“All hold this Tantrum to be the most important of all the other branches of the Ayur Veda in as much as instantaneous actions can be produced with the help of such appliances as surgical operations, external applications of alkalis, cauterization, etc., and secondly as it contains all that can be found in the other branches of the science of medicine as well, with the superior advantage of producing instantaneous effects. Hence, it is the highest in value of all the medical Tantras.”

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Introduction

There is no doubt that the American medical curriculum thoroughly addresses the pertinent scientific knowledge that is necessary for the student – physician to master. However, it does so at the detriment of providing a “true” education, complete with exhaustive studies in medical ethics, philosophy and history. In the rare cases where this does occur, it is done so informally and influenced by the presenters’ background. This most often means, medical history being presented through the lens of the Western hemisphere. In no discipline is this more prevalent than in surgery, notably urological surgery, where many of the widely recognized pioneers are from the Greco-Roman era and their Eastern ancestors are still cloaked in anonymity, not only to the lay public but to the ordained as well.

Historically, Asia – the “Orient” and specifically India has been seen as the land of enchantment, mystery, and superstition where magical creatures and curious religions have enticed adventurers and conquerors alike to seek out her secrets. However, this romanticized notion of the Orient creates a cultural stereotype, especially when evaluating the sciences that suggests that cultural thought was fraught with superstitious beliefs and rituals and medicine was just as much based on the former two than scientific knowledge. The fact that the Greeks utilized the same mythological and ritualistic approach to medicine appears to be inconsequential to the eyes of the west as the admiration of Greco-Roman achievements does not suffer from the same veil of inferiority that cloaks the achievements of ancient Indian medicine.

The marginalization of Indian surgical knowledge results in the conclusion that “acquisition of anatomical knowledge by means of sacrifice of animals, principally the horse, and of men” was common and “chance observations contributed to...the body of anatomical knowledge”. Although one cannot deny the importance of superstitions and rituals in Indian medicine, this does not adequately describe the entire picture. There are many instances where health and disease were scrutinized systematically and categorized in a manner similar to the traditional Western approach, at the ignorance of cultural taboos. In the field of surgery, and specifically urology, this is no more evident than reflecting on the legacy of the surgeon, Susruta.
Susruta

» Accomplished surgeon and a philosopher of Indian antiquity
  • Emphasized the systematic study and teaching of anatomy
  • Compiled the quintessential treatise in Indian surgery, the Susruta Samhita
  • Often viewed as a deity in the terms of Indian medicine
  • Other than the legacy of his compendium, not much else is known about Susruta

» Lived and practiced around the eastern Indian city of Benares, but the exact chronology of his life is unknown.

» Consensus is that he lived between 600-1000 BC

» Depending on the dates utilized, this places him a millennium before the revered Western stalwart Hippocrates and two millennia prior to the likes of Galen and Celsius
In eras prior to Susruta, medical doctrines were first encountered in the religious texts, the Vedas.

There are four Vedas, the Rig, Yajur, Sam and Atharva Vedas

- It is in the Atharvaveda that the great compendium of medicine, Ayurveda, is found
- No mention of surgery and medicine is very stereotypically “oriental”, revolving around the anointing of indigenous herbs and chanting of religious hymns to cure every ailment from urinary stones to sexual impotence

9th century BC, a new paradigm of thought began to permeate in which “new evolution of ethics, conscience and rational thinking” developed that “challenged the prevailing religious of customs and magic”

In India, this age is referred to as the Samhita period and it is during this period that Susruta and his colleagues helped Indian medicine reach its zenith


**Susruta Samhita**

» A systematic treatise of surgery and medicine

» Established the magnitude of the importance of surgery

» Elevated the social standing of surgery in Indian society

» Wide ranging influence in the ancient diaspora
  
  • Multiple translations including into Arabic, Latin, German, and English
  
  • Revered Greek physicians Ammonias (283 to 247 BC) and Celsus (1st century AD) described surgical technique (perineal vesicolithotomy) that was very similar to the one described in the Samhita

» 5 principle sections
  
  1. Sutrasthana (primary principles) -- 46 chapters on technical nomenclature and pharmacological classification
  2. Nindana -- 6 chapters focused pathological concepts of disease
  3. Sarirasthana -- 10 chapters on human anatomy
  4. Chikitsasthanam -- 34 chapters on medical and surgical treatment of various diseases
  5. Kalpasthana -- 8 chapters on toxicology
Medical and Surgical Education

» Describes the necessary qualifications for candidates seeking a medical education

“belonging to one of the three twice-born castes such as, the Brahma, the Kshatrya, and the Vaishya, and who should be of tender years, born of a good family, possessed of, a desire to learn, strength, energy of action, contentment character, self-control, a good retentive memory, intellect, courage, purity of mind and body and a simple and clear comprehension, command a clear insight into the things studied, and should be found to have been further graced with the necessary qualifications of thin lips, thin teeth and thin tongue, and possessed of a straight nose, large honest, intelligent eyes, with a benign contour of the mouth, and a contented frame of mind, being pleasant in his speech and dealings, and usually painstaking in his efforts. A man possessed of contrary attributes should not be admitted into (the sacred precincts of) medicine...”

» Even describes the role of students in surgery

“A pupil, otherwise well-read, but uninitiated, in the practice (of medicine or surgery) is not competent to take in hand the medical and surgical treatment of disease...and should be taught the art of making cuts in the body of a puspaphala (a kind of gourd), alavu (bottle gourd) or ervaruka (cucumber) prior to dissection of human cadavers.”
Hippocratic Susruti Oath?

“Thou shalt renounce lust, anger, greed, ignorance, vanity, egotistic feelings, envy, harshness, niggardliness, falsehood, idleness, nay all acts that soil the good name of a man. In proper season, thou shalt pare thy nails and clip thy hair and put on the sacred cloth, dyed brownish-yellow, live the life of a truthful, self-controlled anchorite, and be obedient and respectful toward thy preceptor. In sleep, in rest, or while moving about—while at meals or in study, and in all acts though shalt be guided by my directions. Thou shalt do what is pleasant and beneficial to me, otherwise thou shalt incur sin and all thy study and knowledge shall fail to bear their wished-for fruit, and thou shalt gain no fame. If I, on the other hand, treat thee unjustly, even with thy perfect obedience and in full conformity to the terms agreed upon, may I incur equal sin with thee, and may all my knowledge prove futile, and never have any scope of work or display. Thou shalt help, with thy professional skill and knowledge, the Brahmanas, thy elders, preceptors, and friends, the indigent, the honest, the anchorites, the helpless, and those who shall come to thee from a distance, or those who shall live close by, as well as thy relations and kinsman to the best of thy knowledge and ability, and thou shalt give them medicine without charging for it any remuneration whatever, and God will bless thee for that.”
Human Anatomy and Dissection

» Observed decomposition and dissected bodies
  • Unique approach to dissection that did not overtly violate the cultural taboos
    • Allowed the body to decompose a river and then scrubbed it layer by layer in order to view the internal composition
    • Similar cultural and religious taboos prevented the Corpus Hippocraticum from having a discourse on anatomy

» Allowed him to make observations such as
  • “Blood is the origin of the body. It is blood that maintains vitality. Blood is life. Hence, it should be preserved with the greatest care.”
    • (This concept, only after centuries of practicing bloodletting to cure everything from headaches to cancer, was finally accepted in the Western hemisphere during the 19th century, thanks to John Hunter)
  • The embryo “is made up of sperm, ovum, soul and 5 principles of earth, water, sky, fire, and air.”
Contributions to Surgery

» Well known for his plastic surgical procedures such as the pedicle flap and rhinoplasty as well as cataract surgery, he was also one of the pioneer urologists of antiquity

» Categorized surgical methods into seven different types of procedures:

» Utilized anesthetics and antispetics
  • Protocol described in the Samhita includes use of sulfur incense and essential oils — antibacterials
  • Susruta himself bathed, changed clothes, and tied his long hair in a pony tail prior to the proceeding with an operation
  • Patients given a mixture of Indian cannabis, herbs, and milk

» Used cauterization by escharotics, hot metal, or boiling fluids as well as use of suturing (including fascial layers)

» Created multiple types of dressings and splints (14 different types)

» Practiced Cesarean section and dilatation and curettage
Many urological diseases as well as management described including venereal diseases, urinary tract infection, hydrocele, urethral stricture and urinary stones.

Emphasis on urinary calculus:
- Described different varieties of stones and their association with specific dietary indiscretions
- Non-surgical management is encouraged with the use of diet, fluids, alkalai and bladder instillations.
- Only if conservative management fails then vesicolithotomy or bladder stone removal is recommended
- Detailed description of urological procedures.
Lateral Perineal Cystolithotomy

» First person to describe this procedure
» Prior operations were from midline
» Credit given to Feres Jacques (of the nursery rhyme) by the surgical establishment
» Lateral operation, after systematic study, has been subsequently been shown to provide safer access to the bladder and decreased injury to surrounding organs
» Adapted by modern urologists to perform prostatectomy as well as ruptured urethral repair
  • In a study performed by Gadhvi, he determines that the “main advantage to this technique is the clear visibility and easy access to the prostate and posterior urethra. It is easy to protect all important organs during the incision of the prostatic capsule, and to enucleate any size of adenoma in obese or thin patients.”
  • Concludes that “this ancient surgical approach invented originally for perineal cystolithotomy, fulfils most of the criteria for a prostatectomy and is an ideal way to expose the ruptured posterior urethra.”
Surgical Instruments

» Devised over 100 such instruments and categorized them in a thorough manner

» 6 principle types of instruments:
  1. Svastika (forceps)
  2. Sandansa (tongs)
  3. Tala (foreign body extractors)
  4. Nadi (tubular instruments like catheters)
  5. Shalaka (sounds)
  6. Upayantra (surgical accessories such as suture)

» These 6 categories were further subdivided into sub-categories

» Susruta’s instruments were also based on the observed universe. The tips of some of the instruments resembled the mouths of birds and animals

» Very particular in the selection of materials to make them. Often the tubular instruments such as catheters and sounds were made of metal and resembled their modern brethren

» Just like modern surgeons, very particular in his use of instruments. He often did not use an instrument unless he deemed it an adequate length, strength, and weight.

» This the same approach and attitude towards instrument use is prevalent in modern surgery, where instrument technology is a major sub-specialty of the field
Conclusions

The Samhita period was the golden age of Indian medicine and also the era of the dawn and dusk of Indian surgery. In this short lived period, many advances were made to the surgical arts that are often under-appreciated, if known at all in this current age, especially in the West. Through the study of the Susruta Samhita, one can appreciate the impact that this great sage had on not only one civilization but to an entire species. The preliminary foundations laid by Susruta established some of the earliest concepts regarding not only surgery but also medical education. In this current era of medicine where it is often convenient to disregard issues and information that are not vital to daily functioning, it is still pertinent to appreciate the history of medicine, including history that is not derived from the Western culture. By keeping a broad and open mind, the contributions of other cultures and civilizations to our current medical knowledge base can be appreciated, while giving us a comprehensive perspective to the medical field itself.
References

Figure 1. Depictions of Susruta performing procedures. (Loukas, 2010)
Figure 2. Susruta’s lateral perineal cystolithotomy approach (Gadhvi, 1988)

Figure 3. Depictions of some of Susruta’s surgical instruments (Nataranjan, 2008)
Figure 4. The similarity of some of Susruta’s instruments, for example the “Snake hood probe” (left) to modern urological instruments (right), such as the urological sound (Das, 2001)