs, symptoms, types and causes.

Gastric headache in the medieval Persia

In the medical texts of medieval Persia, the physicians clearly used the term "participatory

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headache". Avicenna stated that "…sometimes headaches are created by the participation of other organs which have more neural relations with the brain such as the stomach and etc… and the most participating organ with the brain is the stomach". Elsewhere, he highlighted that a headache accompanying gastrointestinal symptoms would not be necessarily attributed to a stomach illness, for the headache might be merely due to central nervous system disorders (13). Rhazes in the beginning of a chapter on the headache described "… a type of headache with gastric origin created due to the bitter and biting humors produced at the inlet (cardia) of the stomach…" (14). Moreover, Haly Abbas believed in a connection between the head and the stomach through "a pair of nerve from the brain moves downward to the stomach where it distributes through the organ" (15). Haly Abbas's description of the nerve might be attributed to the vagus nerve. Furthermore, Hakim Esmail Jorjani devoted several chapters of his Zakhireh-ye Khwarazmshahi (*The Treasure of King Khwarazm*) to the topic of gastric headache and the related etiologies and factors (16). Later, Nafis ibn Avaz Kermani (1409-1449) in his commentary on the Al-Asbab va Al-Alamaat (*The Causes and Symptoms*) of Najib al-Din Samarqandi (D. 1222) indicated three mechanisms of the gastric headache, namely connection of the stomach to meninges via a nerve, being of the stomach along the brain, and the very sensitive nerve conducting pain from the stomach to the brain (17). In medieval Persian medicine, the gastric headache was diagnosed when gastrointestinal symptoms were present before and along with the onset of the headache.

Different types of gastric headache and the related symptoms

The humor theory of health and the mood was a widely held belief in the medieval period. Accordingly, the four humors are in balance when a person is healthy; dam (blood), balgham (phlegm), safra (yellow bile), and sauda (black bile). Each of these four humors corresponds to one of the traditional four temperaments. In traditional medicine, all diseases result from irregular distribution of these four humors and their corresponding temperaments. In other words, dystemperament of an organ reflects an alteration in the temperament or the quality state of the organ causing organ dysfunction. Simple type of dystemperament is caused by factors only changing the four qualities of the organs; warmness, coldness, dryness and wetness. In the medieval Persian medical books, the simple dystemperament of the stomach was considered as a particular cause of the gastric headache with an onset after consuming heavy meals (17,18). This type of the gastric headache is caused due to excess of warmth, coldness, dryness, or moisture in the stomach and factors weakening the gastric digestion.

On the other hand, material (humoral) type of the dystemperament is attributed to the presence of a pathologic substance; humor, abnormal quantity or quality. Some types of the gastric headache were attributed to the material type of the dystemperament. Phlegmatic, choleric and melancholic dystemperaments of the stomach were believed to cause the gastric headaches.

In the phlegmatic type, excess of the phlegm in the stomach leading to the cold and wet quality of the organ was considered as the etiology of the gastric headache. Relief of the headache after vomiting the phlegm, excessive salivation, sour belching, abdominal bloating, dyspepsia, nausea, lack of thirst, exacerbation of the headache after overeating, and headache reduction in hunger and sleep were known as the common symptoms of the phlegmatic type of the gastric headache (16-18).

In another type of the gastric headache (choleric type), abundant yellow bile in the stomach gives rise to the warm and dry quality of the organ and subsequently malfunction of the stomach. The medieval Persian scholars indicated the related symptoms of the choleric type gastric headache as nauseating sensation, anorexia, dyspepsia, relief from headache after vomiting the yellow bile substance, bitter taste in the mouth, intense thirst, subicteric sclera, intensification of the headache in hunger and fasting, heartburn, and malodorous belching (13,16-18).

An overload of the black bile in the stomach followed by the cold and dry quality of the organ (melancholic dystemperament of the stomach) was regarded as an origin of the gastric headache. This type of headache was characterized by bulimia, heartburn, depression symptoms, relief of the headache after vomiting the black bile substances, sour belching, and sour taste in the mouth (16-18).

Medieval Persian physicians observed that gastric headache could be related to intake of particular foods. The stomach gas or flatulence secondary to flatulent foods or weakness of the gastric natural heat was a source of the gastric headache in the medieval Persian books. Onset of the headache from the frontal area, headache after stomach-ache or bloating, relief of the headache after reducing the stomach-ache or flatulence are the common symptoms of this type of the gastric

headache (16-18). On the other hand, intake of some foods including onion (Allium cepa), garlic (*Allium sativum*), pepper (*Piper spp.*), and spicy vegetables was thought to produce vapors rising from the stomach to the brain. These foods as well as the warm dystemperament of the stomach were believed to cause a particular type of the gastric headache. The related symptoms were stated as the onset of headache after intake of the vapor producing foods, throbbing headache, dizziness, tinnitus, eye strain, and severe headache without pressure quality of the pain (18).

According to the observations by the medieval Persian scholars such as Rhazes and Avicenna, the headache due to weakness of the gastric inlet (cardia) usually presented before breakfast, in hunger, and while smelling malodor (13,14,16-18). In addition, in his Moalejat-e Aghili (*Aghili's Treatments*), Aghili Khorasani (16^{th}-17^{th} century AD) highlighted the onset of this particular gastric headache after walking under the sun while fasting (18).

Discussion

Although the history of headache and migraine has been widely discussed in the literature, the condition known as "gastric headache" has received little attention. The connection between the head and the stomach and hence the gastric headache was well known to the ancients (12). The earliest description of this connection might be seen in the medical Papyrus Ebers. The ancient Egyptians believed that an origin of the headache might be an incomplete digestion of food in the stomach (19). Later, the ancient Greek scholars such as Aulus Cornelius Celsus (ca 25-50 BC), Galen (129-200 AD) and Aretaeus of Cappadocia (first half of the 2^{nd} century) stated that headache might result from gastric disturbance (12,20,21). A similar idea lingered in the Byzantine period (330-1453) which was reflected in the writings of Alexander of Tralles (525-605) and Paul of Aegina (ca 625-690) (21). Although theory on the connection between the stomach and the head ensued in the medieval Persian medical books, the Persian physicians categorized the gastric headache as a particular type of the headache and devoted detailed parts of their books to this topic. However, their predecessors gave a few hints about this connection in their writings.

The basic mechanisms underlying the gastric headache were uncertainly indicated throughout the history. Galen attributed the gastric headache to the numerous nerves passing from the brain to the mouth of the stomach (vagus nerve), and to indigestion causing definite irritating humors and vapors to pass from the stomach to the head (12). Galen and his successors in the Byzantine era indicated disturbances of the humors of the body and the head such as bilious humors as the pathophysiological explanation of the gastric headache; hence the old term "bilious headache" (12,21). Although the humoral theory of the headache constituted the main concept of the headache in the ancient Greece and later the Byzantine period, the medieval Persian scholars determined particular types of the gastric headache based on this theory and accordingly described the related signs and symptoms. Much of the same views on the gastric headache are found in the writings of the Middle Ages and later. Readers are referred to the paper by Campbell about theories of the Renaissance physicians and scholars on the gastric headache (12). The late 19^{th} century theory of the gastric headache was similar to that of the ancient physicians including the medieval Persian scholars. Based on this theory, the gastric disturbances affect the head through the nerve currents streaming upwards as well as accumulation of poisons in the blood resulting from indigestion. The latter might be attributed to the morbid humors and vapors in the ancient medicine, while corresponded to urates and leucomaines in the modern theory (12). Since the early 20^{th} century, topic of the gastric headache has been neglected in the medical literature and subsequently in the International Headache Classifications. However, recent studies have targeted at the possible links between the gastrointestinal factors and headaches (see below).

The gastric headache related to the intake of particular foods has been less highlighted in the ancient medical books. Aretaeus of Cappadocia, an ancient Greek physician, stated that patients suffering from the headache ought to abstain from acrid foods such as onions and garlic and flatulent foods including beans, peas and lentils (20). The medieval Persian physicians not only emphasized both acrid and flatulent foods in inducing the headache, but also described the related signs and symptoms in details. Similarly, in his *Fusul Musa* (*Medical Aphorisms of Moses*), Maimonides (1135-1204) counseled his patients not to consume fruit rich in moisture such as melons, peaches, etc due to their headache-inducing characteristics (22). Interestingly, dietary headache or headache induced by food components and additives has been recently indicated in the International Classification of Headache Disorders (23).

In the modern clinical practice approach to a patient

with headache is mainly based on the description of episodes, quality of pain, intensity of the pain, location, mode of onset, duration, etc. This method was partly applied to patients with headache by the medieval Persian physicians (2). With regard to the gastric headache, features such as the quality, the intensity and the location of the headache as well as the precipitating and aggravating factors were indicated in the medieval Persian medical books. Likewise, the ancient Byzantine physicians used these features to diagnose the headaches. Paul of Aegina stated that patients with headache from a bilious humor had a bitter taste in the mouth (21). In the 10th century, Theophanes Nonnus evinced that headache from vapors were diagnosed with thready pain, throbbing in the forehead, vertigo and tinnitus (21). Similarly, description of the gastric headache in the early 20th century showed some features in common with those of the medieval Persian books. Nausea, vomiting, belching, heartburn, hypersalivation, sense of distension after meals, abnormal appetite and sour taste in the mouth were among the similar characteristics of the gastric headache between the medieval Persian and the early 20th century descriptions (24,25).

According to the modern medicine, the gastrointestinal disturbances are common in some types of headaches, particularly the migraine headaches. However, the possible causality of the gastrointestinal diseases in inducing headaches has been little investigated. Although controversial, some researchers have suggested the relationship between the Helicobacter pylori and the migraine headache (26-31). On the other hand, gastroesophageal reflux disease has been found to be correlated with the headache (32-36). Other gastrointestinal disturbances such as dyspepsia, diarrhea, constipation and nausea have been linked to the onset of the headaches (32,34,37,38). In conclusion, the medieval Persian scholars adopted the main ideas of the gastric headache from predecessors in the ancient Greece and Rome, added substantial subcategories and details to the earlier descriptions and therapeutic options. The medieval Persian physicians' contributions to the concept of the gastric headache influenced beyond doubt the later accounts of this condition. Although the humoral theory of the pathogenesis shifted to the solitary pathology by the 19th century, the clinical descriptions and subcategories of the gastric headache by the medieval Persian scholars would be of research interest in the modern medicine.

References

1. Hosseini SF, Alakbarli F, Ghabili K, Shoja MM. Hakim Esmail Jorjani (1042-1137 AD): Persian physician and jurist. Arch Gynecol Obstet 2011;284(3):647-50.
2. Gorji A, Khaleghi Ghadiri M. History of headache in medieval Persian medicine. Lancet Neurol 2002:1(8):510-15.
3. Ardalan MR, Shoja MM, Tubbs RS, Eknoyan G. Diseases of the kidney in medieval Persia the--Hidayat of Al-Akawayni. Nephrol Dial Transplant 2007;22(12):3413-21.
4. Elgood C. A Medical History of Persia and the Eastern Caliphate. From the Earliest Times until the Year 1932. Cambridge University Press, Cambridge. 1951
5. Eknoyan G. Arabic medicine and nephrology. Am J Nephrol 1994;14(4-6):270-8.
6. Shoja MM, Tubbs RS. The history of anatomy in Persia. J Anat 2007;210(4):359-78.
7. Khaleghi Ghadiri M, Gorji A. Natural remedies for impotence in medieval Persia. Int J Impot Res 2004;16(1):80-3.
8. Pearce JM. Historical aspects of migraine. J Neurol Neurosurg Psychiatry 1986;49(10):1097-103.
9. Rose FC. The history of migraine from Mesopotamian to Medieval times. Cephalalgia 1995;Suppl 15:1-3.
10. Rapoport A, Edmeads J. Migraine: the evolution of our knowledge. Arch Neurol 2000;57(8):1221-3.
11. Gorji A. Pharmacological treatment of headache using traditional Persian medicine. Trends Pharmacol Sci 2003;24(7):331-4.
12. Campbell H. Dyspeptic headache: a historical sketch. Lancet 1892;140:933-5.
13. Sharafkandi A. (Translator) The Persian translation of Qanoun fi al-Tibb (or The Canon of Medicine), Vol. 3. Soroush Press, Tehran 2008.
14. Tabatabaei SM. (Translator) The Persian translation of Al-Hawi (or The Continens). Al-Hawi Pharmaceutical Company Press, Tehran 1991.
15. Gaffari MK. (Translator) The Persian translation of Kamil al-Sinaat al-Tibbiyya (or The Liber Regius), vol. 1. The Institute of Islamic Studies University of Tehran-McGill University, Tehran 2009.
16. Jorjani E. Zakhireye Khwarzam Shahi (Treasure of Khwarazm Shah) edited by Sirjani S (in Persian). Entesharat-e Bonyade Farhang-e Iran, Tehran 1976.
17. Kermani NA. Sharh Al-Asbab va Al-Alamaat (Commentary on The Causes and Symptoms) (in Arabic), vol. 1. Research Institute for Islamic and Complimentary Medicine, Tehran 2004.

18. Aghili-Khorasani MH. Moalejat-e-Aghili (Aghili's Treatments) (in Persian). Research Institute for Islamic and Complimentary Medicine, Tehran 2008.
19. Karenberg A, Leitz C. Headache in magical and medical papyri of ancient Egypt. Cephalalgia 2001;21(9):911-6.
20. Koehler PJ, van de Wiel TW. Aretaeus on migraine and headache. J Hist Neurosci 2001;10(3):253-61.
21. Trompoukis C, Vadikolias K. The Byzantine Classification of headache disorders. Headache 2007;47(7):1063-8.
22. Rosner F. Headache in the writings of Moses Maimonides and other Hebrew sages. Headache 1993;33:315-9.
23. Headache Classification Subcommittee of the International Headache Society. The International Classification of Headache Disorders: 2nd edition. Cephalalgia 2004;24 Suppl 1:9-160.
24. Gastric Headache. Lancet 185:1356.
25. Cheney WF. Gastric headaches. Am J Med Sci 1915;149:656-60.
26. Gasbarrini A, De Luca A, Fiore G, Franceschi F, Ojetti V V, Torre ES, Di Campli C, Candelli M, Pola R, Serricchio M, Tondi P, Gasbarrini G, Pola P, Giacovazzo M. Primary Headache and Helicobacter Pylori. Int J Angiol 1998;7(4):310-2.
27. Gasbarrini A, De Luca A, Fiore G, Gambrielli M, Franceschi F, Ojetti V, Torre ES, Gasbarrini G, Pola P, Giacovazzo M. Beneficial effects of Helicobacter pylori eradication on migraine. Hepatogastroenterology 1998;45(21):765-70.
28. Ciancarelli I, Di Massimo C, Tozzi-Ciancarelli MG, De Matteis G, Marini C, Carolei A. Helicobacter pylori infection and migraine. Cephalalgia 2002;22(3):222-5.
29. Tunca A, Türkay C, Tekin O, Kargili A, Erbayrak M. Is Helicobacter pylori infection a risk factor for migraine? A case-control study. Acta Neurol Belg 2004;104(4):161-4.
30. Yiannopoulou KG, Efthymiou A, Karydakis K, Arhimandritis A, Bovaretos N, Tzivras M. Helicobacter pylori infection as an environmental risk factor for migraine without aura. J Headache Pain 2007;8(6):329-33.
31. Hosseinzadeh M, Khosravi A, Saki K, Ranjbar R. Evaluation of Helicobacter pylori infection in patients with common migraine headache. Arch Med Sci 2011;7(5):844-9.
32. Aamodt AH, Stovner LJ, Hagen K, Zwart JA. Comorbidity of headache and gastrointestinal complaints. The Head-HUNT Study. Cephalalgia 2008;28(2):144-51.
33. Spierings EL. Reflux-triggered migraine headache originating from the upper gum/teeth. Cephalalgia 2002;22(7):555-6.
34. Spierings EL. Headache of gastrointestinal origin: case studies. Headache 2002;42(3):217-9.
35. Saberi-Firoozi M, Khademolhosseini F, Yousefi M, Mehrabani D, Zare N, Heydari ST. Risk factors of gastroesophageal reflux disease in Shiraz, southern Iran. World J Gastroenterol 2007;13(41):5486-91.
36. Saberi-Firoozi M, Yazdanbakhsh MA, Heidari ST, Khademolhosseini F, Mehrabani D. Correlation of gastroesophageal reflux disease with positive family history and headache in Shiraz city, southern Iran. Saudi J Gastroenterol 2007;13(4):176-9.
37. Meucci G, Radaelli F, Prada A, Bortoli A, Crotta S, Cerrato C, Minoli G. Increased prevalence of migraine in patients with uninvestigated dyspepsia referred for open-access upper gastrointestinal endoscopy. Endoscopy 2005;37(7):622-5.
38. Hwang HS, Choi HS, Bin JH, Kim YH, Lee IG, Chung SY. Clinical Manifestation of Primary Headache with Epigastric Pain or Tenderness in Children. J Korean Child Neurol Soc 2008;16:169-74.