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SURGICAL CONCEPTS OF SUSHRUTHA SAMHITA

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ABSTRACT

The "Sushruta Samhita" is an ancient Sanskrit text that covers areas of both surgery and medicine. It is widely regarded as one of the most important documents on these topics to have reached present day from the ancient past. This compendium is also considered to be one of the main foundations of Ayurveda, which is a traditional form of Indian medicine alongside *Charaka-Samhitā*. The *Sushruta Samhita*, in its extant form, is divided into two parts containing 184 chapters, descriptions of 1,120 illnesses, 700 medicinal plants, 64 preparations from mineral sources and 57 preparations based on animal sources. *Sushruta Samhita* is said to be the most comprehensive treatise written on surgical practice. This treatise is the main source of knowledge about surgery in ancient India. *Sushruta* became the master and pioneer of this science. The modern surgery is also said to be developed from the basics provided by *Sushruta*. The fact that *Sushruta* made the beginning of every aspect of surgery, documented the techniques covering all minute details of *Shalya Tantra* in an era which lacked scientific advancements and technical help and with almost no facilities available makes us bow down our head with respect and reverence to this great saint and teacher of Ayurveda.

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INTRODUCTION

Sushruta Samhita, work of *Maharshi Sushruta* is one of books of ancient India which has merited the attention and admiration of Modern world. It is one of the greatest of its kind in Sanskrit literature. The book written about 2000 years ago deals with Medicine and Surgery. *Sushruta* was emphatically a surgeon and his work *Sushruta Samhita* is the only complete book that deals with problems of surgery and midwifery. To *Sushruta* may be attributed the glory of elevating the art of holding a lancet or forceps to the status of practical science.

Sushruta called Ayurveda a sub-division of *Atharva Veda* (*Su. su-1/6*). This seems to have bearing on the fact that while thoughts on medicine mostly occur in *Rigveda* and ideas of surgery is found in *Atharva Veda*. *Sushruta*, basically being a surgeon traced origin of his science to *Atharva Veda*. It is also held that *Sushruta* relied heavily on *Vedic* literature for his source material. Material on medicine and Surgery available already in *Vedic* literature was scanty and scattered. *Sushruta* made a careful study of these and collected them in a book with enormous additions from his own observations and experimentation. It is an advanced treatise meant for a specialized and rather a technical audience of those times. The *Sushruta Samhita* has been divided into six sections, each dealing with a specific subject. *Sutr-sthana*, the first section with surgery and *Uttara-sthana* with Ophthalmology, diseases

of Ear, Nose and Throat. The other four being *Shareera sthaana* (Anatomy), *Nidana sthaana* (Pathology), *Kalpa Sthana* (Toxicology) and *Chikitsa sthaana* (Therapeutics).

In all, there are 186 chapters individually titled. This book mentions 85 animals, 125 surgical instruments, 500 drugs, 700 medicinal plants and over 1000 diseases. The surgical operations and scores of instruments used have surprised Modern surgeons in particular. The book discusses in great detail and with masterly touch, different types of surgical operations and their techniques, anesthesia, sterilization, hospitalization and much more.

The story of the progress of Ayurvedic surgery is long and interesting. So much for the history of *Vedic* surgery. It is in *Sushruta Samhita* that we come across a systemic method of arranging the surgical experiences. *Sushruta* devoted his whole life in the pursuit of surgery proper. It was he who classified all surgical operations under the following headings (*Su. su-25/2-16*)

- | | | |
|-------------------|---|----------------------------|
| a. <i>Aharya</i> | - | Extraction of solid bodies |
| b. <i>Bhedya</i> | - | Incising |
| c. <i>Chedhya</i> | - | Excising |
| d. <i>Eashya</i> | - | Probing |
| e. <i>Lekhya</i> | - | Scarifying |
| f. <i>Seevya</i> | - | Suturing |

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- g. *Vedhya* - Puncturing
 h. *Visravya* - Evacuation of fluids

Any operative maneuver involves one or more of these procedures in combination. He has described them in such a way that even today; it will be hard to add further to these basic procedures. Similarly, types of stitches as Straight (*Riju*), Interrupted Continuous, (*Vellitaka*), Blanket (*Gophanika*) and Running (*Tunna sevani*) are also described (*Su.su-25 /19-21*). Many materials have also been introduced from fibers of the tree bark to threads of cotton and silk for the purpose of suturing.

Surgery is said to carry out by three measures-Instruments, Caustics and Cauterization. The number of surgical implements described in *Susruta Samhita* is decidedly small in comparison with almost in-exhaustible resources of Western surgery. But the knowledge and the achievements of surgeons of yore are glorious and outstanding. Here are some of the surgical specialties one can come across in *Susruta Samhita*:

Anatomy & Dissection

Susruta says that theory without practice is like a one-winged bird that is incapable of flight. The text book of *Susruta* is more systemic in arrangement and exhibits better knowledge of Anatomy, Pathology and indicates a more advanced state of knowledge (*Su. Sa. -5/47*). For a successful surgeon, knowledge of anatomy is necessary *Susruta* himself being a practicing surgeon, was the first to advocate dissection of dead bodies as indispensable for a successful student of surgery. Although this type of dissection was very crude, the very idea of anatomical study was considered important is a noteworthy contribution of *Susruta*.

It is stated that every medical student should conduct dissection of dead body to comprehensively learn the anatomy. Dissection was conducted with ultimate precision during *Susruta's* period. *Sushruta* has also given details of dead body preservation. This knowledge of anatomy enabled *Sushruta* to document every minute detail of the organs, tissues, blood vessels, nerves, bones and joints etc, with reference to their structure, quantity, shape, size, capacity, location and dimensions. This knowledge was thought to be mandatory for becoming a surgeon.

Anaesthesia

Susruta has felt the necessity of making the patient insensible to pain for the successful performance of operation and for this purpose, has advocated the use of Wine. Intoxication with beverage makes the patient insensible to the instruments. In the absence of satisfactory anaesthesia, sufficient stress was laid on the speed, presence of mind, correct diagnosis and the sharp instruments of good quality. Although, the use cannabis, *Sammohini* and *Sanjivani* herbs are reported to have been used in later periods for the purpose of anesthesia, *Susruta* must be credited and accepted as pioneer of anesthesia in the remote past history of Indian surgery.

Study of practical surgery

Sushruta may be the first person to imagine, evolve and introduce simple experimental models for the training of surgical procedures. *Sushruta* insists that the surgical procedures like incision, excision, suturing etc should not be

practiced on the human body at the first attempt. He opines that these procedures should be first practiced thoroughly on props like flowers, fruits, toys etc during the course of learning the operative surgery. Once they are learnt with ultimate precision, the procedures shall be conducted on human body. One wonders *Susruta* talking extirpation of uterine excrescences and discourse on the necessity of observation with caution while surgically operating upon uterine tumours (*Su. Su.-9/3-14*).

Mid Wifery

In the region of practical mid-wifery, one becomes so impressed with the greatness of *Susruta*. Different turning, flexing, gliding movements, the application of forceps in cases of difficult labour, and other obstetric operations such as craniotomy, were systematically described in *Susruta Samhita* long before fillets and forceps were dreamt of in Europe. He advocated caesarian sections in hopeless cases of obstruction and also the puerperal management, lactation and child care substantially (*Su.ni.-8/10-14*).

Elaborate instructions have been given for making perineal incision and instrumental parturition and also about the post-operative care and general management.

Ophthalmic Surgery

Of the seventy six varieties of ophthalmic diseases, *Susruta* holds that fifty one are surgical (*Su.us.-8/3-5*). Mode of operation to be performed in each of 51 diseases is elaborately discussed. To *Susruta* goes the credit of cataract crouching (*Su.us.-8/11*).

Orthopaedic Surgery

Susruta classified and given the details of six types of dislocations (*Sandhi mukta*) and Twelve varieties of fractures (*Kanda-bhagna*). The principle of fracture treatment has been given as:

1. Traction
2. Manipulation
3. Apposition
4. Stabilization (*Su.ch.-3/18*).

Differentiating the skeletal injuries into simple and compound fractures, *Susruta* has given importance to avoiding sepsis and discusses the prognosis in terms of age and nutrition. Mentioning the complications of fractures, *Susruta* insists on obtaining physiological and anatomical ideal union. Physiotherapy has received due attention. He also indicated internal medicines, external applications for better healing. In case of mal-union, reduction and proper apposition after re-fracture have been advocated. (*Su.ch.-3/52*).

Treatment of open wound first in case of fracture with *vrana* is also described. Characters of ideal union of fracture were described. Thus orthopedic surgery including certain measures of re-habilitation has been described in brief by *Susruta* in his work (*Su.ch.-3/70*).

Ano-Rectal Surgery

Describing certain surgical conditions of Ano-rectal region, *Susruta* has given different methods of management both

hemorrhoids and Fistula-in-ano along with the classification and palliative management (*Su.ch.-8/4-8*).

Medical management, Cauterization by Caustics (*Kshara-sutra*), Cauterization by fire (*Agni-karma*) (*Su.ch.-8/13*), and finally surgical excision have been advocated as order of priority in handling ano-rectal cases (*Su.ch.-6/3*).

Different types of incisions to remove fistulous tracts have been described for adoption depending upon the type of fistula (*Su.ch.-8/10-12*). The incisions are:

- | | | |
|----------------------------|---|----------|
| a. <i>Langalika</i> | - | ‘T’ |
| b. <i>Ardha-Langaliaka</i> | - | ‘L’ |
| c. <i>Sarvabhadra</i> | - | Bracket |
| d. <i>Chandrardha</i> | - | Curved |
| e. <i>Kharjura Patraka</i> | - | Serrated |

Susruta's special method of treating fistula with *Kshara-sutra* has stood to the test of the time. Considering the gravity of the problem, which has not been solved even today due to its tendency to recurrence, *Susruta*'s method of *Kshara Sutra* which achieves practically nil recurrence is a significant contribution in the treatment of ano-rectal diseases.

Urological Surgery

The management of urinary stone is yet another subject which speaks high of his practical experience and logical approach to the problem. Varieties of stones, their signs, symptoms, methods of extraction and their operative complications are discussed in detail. Perineal Vesico-lithotomy was described very vividly (*Su.ch.-7/30-33*). *Susruta* has advised to remove the stone as a whole and to avoid injuries to the sphincter, Careless counter opening of the bladder. Complications that may follow immediately or later due to the injury to adjacent structures were detailed (*Su.ch.-7/36-39*).

Traumatology

In the subject of trauma, *Susruta* peaks of six varieties of accidental injuries encompassing almost all parts of the body. They are *Chinna*, *Bhinna*, *Viddha*, *Kshata*, *Picchita*, and *Ghrishtha*. It is a matter of pride to observe here that his classification has not changed even after many centuries except for the Fire-arm injury (*Su.ch.-2/9*).

Amputations

The description of this particular subject conclusively shows that *Susruta* does not rest content with bursting or opening of abscess and healing the incidental wound. He laid down process for major operations as well. The removal of cicatrix until it becomes the same colour with that of the surrounding and growth of hair there on are suggestions which we find nowhere else.

Plastic Surgery

In the field of reconstructive surgery lies his outstanding contribution, taking into consideration the limitations under which surgery had to be done in those days. Elaborating basic factors involved in proper healing, he draws attention of the surgeon to the fact that a wound would not unite in all such conditions, where there is an interposition of haemetoma due to excessive bleeding or complete absence of the bleeding of the edges of the wound happen to be infected. (*Su. su.-16/19*). He

lays down basic principle of plastic surgery by advocating a proper physiotherapy before the operation and describes various methods for different types of defects (*Su. su.-16/14-17*) Viz.

1. Release of the skin for covering small defects.
2. Rotation of the flaps to make up for the partial loss.
3. The pedicle flaps for covering complete loss of skin from an area.

The *Sushruta* mentions various methods including sliding graft, rotation graft and pedicle graft. Reconstruction of a nose (rhinoplasty) which has been cut off, using a flap of skin from the cheek is also described. Rhinoplasty, Labioplasty too has received his attention. (*Su. su.-16/48-54*). All the principles of plastic surgery viz, accuracy, precision, economy, haemostasis and perfection find an important place in his writings on this subject. Passage of time with improvements in instruments, aseptic measures, availability of sophisticated technology and gadgets could hardly change or modify or add to the basic principles enumerated by *Susruta*. Hardly have any such perfect principles of vital importance and wide applicability on fundamental issues been recorded with such clarity, emphasis and which have become authoritative dicta today. This alone can be taken as single yard-stick to grade in this field of *Susruta*'s contribution.

In Encyclopedia Britannica, it was written that ‘the result [of plastic surgery] appears to be tolerably satisfactory and the modern operation has certainly derived indirectly from this ancient source.’ This is no ordinary tribute to a book that was written 20 centuries ago.

Surgical Patho Physiology

The *Vrana* or injury involves breakdown of body components and may have one or more seats for occurrence. Classically *Vrana* is the ultimate explosion of the underlying pathological structures. *Susruta* makes his own contribution of a six stage continuous Patho-Physiological sequences to the understanding of the disease process. He insists that if a surgeon understands these sequential patho-physiological events (*Shat-Kriyakala*) the treatment for a particular stage of the disease process can be done effectively. (*Su. su.-21/36*).

Surgical Instruments

The status of surgery during any period can be best evaluated by the type of instruments in vogue during that period. Judged by this standard, what we find in *Susruta* is admirable. Infact, an aspect of *Susruta Samhita* that has received great attention and admiration of modern system is that, over 125 surgical instruments were mentioned in it for various purposes. These include knives of different patterns, scissors, saws, needles, instruments for drawing fluid from the body, spatula, tubes, leaves, hooks and probes. In addition to this, also the description of their shape, size, utility, testing, tampering and handling of these instruments have been mentioned. Generally the heads of the instruments are shaped into likeness of heads of animals or birds and are named after such animals and birds (*Su. su.-7/4-25*).

Along with the explanation of various types of surgical instruments (*yantras* and *shastras*), methods of sterilization of the same, 8 types of surgical procedures (*ashta vidha shastra*

karma), shashti upakrama (60 types of management of wounds) have also been described which are the specialties of the treatise

Susruta considers human hand as the most important Surgical instrument but for which the operation of other instruments ceases. (Su. su.-7/1). Besides this there are number of minor appliances 'Upayantras' comprising of rope, braided hair, silk thread, bark, linen etc. All these instruments have fixed sizes (Su. su.-8/14-16). He gives instructions on how to hold and handle an instrument during the course of an operation (Su. su.-8/8-13). Similarly, sharp instruments (Shastras) meant for cutting, incising, scraping, puncturing and for performing blind surgical procedures at deeper and unapproachable sites are described in detail with their specific place of application (Su. su.-18/17-31).

Others

Apart from the above, surgery of intestinal obstruction (baddh-gudodara), perforated intestine (Chhidrodara) have also been mentioned (Su. chi.-14/17). Accidental injuries to abdomen (Ashaya-bhinna) in which protrusion of omentum occurs are also described, along with their management. Susruta also advises application of heated instruments for fear of pus formation. Infact, he is the forerunner in respect of the concept of asepsis which was later elaborated and specified by Lister.

It is not always seen that the disease is cured with one form of management. Alterations may be required some times. But Susruta advices that it is wise to change judiciously the treatment instead of combining a number of procedures simultaneously. Susruta says that there can be nothing more magnificent than the act of removing the human suffering. The science of life in practice is Godly, life giving, indeed it is virtue and fame personified.

CONCLUSION

A basic stand point that one can postulate after the study of full text of Susruta Samhita is that, Susruta's is not an elementary work on its chosen topic. The style of writing, its cogency as well as compactness, the treatment of subject, and the extensiveness of the topics covered are all like of those of a master crafts man and not of an elementary plodder or a stray worker. He has succeeded in surviving till now and so long because he succinctly incorporated much that was found useful and worth commenting upon.

His work in fact is a neat summing up, a compilation of a great body of tested and settled knowledge on a chosen field and rather specialized for an expert and practicing professional circle. It is not a general text book by any means that proposes to cover the subject from a basic to a higher level gradually and logically.

The organization is well planned, detailed and explicitly stated beforehand within such a highly predetermined framework and workman ship. The chief burthen of the author is closely adhered to and meticulously executed down to the extent of many a cross reference later on to previous slokas. It is a very properly knit body of writing, in spite of its considerable extensiveness and is neither loose nor rambling anywhere.

Much like our present-day manuals and scientific treatises, Susruta Samhita contains a glossary 'Tantra Yukti name adhyaya' to explain the technical terms used in the book. There are 32 of these adhikaranas, yoga, vikalpa, nirnaya etc... This chapter is one more example of the total professionalism exercised by the author.

No single surgeon in the history of the science has to his credit such masterly contribution in terms of basic classification, thoroughness of management of disease and perfect understanding of the ideals to be achieved.

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