

The roots of ancient medicine: an historical outline

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1. Introduction

In the beginning of the first millennium AD, there were three principal systems of medicine: Ayurveda, Greek and Chinese medicine. Their fundamental attitude to the relationship of man and nature was more or less the same; but their explanations of the human body and its physiology, pathology and therapy differed in some ways. Of the three ancient systems of medicine, it would appear that Ayurveda emerged as a remarkably holistic approach both in its foundational ideas and therapeutic measures. The present article attempts to trace the roots of ancient methods of healing, including the traditional Indian systems – Ayurveda, Unani and Siddha.

2. Egyptian medicine

The incessant human struggle for existence, from pre-historic times to the present, against a hostile external environment and diseases that attack both externally and internally, has been a fascinating story. We do not know what measures were adopted by wandering prehistoric humans for curing their ailments. Conceivably, techniques of healing had been developed perhaps by a trial and error method, or by observing the path followed instinctively by animals which, when afflicted, would find succour in some plants. We are also in the dark about the nature of medical practices of the neolithic age (sixth-fifth millennium BC) when man began to lead a settled life. The picture gets somewhat clear with the ancient advanced civilizations, of which Egypt may have been the oldest (fifth millennium BC).

Medicine and superstitious teleology were as a two-in-one pair among Egyptian priests (Guthrie 1920). Osiris and his wife Isis (raised to the level of a goddess) were

regarded by Egyptians as not only the inventors of the healing art but also the custodians of the health of mankind. Egyptian medicine had two dimensions: one was theurgic, and the other, the actual practices of a physician. In respect of the former, the priest-magicians were largely involved in offering magical cures and charms in temples. In the case of the latter, ordinary priests employed some natural curative measures, mostly plant products. Since each physician was expected to be a specialist in curing one disease only, there were either occultists or dentists or bone-setters and the like. Embalming the dead body was an accomplished art. In any case Egyptian medicine was essentially a belief system. It was believed that there were thirty six gods of the atmosphere and thirty-six 'demons', and the human body was conceptually divided into as many parts. If a part of the body was affected, the concerned 'demon' had to be invoked for its cure. The concept of disease-demons was very strong among Egyptians. Though plant medicaments were in use, they were not considered to be efficacious without the appeasement of 'demons' through magical rites. Egyptian medical papyri preserved in the museums of Europe provide several details about the medicinal herbs and adjuvants such as milk, honey, salt and beer, on the one hand and, on the other, magical invocations, amulets and other curative devices. The 'Medical Papyrus' now in the Berlin Museum is like an encyclopedia of medicine and provides details of a large number of prescriptions that were in vogue among Egyptians of the eighteenth dynasty (c. 1630–1350 BC) – herbs and other preparations for the cure of tumours of the breast, bites, cuts, and other ailments. Administration of medicines, charms or any other magical remedy was to be done on an auspicious day determined by the priests who were also the calendar-makers. Egyptian physicians who had evolved a materia medica and therapeutic interventions depending upon the nature of disease were sought after even by the Persian Kings.

The Jews, who resided in Egypt for long owed their healing practices to Egyptians. Among them too, the

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priests were physicians. In the Jewish text, the *Talmud*, there are expressions indicating that a physician had divine permission to treat diseases since it was believed that both the disease and its cure lay in the hands of god. A Jewish physician came to be known as a *Hakim*, a term used later by Arabs for their physicians. Significantly, Jewish physicians used less of amulets and incantation but relied more on natural methods. Jewish medical practices were also two-fold, preventive and curative, with the attitude that a physician does not really cure a disease, but prepares the ground for nature which is the actual healer.

3. Greek medicine

In the early Greek civilizational settlements, Apollo, the Sun-God, was considered to be the protector of mankind from the attack of epidemics such as the plague. According to the Greek epic the *Iliad*, the main healing deity, Cheiron, the Centaur, received instructions from Apollo. In turn, he imparted the art of healing to one Aesculapius regarded as the son of Apollo. The now familiar symbol of the serpent entwined round the rod of Aesculapius denoted the idea that serpents could renovate themselves and had the capacity of finding out the healing power of plants. The tradition of healing by visiting the temples of Aesculapius became popular and deep-rooted in Greek society around 1000 BC. Among the sons and daughters of Aesculapius were Hygeia (the goddess of health) and Panacea (the all-healer) – words that are still with us as hygiene and panacea. Sick persons visited temples of Aesculapius, offered prayers and animal sacrifices to him, and slept on the skin of the slain animal, while the priests conducted rites on the sick and administered medicines along with prescribing proper diet and rules of conduct. It was in essence a faith cure; and temple-healing acquired some credibility because the successful cases were illustrated by carvings on the temple walls. There was also the practice of offering symbolically the afflicted part of the body of a patient in the form of models of metals like gold and silver – a practice we notice even today in India in some temples. The nomenclature “Greek medicine” is not due to the priest-physicians or Asclepiads but owes its origin to the new mode of thinking and practice that came up among Ionian philosophers and, more importantly, to what is generally known as the Hippocratic method (Broek 1929; Berdoe 1893; Zaidi 1963).

Man as a biological entity and as an integral part of the biology of nature demanded a new understanding of, and a new insight into, healthy living. This was the approach of Hippocrates (b. 460 BC) of Cos, who came from a family of Asclepiads. In the Greek-speaking cities and islands, there were at least two schools of medicine – one of Hippocrates at Cos, and the other at Cnidus. Not much is known about the personal life of Hippocrates. A body

of writings cumulatively called the *Corpus Hippocraticum* is attributed to this physician who exerted tremendous influence over the future course of medicine by his scientific approach to diseases and their cure, known widely as the ‘Hippocratic method’. The general approach at Cos was the insistence on prognosis and the notion that disease was a natural process of abnormality, while at Cnidus, stress was laid on diagnosis and the observation of external manifestations. To Hippocrates, the life-process meant a constant interaction between the individual and nature or environment. Hippocrates built on the classical theory of Greek medicine involving the four humors – blood, phlegm, yellow bile and black bile (late fifth century BC). In tune with the Empedoclean theory of *four* elements, the various body-fluids were also perceived under these four humours. According to Hippocrates, health in the body meant the interplay of proper proportions of the four humours and when one or the other would be in excess, abnormality would result. In certain people there would be a natural tendency towards having one or the other humour in excess leading to their difference in temperaments (sanguinous, phlegmatic, bilious and melancholic). Hippocrates also thought that in a majority of cases the body would be able to solve the harmful effects of a disease by itself; a physician should step in only when the condition deteriorates. Two groups of causative factors were recognized in Hippocratic medicine: (i) the vitiation of natural dispositions or temperaments and (ii) improper environmental conditions, food and drink. A third group was also recognized, in relation to an individual’s own habits, actions or functions. Hippocrates and his followers were careful observers, believed in recording actual observations and in the systematic examination of a patient. They did not think of a sharp divide between the normal and pathological states, but viewed the disease state as one which would be less capable of overcoming the harmful environment. Hippocrates stressed the importance of climate *vis-a-vis* physiological and pathological states. The teachings of Hippocrates and the works of his followers became an unassailable canon of medicine in the succeeding centuries, fortified with reasoning (*logos*) and setting aside supernatural beliefs (*mythos*).

The second century AD witnessed the appearance of a medical-encyclopedist, Galen (Zaidi 1963) of Pergamum (in Asia Minor). A Greek by birth, he spent his active life in Rome, though he was forced to leave Rome later because of professional intrigues. He held Hippocrates in high esteem and enriched Greek medicine with his own clinical, anatomical and physiological investigations. It was Galen who elucidated the *physis* (living organism) of Hippocrates in terms of an internally pervasive creative essence that would sustain the organism. More importantly, one of his main expositions was that a spirit,

pneuma, drawn inside by the act of breathing, was responsible for the various faculties of the *physis*. Galen's physiology encompassed what he called the 'natural spirit' (in the liver); 'vital spirit' (in the heart); and 'animal spirit' (in the brain) as well as the *pneuma* and its circulation in the body. He thought that the liver was the centre of the venous blood system. His assertion that anatomical structure and bodily functions were the Creator's design received the approval of the Church (by about the eighth century AD). It was, therefore, Galen, more than Hippocrates, who greatly influenced European medicine for several centuries.

Imperial Rome inherited Greek medical tradition and practices. It also had its own laws of medical service especially with regard to public health. Sanitation was an important feature of Roman life including subterranean sewers, cleaning the streets and the distribution of potable water. Rome had also a public medical service specially to attend to the needs of the poor, and a hospital system which was perhaps initially connected with the Roman military system. Later military hospitals were established at important strategic places. In the succeeding centuries, the humanitarian tradition of founding hospitals was carried on wherever Islamic culture took root.

4. Greco-Arabic medicine

Several treatises dealing with what is called Prophetic Medicine, were compiled by clerics engaged in traditional medical practices during the time of the Prophet Mohammed. There emerged, however, a school of medicine at Jundishapur (in Persia) where the Greek as well as Ayurvedic medicine was studied by Islamic and other savants. Soon the centre of learning shifted to Baghdad. The *Kitāb al-Hawī fī al-tibb* (The Comprehensive Book on Medicine) by Abū Bakr Muḥammad ibn Zakarīya al-Rāzī (865–925) was an important landmark of Islamic medical literature (Browne, 1921). Known to medieval Europe as the *Liber continens*, al-Rāzī's treatise was a standard reference medical compendium. Born in the Iranian city of Rayy, al-Rāzī (also called Rhazes by Latin writers) headed hospitals both in his home town and later in Baghdad. He incorporated into his extensive treatise the medical ideas and practices of earlier noted physicians as well as some Ayurvedic sources. He is regarded as the first to describe small pox and measles in a scientific manner.

Among the most prominent Islamic physicians was Abū 'Alī al-Husayn ibn 'Abd Allāh ibn Sīnā (980–1037) of Central Asia (near Bukhara in Uzbekistan). Known as Avicenna in Europe, ibn Sīnā emerged as an authority on Islamic (Greco-Arabic) medicine and his treatise *Kitāb al-Qānūn fī al-tibb* or *Canon of Medicine* (Shah 1966) influenced not only Europe but also medieval India. Ibn Sīnā and his text continue to be the authorities of Unani

medicine in India. Islamic physicians made notable contributions to rational medicine, ophthalmology, anatomy, surgery and pharmaceuticals, and enriched the medical literature through their writings, many of which are still extant.

The most significant dimension of Greco-Arabic medicine in the Islamic world was the establishment of a number of hospitals which were far better than the earlier ones in the Greco-Roman empire. They were secular medical institutions catering to the sick regardless of their religion or status. Generally known as *bimaristan* (place for sick person), the hospitals dotted practically all the urban centres of the Islamic world, from the eighth century onwards, as the centres of healing the sick and providing free diet to them, since they were financed by the rulers, wealthy men and trusts. Sometimes even a small stipend used to be given to the needy patients after their discharge from the hospital. Islam as a religion emphasized such moral and humanitarian acts.

5. Chinese medicine

The Chinese had developed a vibrant medical thought and practice in their own characteristic way. In earlier stages, around the 14th or 13th century BC, in the Shang dynasty, the curse of dead ancestors was believed to be the cause of ailments and they were to be appeased by offerings, prayers and incantations. The Shang culture did not believe in any pharmacology *per se*. Sorcerers were held in esteem because it was thought that they would be the communicators with the spirits of the dead. In course of time, the 'ancestral medicine' yielded place to 'demonic medicine' as a healing practice. In this process the use of Confucian ideas and the Taoists' esoteric principles and practices came to the fore, and a new healing system gradually came up in the context of the social and political changes that took place from time to time. Even so, the remnants of 'demonic medicine' did not lose their relevance as they were also in practice. But, healing by the use of drugs and a systematic materia medica were by and large confined to Taoists who had their own speculations. Among them, from the point of view of Chinese medicine, the *yin-yang* theory, the five elements and what was called *Qi*, deserve special mention. Taoists also believed in alchemy. As a result, mercury and its compounds, sulphur, arsenic substances, mica and others also found their way into the Chinese medicine, though for realizing some esoteric goals like attaining immortality or a state of 'deathlessness' (Needham 1963).

The Chinese theory of five 'elements' and the concept of *yin-yang* constitute, by and large, the foundation of Chinese medicine (Ware 1966). While there is some similarity between the Greek and the Indian postulates of five 'elements', the Chinese 'elements' are at variance with

either of them. The Chinese five 'elements' are water, fire, wood, metal and earth. It may be noted that air, all-pervading and vital to life, is not included in this concept, while it is a dynamic concept in Ayurveda (*vāyu*; *vāta*) and in Greek or Greco-Roman (*pneuma*) medicine. However, the illness-causing potential of wind was known to the Chinese, but it was also thought of as a demon (Unschuld 1985). The Chinese also postulated a sixth 'element' which was associated with a heavenly atmosphere. The elements of the Chinese were symbolic of some inherent qualities, natural phenomenal states, movements and even phases of seasonal cycle. They had also political implications in the sense that a ruler was linked with one of the elements, and his ceremonial function had to conform to the attributes of that element. The five elements were not also devoid of numerological aspects. In physiology, they were stated to be intimately involved in (i) a generating sequence (e.g. wood generating fire and itself being generated by water; these were also related to liver, heart and kidneys) and (ii) a governing one, in the context of several auto-regulatory and balancing physiological processes. In diagnosis too the five-elemental postulate was employed in relation to qualities like colour, taste, sound and smell. Chinese herbal therapy along with a carefully worked out dietary regimen was also based on the five elements. Pulse examination was another important diagnostic tool. Acupuncture involving vital centres was a specialty of Chinese treatment.

The activities of body and mind, according to Chinese, go on because of the interaction of certain substances of vital character, which were a manifestation of what was called *Qi*, a primal entity both material (body) and non-material (mind), gross and subtle. In its material aspects, *Qi* was believed to lie at the bottom of all the observed phenomena and their degrees of aggregation and dispersion. *Qi*, was therefore, a basic concept of Chinese philosophy and through it of its medicine inasmuch as it explained the inter-relatedness between the universe and man (microcosm and macrocosm), the natural force outside and the physiological processes inside.

6. Medicine in India

The origin of Ayurveda is generally traced to the Atharvaveda (c. 1000 BC) which has details of what may be called religious or priestly medicine similar to early Egyptian medicine.

The fact that several diseases ranging from glandular boils to epilepsy, from dropsy to several types of fever with their pathogenic aspects, were known to the Vedic people reveals the careful observation of disease by the priests. But their cures were expectedly on primitive lines – the magic power of amulets, 'expulsion' of disease-causing demons through propitiation and exorcism,

'trapping' the disease demon by an offering to fire surrounded by a ditch filled with hot water, ceremonial offering or sprinkling of water after uttering the so-called curative *mantras* into it, and invocations to a god or gods who were supposed to be specifically beneficial for curing a particular disease.

An important aspect of Vedic medicine was the use of certain plants as amulets, apart from their use either in the form of decoction or powder or fumigant as medicines. In any case Vedic medicinal practices were associated with rather an elaborate ritual which varied according to the nature of the disease. But the Atharvaveda is not devoid of some rational ideas about disease. A verse in the *Atharvaveda* explicitly states that a disease may be caused by one of the three natural factors – *abhraja* (from clouds or moisture); *vātaja* (from wind); and *susmaja* (from desiccation).

Both the *R̥gveda* and the *Atharvaveda* point out that diseases are caused by congenital factors (*kṣetriya*) or infection or seasonal change, or by minute organisms or insects (*kṛmi*) residing in the body. The *Atharvaveda* recommended that surgical operation should be carried out to remove imbedded arrows. There are also references in the *Atharvaveda* to the treatment of fractures and the use of a reed as a catheter to relieve a blocked urinary tract. Despite progressive ideas such as these, the Vedic people appeared to have been obsessed with magico-religious rites for the appeasement of gods and goddesses of their imagination for the redressal of diverse woes including ailments that seized them from time to time (Majumdar 1971).

6.1 Systematization

During the 6th–4th century BC, the Upaniṣadic fervour provided a fillip to the systematization of a spectrum of new ideas that were floating around that time. The relation between man and nature, between man and the observed material world, the methodology needed for a knowledge of the phenomenal world and the elevation of the human mind with a control over the senses, were succinctly delineated in the form of the *Sāṃkhya*, *Vaiśeṣika*, *Nyāya* and *Yoga* systems. Alongside, two other systems – the *Pūrva-Mīmāṃsā* (ritualistic); and *Uttara-Mīmāṃsā* (relating to higher self) also came up. In the new mood and endeavour of systematization, the five elements loomed large and found their way specially into the *Sāṃkhya* and the *Vaiśeṣika*. The floating medicinal ideas and healing practices too could not but be consolidated and systematized, separating the grain from the chaff. The philosophical positions of the *Sāṃkhya* and the *Vaiśeṣika* along with their associated five elemental postulates, provided the basic framework for medicinal concepts as well as curative practices (Udupa and Singh 1996). In the process, the

Atharvavedic magico-religious healing attempts that had held the fort for a long time receded to the background to some extent. The new systematized approach to medicine, which took on the appellation of Ayurveda, did not forget its roots in the *Atharvaveda*, however superstitious they were. Ayurveda was, therefore, recognized as an emanation of the *Atharvaveda*, a continuation of the past, but with an altogether modified approach. In recognition of its Atharvavedic roots, Ayurveda included in its compendium a branch called *Bhūta vidyā* (psychiatry and demonology). In its changed perceptions of medical thought and, more importantly, in its therapeutic practices, Ayurveda appealed not merely to the elite but also to the laity. It would appear that the wave of Buddhism with its compassion for the common people and the sick people aided this process. Several Buddhist monks were torch-bearers of Ayurveda and contributed to its practical aspects.

The Ayurvedic compendium comprises eight branches: *Kāyacikitsā* (internal medicine); *Śālya tantra* (surgery); *Śālākya tantra* (ophthalmology and ENT); *Kaumāra bṛh̥tya* (paediatrics, obstetrics and gynaecology); *Agada tantra* (toxicology); *Rasāyana* (geriatrics and nutrition); *Vājīkaraṇa* (sexology); *Bhūta vidyā* (psychiatry and demonology). These are the themes described in Ayurvedic classics and other texts, but each has presented them under its own different heads and chapters.

The systematized preservation of Ayurvedic knowledge had its social compulsions. Amidst the expanding human settlements in different parts specially of the Indo-Gangetic plains, there also came about urbanization. Here and there, in the emerging social milieu, quacks and charlatans had also assumed the role of healers. This had to be arrested in the interest of the health of people by methodical Ayurvedic practices and training. A new class called the *vaidyas* came up and they were involved in standardized health-care.

The two Ayurvedic classics are the *Caraka* and the *Suśruta saṃhitās*. The third one, the *Aṣṭāṅgahr̥daya* of Vāgbhaṭa of about the 8th century AD is also recognized as an Ayurvedic authority, though it has largely relied on the first two with some elaboration here and there. The *Caraka saṃhitā* by and large deals with the fundamental postulates of Ayurveda along with the nature of diseases and therapeutic methods. The *Suśruta saṃhitā* has given details of surgical practices in addition.

6.2 Intellectual coherence

The thought-structure of Ayurveda, apart from its intricately worked out therapeutics, is an example of intellectual coherence – a consistent way of looking at the phenomenal and the biological world of man, plants and animals (Caraka saṃhitā, Sharma 1984–1986). It has rightly recognized the inter-relatedness of body and mind, of

food and medicine, and within the body, of the various physiological processes – all conceived and explained in terms of the five elements (*pañchabhūta*). Central to all of these is the holistic approach with its concept of balance or equilibrium which has pride of place. The equilibrium or the harmony of both mind and the physical body is a pre-requisite for a healthy and purposeful life, and for the realization of human goals – *dharma*, *artha* and *kāma*. Recognizing the dynamic interaction between man (microcosm) and the universe (macrocosm), the Ayurvedic theory of *loka-puruṣa sāmya* (equivalence of macrocosm and microcosm) envisages that an individual's health would be sound and vibrant, if the interaction is natural and wholesome, while a disharmonious interaction would lead to a diseased state.

It is important to note that Ayurveda emphasizes that the individual *as a whole* is to be examined in detail in respect of his disease and not merely his disease. Even in a patient, his residual or positive health is to be engendered simultaneously with the cure of the disease. Preventive and health-promotive measures are important even for a healthy individual. His daily (*dinacaryā*) and seasonal routine (*ṛtucaryā*) on the one hand and, on the other, the nutritious food and drink as well as rejuvenating compositions, among others, constitute the health-promotive measures – all towards a balanced body and mind (*dehamānasa*) and an equally balanced physiological processes within.

A seminal concept of Ayurveda is its *tridhātu-tridoṣa* or *vāta, pitta* and *kapha*, a three 'humoural' theory that encompasses not only the physical and physiological processes in the human body but also the pathogenesis of diseases and their symptoms. Though they could be translated into English as wind, bile and phlegm respectively, or the three 'humours', each one of them, in fact the three as a whole, have much wider meaning and applicability in the Ayurvedic conceptual framework of health and disease. Health is the equilibrium, harmony or balance among the *tridoṣas* in the body, and their disequilibrium or disharmony or imbalance would be the diseased-state. It should be noted that the *tridoṣas* or the *tridhātus* which have the potentiality of being vitiated (*duṣya*) are a part of the five elements. Caraka states that the *tridoṣas* are eternally present in the body of living beings either normal or abnormal, besides regulating the utilization of the nutrient and energetic fluids at the cellular level. Its significance lies in the fact that all anabolic and catabolic activities that comprise metabolism or digestion are governed by *vāta* which also controls the movements of both *pitta* and *kapha*. Besides *vāta* is involved in voluntary actions and the discharge of waste products through its five forms – *prāṇa* (air breathed into the lungs), *udāna* (that which enters head), *samāna* (essential for digestion), *vyāna* (diffused throughout the body) and *apāna* (that

which goes out of the anus). The functions of both *pitta* and *kapha* have also been thought of in their five aspects.

Another set of five entities in Ayurveda relates to (i) *rasa* (the tastes), (ii) *guṇa* (attributes), (iii) *vīrya* (potency of a drug), (iv) *vipāka* (action or change of drug in the very process of digestion and metabolism) and (v) *prabhāva* (ultimate and decisive influence of a drug). Caraka has clearly stated: 'Rasa is known by its contact with senses (particularly tongue); *vipāka* by observing the effect (of a drug) on the body; *vīrya*, by the action exuded during the period from the administration of a drug to its exertion. In cases where, inspite of similarity in *rasa*, *guṇa*, *vīrya* and *vipāka*, there is difference (in the action of a drug), this is said to be due its *prabhāva*'.

The *Caraka samhitā* has several examples of intellectual discourses, both fundamental and applied. These throw ample light on the methodology by which Ayurveda was text-stabilized and its procedure standardized. But the manner of discussion was also regarded as very important as the theme to be discussed. Carakas says that 'a physician should discuss with a physician' and that 'discussions with specialists would promote the pursuit or the advancement of knowledge, illumine intellect and bring forth new ideas'.

7. Ayurvedic therapy

The three main categories of Ayurvedic therapy (*cikitsā*) are (Singh 1994): (i) divine therapy (*daiva vyapāsraya*), (ii) rational therapy (*yukti vyapāsraya cikitsā*) and (iii) psychotherapy (*sattvāvajaya*). The first one is particularly undertaken in respect of diseases for which no cause(s) can be known with exactitude, but attributed to the result of a patient's actions (*karma*) in his previous birth or births. Ayurveda thus subscribes to the *karma* theory. As in the Atharvavedic practices, such diseases, not necessarily mental or psychical ones, are sought to be cured through prayers, incantations, amulets, propitiation specially of certain god or goddess and the like. This type of 'therapy' continues even to this day practically in every part of the country. The second is in the nature of a rational attempt at curing diseases after the thorough examination of a patient as a whole, his *prakṛti* (temperament and nature) as well as his disease by the methods prescribed in Ayurveda. In this respect, a physician brings to bear upon his experience his knowledge of the postulates relating to *tridosā*, *rasa*, *vīrya* and *vipāka*, *āma* (impaired digestion), *sātmya* (adaptability), *sāmānya* and *viśeṣa* (homologous versus heterologous) and the like, keeping in view the interplay of the five elements and the restoration of the balance of *tridoṣas*. The purificatory as well as the curative methods are the twin aspects of Ayurvedic therapy. The former is, by and large, concerned with what is known as *pañcakarma* (five processes) for both external and internal purification in a

systematic manner. These are: *vamana* (emetics), *virecana* (purgative), *āsthāpāna basti* (enema with medicated decoction, but without oil or *ghee* or any fatty substances), *ānuvāsana basti* (enema with medicated oil or *ghee* or other fatty substances) and *śirovirecana* (errhines, removal of vitiating factors from the head through the nose).

7.1 Diagnosis

The triumph of modern medicine in the cure of most diseases lies in its diagnostic methods and tools. In all of these it is direct perception and inference that provide a modern physician or surgeon an insight into his therapeutic or surgical determinants. Ayurveda recognizes the fundamental importance of examining a patient by direct perception (*pratyakṣa*) and inference (*anumāna*). In addition, however, it accepts verbal or textual knowledge as testimony (*āptopadeśa*) – the orally transmitted tradition or a record of observational experience of Ayurvedic experts in diagnosis in the same way as a student of modern medicine accepts the textual as well as his preceptor's exposition. *Pratyakṣa*, *anumāna* and *āptopadeśa* are called collectively the *trividha pramāṇa* or *trividha parīkṣa* (three methods of diagnostic knowledge or examination).

According to Caraka, the fourth but an important supplementary one, is *yukti* by which a physician should try to obtain information of a disease through experimentation or planned investigations to confirm or otherwise his perceptions of the causative factors of disease based on the first three methods. The physical examination of a patient is carried out using his (physician's) five senses (*pañcendriya parīkṣā* or *pañcavidha parīkṣā*) in the same way as a physician of modern medicine does, but with instruments which are an extension of his sense perceptions. The sixth method, similar to modern medical examination, in Ayurvedic diagnosis is the questioning (*praśna*) a patient in great detail, the interrogation being done in an endearing manner treating the patient as a friend. This method is adopted for gaining an insight into the history of the disease of a patient as well as environmental aspects. More importantly, a patient has to be examined to evaluate ten aspects of (*daśavidhana parīkṣā*), namely: (i) his constitution (*prakṛti*) including his mental and psycho-physical aspects, (ii) disease susceptibility (*vikṛti*), (iii) quality of tissues (*sāra*), (iv) compactness of body (*samhanana*), (v) body measures or anthropometry (*pramāna*), (vi) suitability or adaptability (*sātmya*), (vii) mental strength (*satva*), (viii) digestive power (*āhāra śakti*), (ix) exercise-enduring capacity (*vyāyāma śakti*) and (x) age and the rate of ageing (*vaikaraṇa*). As for the examination or diagnosis of a disease in a patient, eight chosen points (*aṣṭavidha parīkṣā*)

constitute the general examination: pulse, urine, stool, tongue, voice and speech, skin, eyes and the face, followed by the examination of a patient's head and neck, chest, abdomen and the limbs.

The classical Ayurvedic texts do not speak of pulse examination (*naḍī parīkṣā*) at all. Possibly, this practice began to be followed from about the 11th century or so as a result of the interaction with the Siddha (south India: Tamil Nadu) and Unani systems in which pulse examination is an important method. Pulse-reading is intended to find out the nature and the extent of the three *doṣas* (*vāta*, *pitta* and *kapha*) either singly or in combination. This requires sensitive training not only to palpate a patient's pulse but also the proper positioning of the physician's three (index, middle and ring) fingers on the pulse to read mentally the type of vitiation by the rate and rhythm, the amplitude and the volume of pulse. The general understanding is that the first relates to *vāta*, the second to *pitta*, and the third to *kapha*, as communicated to the physician by his index, middle and the ring fingers respectively of the examining physician. If the movement of pulse is like that of crawling of a snake or hopping frog or walking of a swan, as felt by a physician through his index, middle or ring finger respectively, it is recognized that the disease is due to *vāta*, *pitta* and *kapha* respectively. A mixed perception may denote complicated vitiation. There are also claims that a physician who is well trained in pulse examination can perceive the *doṣas* by using only one finger and that the pulse examination is the best diagnostic tool. In practice, this is one of the methods of Ayurvedic diagnosis of a disease, urine and stool examination being also part of eight point diagnosis.

What Caraka called the quadruple and recorded about 1800 years ago is full of meaning even now – the quadruple of physician, drug, attendant and patient. His prescription of qualities of each of the quadruple is noteworthy: 'excellence in theoretical knowledge, extensive practical experience, dexterity and cleanliness (physician); abundance, efficacy, several pharmaceutical forms and normal composition (drugs); knowledge of attendance, dexterity, loyalty and clean habits (attendant); memory, obedience, fearlessness and providing all information about his ailment (patient)'. Caraka adds that, 'this quadruple consisting of sixteen qualities is the cause of success in curing a disease; but the physician is the main person because of his special qualities and expertise'.

7.2 Surgery

Eighty years ago the noted historian of medicine, D Guthrie (1920) remarked: 'It was in surgery above all that the ancient Hindus excelled. Suśruta described more than a hundred instruments. This was their greatest contribution to the art of healing and the work was bold and distinc-

tive. It is not unlikely, though difficult to prove, that some of it was of Greek origin. Some, indeed, state that the Greek drew much of their knowledge from the Hindus (p. 19)'. Another historian of medicine, M Neuberger (1925) pointed out that 'the outstanding feats of the ancient Indian surgery related to laparotomy, lithotomy and plastic operations. (p. 58)'. Suśruta may be regarded as the 'Father of Indian Surgery' since he has provided in his *saṃhitā* a detailed account of several surgical operations, surgical instruments (20 sharp and 101 axillaries) with pre- and post-operative measures (Singh *et al* 1972–1993). What characterizes his treatise is his methodical presentation of the practical dimensions of surgery under eight heads: excision (*chedana*), incision (*bhedana*), scarification or curettage (*lekhana*), puncturing or tapping (*vyadhana*), probing or exploring (*eśana*), extraction (*āharaṇa*), drainage or evacuation (*viśravaṇa*) and suturing (*sīvana*). The sharp instruments, some of them resembling the mouths or beaks of animals or birds, include scalpels, lancets, probes, speculums, forceps, tongs, trocar, needles and syringes. Details have been given of how they should be made from metals, of their dimensions, handles and the like. One can also see in the *Suśruta saṃhitā* a vivid account of some surgical operations like cataract-crouching, anal fistular treatment and rhinoplasty. It would seem that plastic surgery was not in practice in the west till the middle of the 18th century.

The question of the actual dissection of a dead human body needs some explanation. Would it have been possible for an Ayurvedic student to dissect a dead body and thus to observe the human anatomical structure? or was the actual dissection a taboo in view of the social injunctions relating to the impurity associated with touching a dead body? However, the *Suśruta saṃhitā* has recorded as follows:

'... anyone desirous of acquiring a thorough knowledge of anatomy should prepare a dead body and carefully observe, by dissecting it, and examine its different parts. For, a thorough knowledge can be acquired only by comparing the accounts given in the authoritative texts (*sāstras*) with direct observation.' For this purpose, it states:

'A dead body chosen for this observation should not lack in any of its parts (organs); it should not be of a person who has lived up to a hundred years (i.e., ripe old age), nor of one who had died of a protracted disease or of poison. The excrements should be removed from the entrails and the body should be placed in a slow flowing water, taking care to see that it might not be eaten by fish or drift away, after having covered it entirely with the outersheaths of *muñja* grass, *kuśa* grass, hemp or rope, etc. After seven days the body would be thoroughly decomposed, when the observer should slowly scrape off the decomposed skin and others, with a brush made of grass-roots, hair, *kuśa* (grass) blade or with a strip of bamboo and carefully observe with his own eyes all the

different organs, internal and external, beginning with the skin . . . ' (Su.Śā.III.5.61).

It is true that there were social injunctions against a dead body or its use other than its disposal by cremation or burial. The polluting aspect of a corpse or the segregation of those who touched it until they underwent purificatory bath or rites was a part of social compulsions. Nonetheless, there is no denying that the art of surgery would not have attained an appreciable expertise which was essential in cases that needed surgery, were it not for the careful observation of the internal human body by medical students of the time. The importance of personal direct observation of dead body for a surgeon or a physician to gain anatomical knowledge was strongly advocated by Suśruta.

8. Unāni

The Greek medicine or the Hippocratic and later the Galenic system (Hippocrates being the propounder and Galen, its admirer) underwent improvement, modification and diligent systematization by Arabic medical writers. It was carried to Europe during the 11–13th centuries (Savage-Smith 1994). At the same time, with the coming into being of Muslim rule in India, the Greco-Arab medicine or unani made its debut into India. In the succeeding centuries, under the patronage of Muslim kings, Unani began to take roots flourishing specially under the Mughal rule. The other independent kingdoms like those of Adil Shahi and Qutub Shahi as well as in Oudh, Rohelkhand, Karnataka and Bengal also encouraged Unani medicine (Aziz 1961). This new entrant, however, was not looked upon as their opponent by the followers of Ayurveda. Instead, they welcomed it, and Hakims and Vaidyas worked side by side whenever the occasion demanded, and the Muslim kings patronized both. They met and discussed, then as now, as physicians, not as Hindu or Muslim.

The reason was not far to seek. The basic approach of Ayurveda and Unani to the preservation of health and the cure of diseases was more or less the same, though they differ in some fundamental postulates. According to Unani, the human body and its health are constituted of seven components: elements (*Al-Arkān*), temperament (*Al-Mizāj*), four humours (*Al-Akhlat*), organs (*Al-A'da*), vital spirit (*Al-Arwāh*), faculties (*Al-Quwa*) and functions (*Al-Afāl*). The Unani concept of elements is that of Empedocles (5th century BC) – earth, fire, water and air with their four primary qualities: hot, cold, dry and moist. While this postulate was made use of by Alexandrian alchemists, Hippocratic medicine viewed it in a different perspective. The viability of Indian five elements (four of this type and *ākāsa*) in the Ayurvedic matrix has been discussed before.

Such an application of five elements towards the explanation of physiological processes is noted for its absence either in Greco- or in Greco-Arabic medicine. In contradistinction to the *tridoṣa* of Ayurveda, Unani adopted four humours: (i) blood or sanguinous humour, (ii) bile or bilious *ḥne*, (iii) phlegm or serus and (iv) black-bile or atrabillious one. Like in Ayurveda, preventive medicine or self-health care is an important aspect of Unani system. Ibn Sīnā has defined medicine (*tibb*) as the knowledge of the estates of the human body in health and decline in health; its purpose is to preserve and endeavour to restore it whenever it is lost.

Unani physicians depend by and large on pulse-reading and the examination of urine and stools as the diagnostic indicators of a disease. But, as in Ayurveda, they take into consideration the whole personality of a patient in diagnosis and prescribe therapeutic procedure in terms of regimental, dietetic and pharmaco-therapy as well as surgery when needed. Medicated baths – cold for a normal person, and a hot one for certain ailments – are also important, according to Unani. Its materia medica includes mostly herbal drugs, besides some of animal and mineral origin. The Unani concept of temperament has its own originality and even drugs are supposed to have their temperament, according to which they are classified.

Unani made rapid strides and attained high status during the Mughal rule (1526–1707). There were many notable Hakims during this period, who left behind their medical treatises which have added a veneer of excellence to the Indian medical literature.

9. Rasaśāstra and the Siddha system

Of the Indian medical trinity – Ayurveda, Unani and Siddha – Ayurveda has its roots in Vedic literature, while Unani, which is Greco-Arabic medicine, owes its origin to Central and West Asia. Neither of them, however had any alchemical undertone. The Siddha system was regionally confined to Tamil Nadu and its adjoining areas among Tamil-speaking people. There is a proverb in Tamil that 'a physician is the son of an alchemist' (Subbarayappa 1997).

Around the fourth century AD, the seeds of a new thinking coupled with esoteric practices, but inspired by Chinese alchemy, began to sprout. In the succeeding five or six centuries, this manifested itself in the form of *Rasaśāstra* (Sanskrit tradition) and Siddha (Tamil tradition). It should, however, be emphasized that they were, and are, the two sides of the same coin, owing allegiance to the alchemical supremo, mercury, and its compounds as well as some processed minerals as elixirs of life to attain immortality or 'deathlessness' of human body in contradistinction to Ayurveda and Unani which at best attempt to rejuvenate and prolong human life, accepting the inevitable death of the body.

The Rasasāstra and Siddha system in course of time developed a materia medica, including elaborately processed mercury, sulphur, arsenic substances, metals, and minerals including gems. Both were concerned with rejuvenation and life-prolonging methods. In this respect the Kaya Kalpa method of the Siddha system (Velan 1963), presumed to lead to a youthful state over a long span of one's life, is still being practised. Both the Rasasāstra and Siddha system have now joined the mainstream of Ayurveda by adopting *mutatis mutandis* the fundamental principles of Ayurveda.

The canvas of Ayurveda was wide, encompassing as it did plant and animal life in its totality, the *Vṛkṣāyurveda* being concerned with the former, while the *Hastyāyurveda*, *Aśvāyurveda* and *Gavāyurveda* with elephants, horses, and bovine animals respectively. Ayurveda, therefore, emerged as the science of life in its diverse forms, and its medicinal armamentarium largely comprised plant extracts but included some animal products too.

Over the five decades since Indian independence, the three traditional systems of medicine – Ayurveda, Unani and Siddha – have made considerable progress in respect of their education and practical training. The Central Council for Research in these systems has been engaged in the scientific investigations and clinical trials, of several chosen traditional drugs like those which claim their efficacy in curing diseases like peptic ulcer, amoebic dysentery and hypertension. The results in some cases have been positive. It would, however, appear that such investigations are few and far between. More systematic investigations are indeed necessary if the traditional drugs are to be preferred to their counterparts of modern medicine. Some pharmaceutical firms have expanded their activities in this direction. In any case, the traditional systems of medicine continue to find markets in India and abroad.

10. Concluding remarks

Perhaps it would be unfair to compare the traditional medical approach with that of modern medicine on the plank of proven efficacy, verifiability and reproductivity. For, the foundational ideas of traditional medicine differ from those of modern medicine. It should be recognized that traditional medical systems had a philosophical basis in relation to man and nature, his environment and the body-mind concord, unlike modern medicine which seems to lack such a basis, concerned as it mainly is with diseases, their recognizable causes and verifiable or reproducible curative methods. However, it would appear that of late the modern medical approach also is towards what may be called 'whole man medicine'; but it is still in its infancy.

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