



ANCIENT INDIAN CADAVER PRESERVATION SCIENCE: EVALUATING THE JALNIMAJJAN TECHNIQUE OF SUSHRUTA

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Abstract

One should study anatomy theoretically as well as practically to acquire complete knowledge of body. Practical study of anatomy includes dissection of a human cadaver. Modern medical science has given many methods of dead body preservation. Likewise, in *Ayurveda*, 1000-1500 before B.C. **Sushrutacharya** has given a particular technique for dead body preservation which can be grossly called as “*Jalnimajjan padhhati*” of dead *Mritsharir sanrakshan* (hydro biological method of body preservation). In ayurvedic texts, there is a reference “*Sharire Sushruta shreshtha*” means **Acharya Sushruta** is the best in describing anatomical structures of human body as he has given the detailed information about each and every body part. Acharya Sushruta has revealed seven layers of skin with their thickness and seven types of *Kalas* (membranes) with their sequence. This was possible for him only because of detailed dissection. Well preserved human cadaver is needed for detailed dissection. Hence, he has mentioned this particular method in this article, effort is made to give the scientific interpretation of dead body preservation method given by *Sushrutacharya*.

Keywords: *Ayurveda, Sushrutacharya, Jalnimajjanpadhhati, Mritsharirsanshodan*

Introduction

Anatomy is the basic and important subject of medical science. As it is said that strong basement is the foundation for strong building, like that one cannot become a good medical practitioner without knowing the complete anatomy of human body. The hydrobiological method of dead body preservation refers to techniques that utilize water or water-based solutions to maintain the structural and anatomical integrity of a cadaver for research, education, or forensic purposes. While not a widely recognized term in contemporary literature, this method can draw from historical and modern

practices involving immersion and preservation in liquid mediums. Thousands of years ago, **Acharya Sushruta** has said that one who intends to acquire definite knowledge of surgery should study anatomy practically by dissecting dead body properly. Surgeon should know anatomical structures to avoid injury of vital structures (arteries, veins, nerves) and complications during surgical procedure. He mentioned that whatever is practically seen and whatever is known from scripture both combined together develops the knowledge further. One should adopt the method of combining theoretical and practical knowledge while practicing in medical field¹. **Acharya Sushruta** knew that dissection is must for medical student for practical knowledge of anatomy, hence he has explained method for preservation and dissection of cadaver. We should understand the reasons behind giving this particular method.

Aim and objectives

1. To study the method of dead body preservation given in **Sushruta Samhita** thoroughly.
2. To study the scientific interpretation of method mentioned by **Acharya Sushruta**.

Material and methods

Textual references from **Ayurvedic** classics like **Sushruta Samhita**, **Ghanekar commentry** etc. and some article references were used for this study.

Scientific interpretation of dead body preservation method

Sushruta has given many criterions while giving this method. Below from here, each criterion with interpretation is Given.²

“तस्मात् समस्तगात्रमविषोपहतमदीर्घव्याधिपीडितमवर्षशतिकं निःसृष्टान्त्रपुरीषं पुरुषमावहन्त्यामापगायां निबद्धं पञ्जरस्थं मुञ्जवल्कलकुशशणादीनामन्यतमेनावेष्टिताङ्गमप्रकाशे देशे कोथयेत्, सम्यक्प्रकुथितं चोद्धृत्य, ततो देहं सप्तरात्रादुशीरबालवेणुबल्वजकूर्चानामन्यतमेन शनैः शनैरवघर्षयंस्त्वगादीन् सर्वानिव बाह्याभ्यन्तरानङ्गप्रत्यङ्गविशेषान् यथोक्तान् लक्षयेच्चक्षुषा॥ (सु.शा.5/61)²

1. Samastagatram:-

To acquire complete anatomical knowledge the dead body should be with its whole *Angapratyangas* (parts) means all body parts should be intact.

2. Avishopahatam:-

Different types of poisons affect different body parts. The affected part does not remain natural and wrong knowledge is gained when we dissect such type of body. Hence, poisoning should not be the reason of death.

3. Adeerghavyadhipeeditam:-

Chronic diseases can cause destruction of body parts like – skin is destructed in leprosy, nasal bone and some other bones in Syphilis, Penis in Gonorrhea, Splenomegaly occurs in Kala-azar etc. These kinds of body give us wrong information about the study of body parts. There is not any kind of damage in starting stage of acute diseases so if dead body suffered from acute disease previously it should be taken for dissection purpose. So, if dissection of such body is carried out it can give false knowledge.

4. Avarshashatikam: -

The dead body should not be of a very old person as old age causes degradation of some body parts. Sushruta refuses to take old person's body as well as children's body. For example, in old age bones become weak, teeth fall down, shape of lower jaw changes, in female body uterus shrinks. On other hand in children body parts are not properly developed so we cannot find the natural state of body parts. Like total teeth not present, bones not formed well etc. Word to word meaning of Avarshashatikam is age should not be equal to or above 100 years. This meaning is correct for Samhita

period as at that time average age level was very high. But nowadays average age level is decreased. So meaning of **Avarshashatikam** should be taken as not of very old age instead of 100 years, in present era average age level diminished so we can take body having age of 50 to 55 years.

5. Niharushtaantrapureesham):-

Before preservation of dead body, intestines should be removed along with faeces as intestine is the main site for bacteria. These bacteria favor early decomposition of dead body. So, initial removal of intestines fulfills two objectives. First one is removal of intestinal bacteria along with faeces and second is intestines are made available for measuring their length and specimen purpose.

6. Purusham

At that time, male body can be made easily available as compared to the female body³.

7. Avagahantyamapgayam:-

The dead body should be kept in such type of river which has abundant water but flows slowly. One of the reasons for keeping the dead body in water is to keep skin moist and soft and decomposition is slower in water due to early cooling of the body and it also washes out the organisms from the surface of body with water body remain prevented from bad odour⁴.

8. Nibadhham:-

Body should be kept tied so that it should not drown and always remain under water.

9. Panjarastham:-

Dead body should be kept in a cage to protect it from aquatic animals like crocodile.

10. Munjavalkalkushshanadinam Anyatamen Aaveshtita Angpratyangam: -

Body should be wrapped by using one of the plants like *Munja*, *Valkal*, *Kusha*, *Shana* etc. There are two purposes behind this –

Kusha- To protect body from small aquatic animals like fishes⁵. As fish may cause postmortem injury or mutilation of the dead body which will favor the process of decomposition by allowing invasion of the body by organisms, through the injuries or mutilated areas⁶.

Shana- To make the skin of dead body soft so as it's dissection will be easy⁷. Also there may be some other reasons for mentioning these specific plants.

Munja- Saccharummunja Roxb – Graminae(Munja grass, *Sarkande* in hindi)

Munja- It is a source of natural fibre⁸. So it has been used to wrap the dead body.

Valkal(inner barks of trees)- Five astringent plants are to be considered under the term valkala. They are *Nyagrodha* (*Ficus bengalensis* Linn. -**Moraceae**), *Udumbara* (*Ficus glomerata* Roxb.-**Moraceae**), *Ashvatha* (*Ficus religiosa* Linn. - **Moraceae**), *Pareesha* (*Thespesia populnea* Soland. - **Malvaceae**) and *Plaksha* (*Ficus lacor* Buch.Ham.- **Moraceae**).

It shows properties like antiseptic, anti-inflammatory, antioxidant, antibacterial, antimicrobial wound purifying and healing, and astringent⁹. As these properties help in dead body preservation, Acharyas have mentioned *Valkala* to wrap the dead body while preserving.

All these 5 plants contain **tannins**¹⁰.

Panchavalkala are *Shothahar* (reduces swelling) and *Vranaropaka* (helps in wound healing).

Kusha- *Desmostachya bipinnata* Stapf – Graminae(*Suchyagra*, *yagyabhushan*)

Kusha- Possesses antibacterial effect against gram negative and gram positive pathogens. This property of *Kusha* helps in protecting the dead body from putrefaction by bacteria. Phytochemical analysis showed presence of tannins in *Kusha*¹¹. Plants containing tannins show astringent, antiseptic and toning properties¹². Tannin containing plants when applied to dead matter, unites with gelatin of dead animal matter and forms solid insoluble compound which resist the action of water and does not putrefy¹³. Tannins have been reported to have anti-viral, anti-bacterial and anti parasitic effects. The

ability of tannins to form a protective layer over the exposed tissue keeps the wound from being infected even more¹⁴. Due to above properties tannins containing plants help in preservation of dead body.

Shan- Crotalaria juncea Linn.-Leguminoaceae (सनई in hindi)

In the folk and Ayurvedic medicines, it is used as astringent¹⁵. This astringent property helps in shrinking swollen tissues of dead body.

Plants of genus *Crotalaria* have been found to possess significant antimicrobial activity¹⁶.

11. Aprakashdeshe Kothayet: -

Body should be made to decompose in a dark area. Meaning of dark area should be taken as that area where people hardly go. This helps in avoiding use of that water by people in which dead body is dipped¹⁷. This also protects the dead body from turbulent people¹⁸.

12. Samyak Prakuthitam Chaudhrutya Tato Deham Saptaratrat: -

After a week, when the body is fully decomposed it is taken out.

13. Ushir Bal Venu Valkala Kurchaanaam Anyatamen Shanai Shanai Avgharshyanstvagadin Sarvaneva

Bahyaabhyantarangpratyang Visheshan Yathokran Lakshaye chchkshusha:-

Slowly rubbed with brush of one of ushira, hair, bamboo and balvaja while observing all parts and sub-parts, external as well as internal¹⁹. Purpose of rubbing the dead body with the help of brush, may be to see minute body parts separately like layers of skin²⁰.

Conclusion

Hence, from above all, it can be said that the **Jalnimajjan padhhati** given by **Acharya Sushruta** for **Mrita sharir sanshodhan (preservation of human cadaver)** has a scientific base. Keeping the dead body in water has also scientific reason. Even while selecting the plants for wrapping the body, he has selected those particular plants having properties which help in preservation of body. Keeping in mind the all above scientific principles, thousands of years ago, *Sushruta* has stated that particular hydro-biological method of preserving and dissecting cadaver.

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