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AYURVEDA CONCEPT OF ASEPSIS AND RECENT DEVELOPMENT IN TECHNIQUES OF STERILIZATION

Sandeep Aheer*

Assistant Professor, Saraswati Ayurved Hospital and Medical College, Mohali, Chandigarh, Punjab, India.

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***Corresponding Author: Dr. Sandeep Aheer**

Assistant Professor, Saraswati Ayurved Hospital and Medical College, Mohali, Chandigarh, Punjab, India.

ABSTRACT

Sterilization is process of eliminating microorganisms and asepsis refers to the state of being free from disease-producing microorganisms (Bacteria and Viruses). Both sterilization and aseptic precautions are crucial for the success of any surgical interventions in ayurveda. Without proper measures, complications such as infections and delayed recovery may occur. Ayurveda utilizes *Agni*, *Kwath* and *Dhoopan* to protect *Atur* from organisms. Fumigation of antimicrobial substances also utilized for sterilizing operative rooms. Ayurveda described the term *Nirjivanukaran* for sterilization and *Acharyas* emphasized role of *Nirjivanukaran* during surgical procedures to prevent infections and complications. This includes various methods such as; *Dhupana Karama*, *Prakshalna* and *Shastra Tapan*, etc. In this regard Ayurveda also suggested concept of *Kumaragara* and *Sootikagaara* for specific care during and after pregnancy period. *Nirjivanukaran* is very crucial for infection control and successful completion of surgical interventions. This article is exploring Ayurveda concept of asepsis and recent development in techniques of sterilization.

KEYWORDS: *Ayurveda*, *Nirjivanukaran*, *Dhupana*, *Sterilization*, *Asepsis.*

INTRODUCTION

The concept of sterilization in Ayurveda is broad, not only protecting from microorganisms but also curing various diseases. Ancient *Acharyas* employed *Agni*, sun-rays, fumigation technique and *Kwath*, etc. to protect from various organisms. The avoidance of sterilization during operating procedure, wound dressing, neonatal care and labor rooms, etc. can leads hazardous impact of microorganisms. These impacts may include secondary infections and delaying surgical recovery. Therefore medical science recommended disinfection and sterilization along with aseptic precaution to prevent complications related with surgery.[1-4]

Ayurveda described uses of aseptic approaches for *Yantra* and *Shastra* used in surgical interventions. *Sushruta* includes *Raksha Karma* to protect *Atura* from *Nishachara*. Ayurveda also recommends *Dhoopana* in operating rooms, *Kumaragar*, *Sutikagar* and *Vranitagar* for sterilization purpose. *Kashaya* of *Rakshoghna dravyas*, *Parikshekah* and *Agnitapan* are also used to maintain aseptic conditions.

The various terminology related to the *Nirjivanukaran* are depicted in **Figure 1**. "Sterilization" is a process of making objects freeing from all microorganisms. "Disinfection" is term mainly used for the destruction of pathogenic organisms from non-living object. "Asepsis" is a process to eliminate infection-causing organisms from surrounding environment of the patient. "Antisepsis" is a process of destroying microorganisms to prevent infection on the body surface. Another terms bactericidal and bacteriostatic referred to the killing bacteria and inhibiting the growth of bacteria respectively. However Ayurveda science provides information differently in various ancient texts related to the concept of sterilization or asepsis.[4-7]

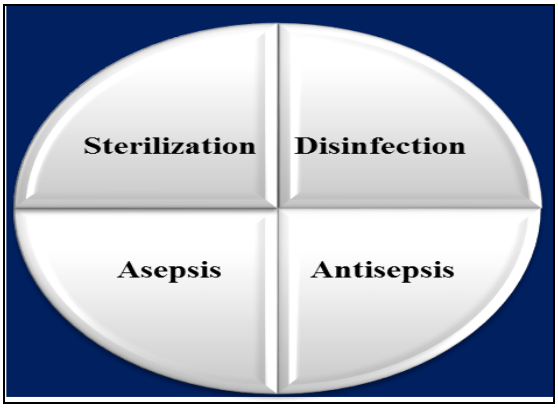

Figure 1: Various approaches of *nirjivanukaran.*

Ayurveda descriptions of sterilization

Yogyasutriya Adhyay mentioned that *Vaidya* should enter *Visikha* after wearing clean cloth and purifying themselves through bathing and removing nails or hair, etc. Similarly before performing incision, instruments should be sterilized using fire or other methods. It is suggested to use metal ion containing water for bathing of children, the ions from the metal imparts antiseptic properties.

Sterilization of Area, Rooms and Instruments

The *Vranitagar* should be prepared in isolated area, shielded from sunlight exposure and devoid of air vents so to prevent invasion of infectious organisms. The cleaning of such room is prerequisite and clean clothes or other materials should be used in such area. Prevention of houseflies and mosquitoes are also required in *Vranitagar*. Sterilization of *Vranitagar*, *Sutikagara*, *Kumaragar* and *Yantra* or *Shastra* can be done through *Dhoopan* with *Rakshoghandravyas* along with other methods like *Kashaya*, *Parishekah* and *Agnitapn*, etc. *Sarjaras*, *Guggulu*, *Vaca*, *Lavna*, *Nimba* and *Sarshap*, etc. are mainly used as *Rakshoghandravyas* for performing *Dhoopan* as sterilization techniques. The fume of these materials offers antimicrobial action and helps to disinfect surrounding environment. Mixture of *Sarshap*, *Lavana* and *Sarpisha* also indicated for fumigation purpose in patient's room since these materials acts as a disinfectant. The concept of *Janopdodhvamsa* outlines various measures for purifying water, soil and air to control impact of harmful microorganisms. *Charak* mentioned certain herbs for fumigation purpose to eliminate rats and insects, these herbs include *Sevya*, *Jatu*, *Guggul*, *Kakubhapushpa*, *Sarjaras* and *Bhalatak*, etc.

Disinfection of wound

Fumigating of *Grita*, *Yava* and *Guggula* helps in healing of wound and relieves symptom of pus discharge. Medicated steam produced by Ayurvedic drugs used over the wound with the help of *Sharav Samputa* and this concept described as *Vranadhoopan* in Ayurveda science. Worm or insect infected wound can be disinfected by *Dhavana* using *Kwathkalpna* of *Surasadigana*. Ayurveda also described uses of *Krumighana* agents in the form of *Lepa* and *Pradeha* for managing diseases like scabies, leprosy and eczema, etc. Formulations for local irrigation purpose are also mentioned under the heading of *Vranshodhan*, here *Kandughna*, *Krimighna Mahakashay* and *Kushthaghna*, etc. described for their antimicrobial properties. *Vrana Raksoghna Dhupa* consisting of *Sarjarasa*, *Guggulu*, *Agaru*, *Vaca*, *Lavana*, *Nimbapatra* and *Hingu* used for wound fumigation.[6-8]

Pregnancy and Neonatal care* through *nirjivanukaran

Cotton pouch containing *Vaca*, *Turuska* and *Hingu* tied around the neck of the infant and mother of new born, this acts as insects repellent as well as disinfectant. *Vaca*, *Trivrta*, *Sarsapa* and *Kustha*, etc. can be used for fumigants purpose in the room of new born baby. This helps to prevent from possible infection of infants.[8-10]

Herbal Cleansers and Disinfectants

- *Neem*: Known for its potent antibacterial, antiviral, and antifungal properties, leaves and oil are used to clean wounds and purify environments.
- *Turmeric*: With strong antiseptic and anti-inflammatory properties, turmeric is used to disinfect wounds and as an internal cleanser.
- *Tulsi*: *Tulsi* is used for its antimicrobial and purifying properties in various cleansing rituals.
- *Dhupana karmas* using *Laksha*, *Ativisha*, *Haritaki*, *Haridra*, *Kustha*, *Valaka*, *Mustak* and *Ela*, etc. is used to purify air.

Water purification

- *Boiling*: Water is boiled to kill pathogens.
- *Herbal Infusion*: Herbs like *Triphala* and *Tulsi* are used to purify water by infusing them in it.
- Drugs like *Mukta*, *Gomedaka* and *Kataka* are used for water purification.
- *Copper Vessels*: Storing water in copper vessels is believed to have antimicrobial effects, purifying the water over time.
- *Hamsodaka* purified water exposed to sun and moon rays.
- *Sushruta* emphasizes *Marjana* and *prasadana* process for water purification.

Sterilization of surgical instruments

- *Fire Sterilization*: Instruments were often sterilized by heating them in fire.
- *Herbal Cleansing*: Instruments were cleaned using antiseptic herbal decoctions.

Recent/Modern sterilization methods

- ✓ Heating by dry and moist heat
- ✓ Radiations
- ✓ Drying in sunlight
- ✓ Ultrasonic Vibrations
- ✓ Chemical sterilization and filtration

1. Heating

- ✓ Exposed to dry heat at temperatures between 150 to 200 degrees Celsius for few minutes.

- ✓ Using a Bunsen Burner or Alcohol lamp until it glows red.
- ✓ Combustion of organic substances.

2. Moist heat

- ✓ Autoclaving to expose in steam at low temperature/long duration or high temperature/short duration.

3. Tyndallization

- ✓ Boiling in water for 20 minutes.

4. Chemical sterilization

- ✓ Chemicals like nitrogen dioxide, ozone, Ethylene oxide, glutaraldehyde, peracetic acid and formaldehyde, etc. are used for sterilization of heat sensitive materials.

5. Radiation

- ✓ UV light can be used for plastic substances, Gamma radiation using radioisotopes, X-rays and electron beams, etc. also used for sterilization purpose.

6. Filtration

- ✓ Earthenware filter of diatomaceous earth or porcelain used for general sterilization.
- ✓ Asbestos filter of chrysolite asbestos also used in industries.
- ✓ Membrane filters of cellulose nitrate and cellulose diacetate, etc. are used for liquid disinfection.

CONCLUSION

Ayurvedic texts possess information related to the ancient approaches of sterilization with reference to term *Nirjivanukaran*. Ayurveda mentioned several methods and drugs having antibacterial properties used as disinfectants. Ancient Ayurvedic science mentioned various methods of sterilization, aseptic precautions and disinfection. These methods include *Dhupana Karama*, *Prakshalna*, *Shastra Tapan*, *Kashaya* of *Rakshoghna dravyas*, *Parikshekah* and *Agnitapan*, etc. Numerous advancements have occurred, leading to the availability of various sterilization methods in modern science such as; sterilization by heating, radiations, drying in sunlight, ultrasonic vibrations, chemical sterilization and filtration, etc. These all methods are very important for successful completion of surgical interventions.

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