



Golden Jubilee Special Article

Susruta of Ancient India

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"It is interesting that while in Hindu medicine, cataract was defined by Susruta as opacity due to derangement of the intraocular fluid, subsequent history is full of fantasies and prejudices concerning its nature."

Duke Elder¹

"All in all Susruta must be considered the greatest surgeon of the pre medieval period."

A.O. Whipple²

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The Golden Age of Surgery in ancient India rests largely on the accomplishments of Susruta, who lived sometime between 800 and 600 B.C. Susruta practiced and taught the art of surgery at the University of Benares in the ancient city of the same name, located on the banks of the river Ganges. His monumental treatise on Surgery, *Susruta Samhita* established him as the Father of Indian Surgery. He was the first surgeon to systematise surgery by dividing it into separate fields. He is known as the originator of plastic surgery, cataract operation, laparotomy, and vesical lithotomy. He also described diabetes.

Medicine in Pre-Susrutian India

The history of medicine in pre-Susrutian India goes back to remote antiquity. Muthu places this period between 4000 and 900 B.C.³ The earliest documents of Indian medicine are found in the Vedas, the oldest sacred books of the Hindu religion. These were compiled in Sanskrit, between 3000 and 1000 B.C. This era is referred to as the Vedic period, during which the four Vedas, namely the *Rigveda*, the *Samaveda*, the *Yajurveda*, and the *Atharvaveda* were compiled. *Ayurveda* was the name given to the art of healing. Hindus believed the Vedas to be of divine origin. Most of the early Vedic medicine was compiled in *Atharvaveda*, which was an amalgam of religion, magic and empiric elements. Medical historians discovered with some surprise that Vedic priests were aware of the connection between dropsy and cardiac problems. The long period of Atharvavedic medicine was replaced by the period of rational medicine around 1000 B.C.

The Period of Rational Medicine

The period between the seventh and first century B.C. saw an immense change in thinking across the ancient

world: Greece, China, Mesopotamia, and India. In each of these widely separated centers of civilisation, there was evidence of an advance in speculative thought.

Charaka, a contemporary of Susruta, compiled a medical treatise known as *Charaka Samhita*,⁴ which is acclaimed as the finest document of the creative period of ancient Indian medicine (600 B.C to 200 A.D.) Charaka's fame spread to Arabia. Avicenna quoted him as "Scirak" and Rhazes, had earlier referred to him as "Scarak," and one of the earliest Arabian authors, Serapion, mentioned him as "Zarch." Charaka's eight branches of medicine, translated into Arabic, were well known in Arabia.⁵

The Age of Susruta

Susruta's time has long been a controversial subject among many medical historians. The date has never been definitely set for lack of direct evidence. The original autographic manuscript of *Susruta Samhita* has not survived. Extant are only copies of copies and revisions of revisions. One of the most important documents in connection with ancient Indian medicine is the Bower Manuscript, housed in the Oxford University library.⁶ It was found in eastern Turkestan in 1890 and is named after the man who brought it. Hoernle edited this document critically and placed its origin around the fifth century B.C. The fact that Susruta's name is mentioned in this document places him in the fifth century B.C. or earlier.

The lack of knowledge of the Sanskrit language may have led to the neglect of the history of Hindu medicine. India was indeed the birthplace of medicine and surgery.⁷ H.H. Wilson (1823) and J.F. Royle (1837) pioneered the study of Indian medical history.⁸ T.A. Wise's *Commentary on the Hindu System of Medicine* (1845) provided the first complete survey.⁹ Before these investigations, Indian thought had received scant attention from medical historians. Sprengel devoted only eight pages of his work to India, Haeser (1845) wrote no more than two, and Renourd, (1846) still considered the Hindus an inferior race.

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Because many later Vedic hymns are ascribed to Susruta, it follows that he must have flourished during the latter part of the Vedic age, which would place him around 1000 B.C. Hoernle contends that a larger portion of the *Atharvaveda* admittedly belongs to a period as early as 1000 B.C., since the hymn in question is included in the older portion. Johnston-Saint suggests that Susruta was a contemporary of Buddha (600 B.C.) because of the style of language used.¹⁰ However, after a thorough study of the subject, Wise concluded that *Susruta Samhita* was prepared in an extremely early age, probably from the third to the ninth century B.C. He based his argument on the ancient form of construction of the Sanskrit language used in the manuscript. The *Samhita* was translated into Arabic before the end of the eighth century A.D. and was named *Kitab-I-Susrud* by Abillasiabil. Rhazes repeatedly quotes Susruta as the foremost authority in surgery.¹¹ *Samhita* was translated into Latin by Hessler, into English by Hoernle, and into German by Muller in the last century.

Susruta divides his *Samhita* into six parts, covering all the branches of medicine, including hygiene, midwifery, ophthalmology, toxicology, psychosomatic ailments and materiamedica. Susruta considers surgery the first and foremost branch of medicine and states: "Surgery has the superior advantage of producing instantaneous effects by means of surgical instruments and appliances. Hence, it is the highest in value of all the medical *tantras*. It is eternal and a source of infinite piety, imports fame and opens the gates of Heaven to its votaries. It prolongs the duration of human existence on earth and helps men in successfully fulfilling their missions and earning a decent competence in life."

Ophthalmology

Susruta devotes 18 chapters to describing 76 different diseases of the eye of which 51 require operations. Susruta who is said to be the first surgeon to have removed cataracts, described varieties of cataracts along with the depression method of couching by the anterior root.

Susruta described and used 101 blunt instruments and 20 sharp instruments, which "should have an edge so fine that it should divide the hairs on the skin."

According to Susruta, the eye, which "resembles the teat of a cow," is composed of five basic elements: the solid earth (*Bhu*) form muscles, heat (*Agni*) is in the blood that courses in its veins/arteries, air (*Vayu*) forms the black part (iris/pupil), the fluid element (*Jala*) forms the lucid part (vitreous), and the void (*Akasa*) forms the lacrimal ducts/sacs for discharge of secretions. Anatomically, he outlines five subdivisions (*Mandalas*) of the eye: eyelashes (*Pakshma-mandala*); eyelid (*Vartma-mandala*); sclera/cornea (*Sveta [or Sukla]-mandala*); choroid (*Krishna-mandala*); and pupil (*Drishti-mandala*), which "looks like a hole and is the size of a Lentil seed." *Sandhis* represent the "joints" where the mandalas bind or connect. An example of a disease involving one of

the *Sandhis* is allergic blepharitis (*Krimi-granthi*): "a swelling (*granthi*) characterized by itching at the joining of the eyelashes with the eyelid."

Medical treatment for these ocular conditions was formulated according to which component of the *Dosha* was predominantly abnormal. Matured clarified butter (*ghee*), breast milk, and Saindhava Salts were frequently used, in addition to plants and meats in the form of eyedrops (*Aschyotanta*, made by folding and squeezing materials through a piece of silk), salves (*Anjana*), snuffs (*Nasya*), and fumigation (*Dhuma*). Additionally, linen-soaked bandages, venesections, soothing measures (*Tarpana*), and emetics/purgatives were employed.

As one would expect in a region so close to the equator, ocular conditions sensitive to ultraviolet light, such as cataract and pterygia, were common maladies. In addition to the technique of cataract extraction, Susruta describes such modern concepts as antiseptics, anaesthesia, and postoperative care. The following is a direct translation from the original Sanskrit of what may be the first record of extracapsular extraction:

"...This procedure is auspiciously performed primarily in the warm season...[Preoperatively] the skin is rubbed with a pledget of cotton saturated with an oily medicinal followed by a heated bath. The patient is given a light refreshment. The sick room is fumigated with vapours of white mustard, bdellium, nimva leaves, and the resinous gums of shala trees (in order to rid the area of insects and the diseases they harbor)... Incense of cannabis is used in addition to wine for sedation... [Technique] The patient sits on a high stool with the surgeon facing him. The hands are secured with proper fastenings. The patient is asked to look at his own nose while the surgeon rests his little finger on the (bony margin of the outer angle of the orbit), holding a *Yava Vaktra Salaka* between his thumb, index, and middle finger. The left eye should be pierced with the right hand, and vice versa. The eye is entered at the junction of the medial and lateral two-thirds of the outer portion of the sclera. If a sound is produced following the gushing of a watery fluid, the needle is in the correct place, but if the puncture is followed by bleeding, it means that it is misplaced. The eye is then sprinkled with breast milk. Care is taken to avoid blood vessels in the region. The tip is then made to incise the (anterior capsule) of the lens. With the needle in this position, the patient is asked to blow down the nostril, while closing the opposite nare. After this, lens material (*Kapha*) is seen coming alongside the needle. When the patient is able to perceive objects, the needle is removed... [Postoperatively] indigenous roots, leaves, and ghee are applied with a lined bandage. Patient then lies flat and is asked not eructate, sneeze, cough or move. The eye is examined every fourth day for ten days. If the whitish material recurs, the same procedure is repeated...."

Many stages of pterygium (*Armes*) are described as distinct diseases. Once medical treatment with the topical



drops and salves was exhausted, surgical excision of the inflamed pterygium was considered. Though instrumentation and perioperative medicinals have changed, the following excerpts illustrate a technique quite similar to those used today: "Perioperatively the eye is irritated with saindhava salt and soaked with a warm compress. The patient faces the surgeon while sitting and is asked to look at the interior corner of his affected eye. The lids are held wide apart and the pterygium is secured with a hook and held with a threaded needle. This is then excised at its base with the mandalagra instrument. The root of the pterygium should be pushed asunder from the cornea and then removed. Postoperatively the area is rubbed with a compound made up of various salts, fomented and bandaged for three days. This will recur if not properly excised."

Treatment of trichiasis (pakshma-kopa) was also a common procedure. This may have been secondary to widespread trachoma in the subcontinent during this era. The following description has been likened to the jaeschearlt procedure used by oculoplastic surgeons in modern times. "After being treated with *sneha* (a special diet) the patient sits facing the surgeon. An excision in the shape and size of barleycorn should be made in the eyelid horizontally parallel leaving two parts below the eyebrow and one part above the eyelashes. The surgeon should then suture up the two edges with horse's hair. An application of honey and ghee should be applied. A piece of linen should be tied around the forehead and the horse's hair sewing up operated part should be attached thereto. The sutures are removed once there is adhesion of the two edges. If this does not succeed, cauterization of the upper lid or complete epilation should be preformed."

The great highlight of Susruta's surgery was however, the operation of rhinoplasty. The making of a new nose captured the imagination of the medical world and brought him fame as the originator of plastic surgery.¹²

Ayurveda Today

With the spread of Islam during the Middle Ages, Indian medicine passed under Arabic domination and gradually its influence declined. However, even today Ayurvedic medicine continues to be practised in India and recently has seen a revival.

In the West, there is a lack of recognition, even awareness, of early Indian contributions to medicine. This is evidenced by the fact that many books on the history of medicine make no mention of ancient Indian medicine. Several factors explain this. First, Sanskrit, which is the language of most ancient texts, is very difficult to master. Secondly, there are few Sanskrit scholar-physicians available to translate the material into western languages. The knowledge of Ayurveda was guarded as family secret by people of the priestly class who practiced it. Lastly, one of the reasons is given by Johnston Saint:

"Our system of classical education had already given us an apparent beginning for all the arts and sciences. A disproportionate part of our education was devoted to ancient Rome and Greece where we learned all about Apollo and Aesculpius and in Greek history we came to Hippocrates. Here we had got a founder of medicine already for us, and that there might have been anyone before him, few of us were disposed to inquire."

Indian versus Hellenic Influence

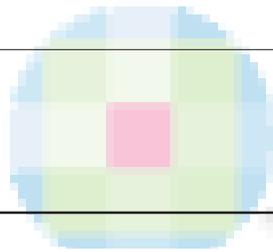
No discussion of Indian medicine is complete without discussing medicine in ancient Greece. The question of who borrowed medical knowledge from whom has always been a stimulating topic. A small school of medical historians believes that the East contributed nothing whatsoever to ancient medicine, and that the Hellenic influence dominated medical practice in ancient India and other Arabic countries. Some even question the existence of Susruta and his *Samhita*. Johann Hermann Bass, the German medical historian, went so far as to assert that Susruta had been none other than Hippocrates. The name, he argued, had been confounded with Socrates in the Indian tenets and finally transmitted as "Susruta." Bass saw proof of his thesis in the fact that Susruta's birth place was given as Kasi, an old name for Benares. That was obviously a distortion of the name of the Greek island of Kos, where Hippocrates was born. Commenting upon this apparently distorted version, Gordon¹³ comments, "How one clever enough to read Hippocrates in the original and reproduce it in his own language could mistake the name of Socrates for Hippocrates surpasses one's imagination." Gordon concludes that Indian medicine, especially its surgery, developed in ancient times, most probably independent of Greek medicine. Thorwald,¹⁴ following his detailed discussion of Indian medicine, asserts that Greek medicine including that variety of it called Hippocratican, had produced nothing in the field of surgery that could remotely compare with the striking ideas of Susruta. Royle, one of the earliest authorities on Indian medicine, gives evidence that Hippocrates borrowed much of his materia medica from the Hindus. Wise, another scholar in ancient Indology, says it is to the Indians that we owe the first system of medicine. Neuberger¹⁵ concluded that "Greek medicine adopted Indian medicaments and methods which is evident from the literature." As to the relationship between Indian and Arabic medicine, it is well documented that works by Susruta and Charaka were translated into Arabic.

It is reasonable to state that Ancient Hindu and Greek systems of medicine were independent of each other.¹⁶ However, contact between the two civilisations first became intimate through the march of Alexander and continued unbroken through the reign of Diadochoi, and the Roman and the Byzantine eras. As a result, Hindus probably borrowed some ideas from Greek medicine which Greek physicians of the time borrowed drugs and surgical techniques from ancient India.



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Stories from stamps



Atharvaveda



Susruta (600 BC?)



Long before the Christian era, the sacred four Vedas were composed by ancient sages of India. 'Ayurveda' is the subsection or *Upanga* of 4th Veda i.e, *Atharvaveda*. It is devoted to medicine and knowledge of longevity. Here, the saying is '*nayanam pradhanam*' which means without it there is no correspondence with external world.

Susruta lived in Kashi (Varanasi) of India. He was the pupil of Lord Dhanvantari, and was the greatest Indian surgeon and pioneer in *cataract surgery by couching*. He is the author of *Susruta Samhita* (The Compendium of Susruta). In *Uttaratantra*, the appendix or last section of *Susruta Samhita*, 76 eyes diseases have been described in detail with their medical and surgical treatment.

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