

## The Relationship between Stroke and Seasonal Variations in Persian Medicine

Dear Editor,

An investigation of the effects of studies on the effect of seasons and weather on the incidence of stroke indicates a contradiction in their findings.<sup>[1]</sup> Since the effect of the seasons on stroke has been recognized for centuries, and great physicians such as Rhazes (865-925 AD) and Avicenna (980-1037 AD) have elaborated on this effect and its contributing factors. The purpose of the present study is to investigate the views of the scholars of the Persian Medicine in this regard. The sages of this doctrine believe that bodily health depends on the balance between the four humours and their unique temperament, viz.: (i) Dam (blood) as 'hot and moist', (ii) Safra (yellow bile) as 'hot and dry', (iii) Balgham (phlegm) as 'cold and moist', and (iv) Sauda (black bile) as 'cold and dry'. Any factor that can disturb the quantitative and qualitative balance between the above humors causes a disease,<sup>[2]</sup> one of which is air quality. Therefore, the effects of seasonal weather changes on most diseases, including stroke, have been extensively discussed along with general recommendations to overcome the adverse effects of such seasonal changes. Cold and wet weather with less physical activity and more tendency to sleep in winter were considered to be a reason for the accumulation of waste material in the body. In early spring, gradual warming of the air mobilizes these humors and waste products, which need a way of excretion.<sup>[3,4]</sup>

Rhazes, a prominent Persian physician, writes in his comprehensive book on medicine (*Kitab al-Hawi fi al-tibb*): *In stroke, other than respiratory motion, all the sensory and motor activities of the body suddenly disappears and, if breathing stops from the onset of the stroke, it is a sign of the disease severity.*<sup>[2]</sup> Jorjani (1042-1137 A.D.)<sup>[5]</sup> is a well-known Iranian wise man, who describes stroke symptoms as: *Stroke happens suddenly because the path of sensation and movement from the brain to the organs is abruptly closed, all senses and functions are disappeared in all the organs, and there are no other movements except for breathing.*<sup>[6]</sup>

In ancient Persian medicine, stroke is categorized according to the cause of its occurrence into two types of phlegmatic and Damavi. If the stroke occurs due to the accumulation of phlegm humor in the cerebrovascular, this occlusion will cause a stroke (phlegmatic stroke) by disrupting the blood supply to the brain. Almost all senses are lost in this type of stroke, which is equivalent to ischemic stroke.<sup>[4]</sup> However, sometimes stroke occurs due to a high blood aggregation in the cerebrovascular or rupture of the vessels, called in Persian medicine as 'Damavi' being equivalent to a hemorrhagic stroke.

Ancient Persian physicians have also discussed the effects of seasons on the type of phlegmatic stroke. They believe that weather change has an impact on the prevalence of this type of stroke, and that phlegmatic stroke increases in winter. Avicenna<sup>[7]</sup> states that *winter diseases are mostly phlegmatic because the phlegm humor is high in this season, and the possibility of such diseases as headache, epilepsy, and stroke rises this season due to the congestion of phlegm mass.*<sup>[8]</sup>

Persian sages justify the effect of winter on the increase of stroke in that winter days are shorter and nights longer, and eating and drinking and physical activity is less, so they accumulate more body fat and this builds up with congestion. They can cause strokes in the arteries.<sup>[4]</sup>

Another factor considered by ancient doctors is the relationship between seasons, which is today ignored by researchers. They point out that weather conditions of the seasons are different in different years. Accordingly, if there is a high rainfall, relatively warm winter, followed by relatively cool and dry spring, stroke increases in spring. This is because the phlegm produced in winter due to dryness and coldness of spring air is accumulated in the ventricles of the brain and does not repel. For this reason, the prevalence of phlegmatic stroke also increases in spring in some years.<sup>[3]</sup>

Modern medicine has also been investigating the effects of seasons on blood pressure, with some researchers suggesting that blood pressure rises during the winter due to cold weather and decreases in summer, as well as stroke and illness mortality rates. Cardiovascular diseases increase in winter.<sup>[9]</sup>

Avicenna states, *If spring is cold and wet, stroke will occur in people who have predominate phlegm humor in their bodies.*<sup>[8]</sup> The reason is that in such a situation, spring acts similar to winter due to its coldness and humidity, causing vessel occlusion because of increasing phlegm production.

Based on the knowledge of the effects of seasons on the human body, ancient Persian physicians have provided special medical advice relevant to each season in order to maintain of health. In winter, for example, they advised to eat hot temperament foods (dates, raisins, figs, honey, lamb, almonds, carrots, etc.) and gentle exercises, and to avoid excessive consumption of cold temperament foods (such as yogurt, cucumber, barberry, cheese, lettuce, watermelon, orange, etc.). Lack of mobility is also prescribed in order to prevent excessive phlegm humor production. Further recommendations include methods such as cupping, warm enemas (*Hoqneh*), bloodletting, eating laxatives, and mild

exercises in order to accelerate and facilitate the process of removing redundant and cumulative phlegm humor in winter at the beginning of spring. They also advise to avoid eating very hot temperament foods (e.g., spices) as well as fast and heavy physical exercise to prevent the movement and sudden relocation of phlegm humor in early spring.<sup>[2,3,8]</sup> Therefore, ancient Persian physicians scrutinized the effect of seasons on the prevalence of ischemic stroke long years ago. It seems that consideration of their findings in this area of research can help better understand the effects of seasons on stroke, which can even help prevent and treat this disease.

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