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APPLICABILITY OF STERILIZATION: BASIC CONCEPTS OF AYURVEDA IN MORDEN ERA

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ABSTRACT

Background: The process of Sterilization is an essential component of infection control, as it is very necessary for patient's safety and good health care. For the success of any surgical treatment sterilization has prime importance. Without sterilization it causes complications like infection, impaired wound healing etc. Hence sterilization is a main goal of surgeon. Ayurveda the ancient science is a system of medicine with historic roots. Sushruta Samhita is an ancient Sanskrit text explained many fundamentals regarding medicine and surgery in details. sterilization is one of them. Sushruta during their practice had a clear idea regarding specific methods of sterilization by means of Dhupana karma. In Ayurveda treatment modalities described are Bahirparimarjana (topical), Antahparimarjana (systemic) and Shashtraparidhana (surgical intervention). For the successful surgery Sushruta has mentioned in Poorvakarma, the various methods of sterilization of Vranitagara, Sutikagara with Kashaya, Parisheka, Dhupana, Agnitapana etc. The Dhupana karma i.e. fumigation characterized under topical (Bahirparimarjana) treatment which has been told as a treatment in all classics of Ayurveda. The detailed description is available in Kashyapa Samhita. This medicated smoke (Dhupana) creates aseptic environment which kills the microbes; thus, prevents the infections. Some Dhupana dravya are Guggul, Sarshapa, Ela, Haridra, Jatamansi and Tulsi. These fundamentals are applicable, proven and also found to be very effective till today in context of sterilization.

KEYWORDS: Sterilization, Raksha Karma, Dhupana Karma.

INTRODUCTION

Sterilization is a process by which freeing an article, a surface or a medium of all microorganism both in vegetative and in spores state by removing or killing them. Advances in technology and bio-physics in modern surgery is developed well and practices widely. But the basic fundamentals are still a hidden truth. For any surgical treatment sterilization is a very important factor for success. Lack of sterilization leads to complication like infection and delayed wound healing. In Ayurveda Sterilization (Dhupan vidhi) is not only used in case of shastra karma but also mentioned in case of Vranitagara, Sutikagara, Kumaragara and also in care of vrana**.**

For Surgeons secondary infection is a big problem which comes from instruments, operation theaters, body surface etc.

AIM

- To explore basic fundamental of sterilization of Ayurveda in context to modern era.

OBJECTIVE

- To study the literature regarding Dhoopan karma
- To study literature regarding sterilization in modern science and correlate the concept of sterilization

METHODS

In modern era sterilization can be achieved by mainly two methods.[1,2]

1) Physical method

2) Chemical method.

In physical methods heat, radiation and filtration are including whereas in chemical method gases, aldehydes, alcohol, dyes, halogens, metallic salts are used.

Aim of sterilization is to reduce initially present microorganism or other potential pathogens. Degree of sterilization is expressed by multiple of the decimal reduction time or D-value (the time needed to reduce the initial number N0 to 1/10th of its original value. N/N0 = (10)-t/D Various methods are used for sterilization like.

Heat

Dry 1. Hot air oven – in this procedure longer exposer to dry heat about 160 – 1900 C for 6 – 12 min 2. Flaming – by Bunsen Burner or Alcohol lamp until it glows red.

3. Incineration – combustions of organic substance contained in waste material.

Moist 1. Autoclave – 1200 C at 20 psi for 60 min or 1340 C for 18 min.

2. Tyndallization – simple boiling water method for 20 min.

Chemical: In case of heat sensitive substance like fiber optics, electronic plastic by Ethylene oxide, nitrogen dioxide, ozone, glutaraldehyde, formaldehyde, H2O2, peracetic acid (0.2%) Radiation: Non-ionizing – UV light for plastic substance. Ionizing – Gamma radiation by radio isotopes (cobalt-60, caesium-137), x rays, electron beam. Filtration: Earthenware filter- It is made up of diatomaceous earth or porcelain. Asbestos filter- It is made from chrysolite type of asbestos chemically composed of magnesium silicate. Membrane filter- It is made up of polymeric materials like cellulose nitrate, cellulose diacetate, polyester. Air filter: HEPA (high efficiency particle air) filter, it can remove particles <0.3 µm in diameter.

Concepts of Ayurveda

The ancient Acharyas used Agni (Fire), Kwath (Decoction), Sunlight and various medicated fumigating yoga to protect patient from different organisms.

For Vrana Prakshalana: Various Kashaya are used to purify Vrana like Panchavalkal kashaya, Tripala kashaya, Surasadi Gana kashaya, Araghvadi kashaya, old Ghrita.

For shastra karma[3]: Importance of sterilization of Shastra prior to shastra karma is mentioned by Sushruta. Incision is taken after proper heating of shastra, otherwise Paka (pus formation) occurs at site of Varna. (Su, chi-2/46).

Dhupan karma i.e. fumigation characterized under topical (Bahiparimarjana) treatment which has been told as a treatment in all classics of Ayurveda. The detailed description is available in Kashyap Samhita. This medicated smoke (Dhupan) creates aseptic environment which kills the microbes thus prevents the infections. Some Dhupan dravya with its applicability in fumigation described as follows.

Guggulu (*Commiphora mukul*)[4]

Extract of Guggulu have the potential action on both gram positive and gram negative bacteria.

Sarshapa (*Brassica campestris*)[4]

This contains contrasting profile of glucosinolates which have the biocidal action on different pathogens including bacteria and fungi. Fumigation of Sarshapa is effective against nematodes.

Ela *(Elettaria cardmomum)*[4]

It contains the volatile oils which have the antimicrobial and antifungal activity.

Haridra *(Curcuma longa)*

It exhibits the fumigant activity against beetles and insect. Haridra itself act as antibacterial agent and also having antifungal activity.

Jatmansi *(Nordostachys jatamansi)*[4]

It contains essential oil having antimicrobial activity.

Tulsi (*Ocimum sanctum)*[4]

Extracted essential oil such as chavicol, euginol, linalool, camphor and some biologically active constituents that are insecticidal, nematicidal and fungicidal.

Nimba (*Azadiracta indiaca)*[4]

Its active constituent possesses insecticidal and insect repellent activity. The *A.indica* fumes acts against Streptococcus pyogenes after 10 min exposures, 100% inhibition. Fumigation of volatile oils of *A.indica* has potent insect repellent property.[5]

Astangasamgraha Uttarasthana, chapter-30 (Vranapratisedha) fumigation with Srivestaka (exudates of Pinus), Sarjarasa (exudates of Shorea robusta), Sala (Shorea robusta), Devadaru (Cedrus deodara), Simsapa (Dalbergia sissoo),Khadira (Acacia catechu), Asana (Pterocarpus marsupium), Kaidaryasara (Melia azedarach), Yava (Hordeum vulgare), Madhucchistha (bee wax), Bhurjapatra (Betula utilis), Atasi (Linum usitatissimum.) and Ghrita (clarified butter) are indicated to allay exudation and pain of wounds.[6,7]

In Astangasamgraha Sutrasthana chapter-38 (Sastrakarmavidhi), Vagbhata mentioned Vrana-raksoghna Dhupa consisting of Guggulu (exudates of Commiphora wightii), Agaru (Aquilaria malaccensis), Sarjarasa (exudates of Shorea robusta), Vacha (rhizome of Acorus calamus), Gaura-sarsapa (white seeds of Brassica campestris), Hingu (exudates of Ferula foetida), Lavana (salt), Nimbapatra (leaves of Azadirachta indica), and Ghrita (clarified

butter) for the fumigation of wound. This reference is also mentioned in Uttarasthana chapter 1 for the protection of newborn infant.[8]

Astangasamgraha Uttarasthana chapter-8(Bhutapratisedha) contains many formulations, which appear consisting of natural biocides and fumigants. Likewise the external therapeutic measures to prevent or cure various infantile Grahabadha (Paediatric idiopathic syndrome) also appear usually consisting of similar nature of drugs. It may be mentioned here that Ayurveda was intricately woven with culture religion in the society and natural biocides and fumigants were widely used on a variety of pretext aimed at prolonging life and providing health, happiness and prosperity.[9]

Sushruta also discribed the Mishrak Gana7 like, Arkadi gana, Eladigana, Patoladigana Aragvadhadigana which are used for disinfections. In the description of Dincharya, Sushruta has recommended some plants used for toothbrush. He recomonded tikta rasa (bitter) plant toothbrush stick made of Nimba (Azadiracta indiaca), Karanja (Pongamia pinnata), Karanja etc that are disinfectant and remove foul smell from mouth.

DISCUSSION

In Ayurveda there are various ways like Dhupan (fumigation), Prakshalana, Agni-tapanetc. to sterililize Vranitagara Kumaragara, Sutikagara, Kumaragara, Shastra (instruments),cost effective, having less side effect and medicinal value. But they are not practiced vigorously due to lack of clarity to the parameters regarding their application.

CONCLUSION

The concept of ancient sterilization is cost effective, having less side effect and may also have medicinal values. It can be evident that the maximum drugs have antibacterial properties and very much effective against bacterial opportunistic infections. The ancient science also has an idea about the foreign infections. They also stated the various methods for disinfection and sterilization which have been used at that time. By the time lots of revolutions takes place. There are many methods of sterilization are available in today's modern science which are based on same principles mentioned in classical text. It is necessary to have more detailed and systemic evaluations of ancient method used for sterilization in pharmacodynamic and phytochemical view.

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