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Ayurveda Understanding of Mastitis in Dairy Animals

Management of animal health is a challenge for livestock keepers. Due to this challenge many farmers are losing interest in animal husbandry. One such challenging disease of dairy animal is mastitis. Many scientists are working across the globe to find simpler solutions for this challenging disease but nothing is yielding results. Traditionally Indian farmers knew simpler methods with locally available resources to address this disease. There are many references in Ayurveda on understanding the etiology, diagnosis and management of similar diseases. So it is very clear that 4000 years old science had solutions which naturally occurring and cost effective.

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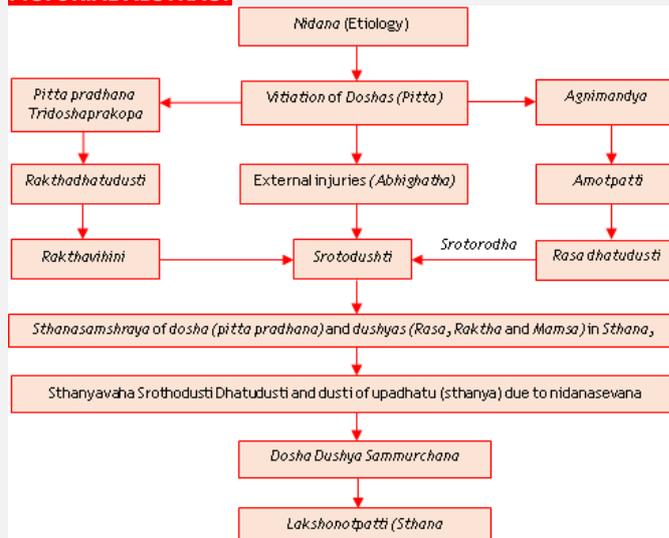
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ABSTRACT

The evidence from archeological sciences states that many countries were having various methods and practices for management of animal diseases. Veterinary science in India has a documented history of around 5000 years. There exists codified veterinary knowledge in the form of medical texts, manuscripts on various aspects of veterinary care such as health management of cattle, horses, birds, and elephants. The veterinary and animal husbandry practices were present and grown in the Vedic, *Puranic* and extending beyond Epic periods. This knowledge is available in the form of manuscripts called Veterinary Ayurveda, viz *Mrugayurveda* (Ayurveda for Animals), *Pashupakshishastra* (Ayurveda for birds), *Hashtyayurveda* (Ayurveda for elephants), *Ashwayurveda* (Ayurveda for horses) etc. Understanding the etiopathogenesis and management of animal diseases through Ayurveda is need of the day. Mastitis is the economically devastating diseases of dairy animals. The loss due to one such disease annually goes up to 7500 crores INR. The saints of Ayurveda have explained in detail about mastitis as *Sthanavidhradi*. The management and treatment modalities have clearly mentioned in the classics of Ayurveda. In this article, an effort has been taken to explain ethno and Ayurvedic understanding of the most economic devastating disease mastitis. It is also tried to establish the link between Ayurveda and Veterinary Ayurveda. This traditional system of India called *Mrugayurveda* (Ayurveda for Animals) or Veterinary Ayurveda is robust and time tested. It has been in practice since age old. This robust system of medicine can address the current challenges of mainstream medicine. Many herbs and formulation from Ethno knowledge and Ayurveda were in practice in ancient India. So it is important to validate and reintroduce these time tested formulations and herbs for animal health.

KEYWORDS Mastitis, *Sthanavidhradi*, Ethnoveterinary, Veterinary Ayurveda

PICTORIAL ABSTRACT



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1. INTRODUCTION

Ethnoveterinary medicine, the scientific term for traditional animal health care, encompasses the knowledge, skills, methods, practices, and beliefs about animal health care found among the members of a community^[1].

The ethnoveterinary or traditional knowledge of Animal husbandry is an integral part of the community which plays an important role in socio-religious, economic and development role in the upliftment of the community. In every household, there are personalities having this knowledge to look after the health and management of Animal husbandry. There are Pashuvaidyas (local healers) who are knowledgeable and experienced in traditional veterinary healthcare spread all over the country. The folk health practices largely remain undocumented and are passed on from one generation to the other by word of mouth. They use the

locally available medicinal plants for treatment of animals. The local healers are very popular in their communities and the farmers generally consult them. The ethnoveterinary systems are eco-system and ethnic-community specific and therefore, the characteristics, sophistication, and intensity of these systems differ greatly among individuals, societies, and regions. These local veterinary health practices are accessible, affordable and culturally acceptable.

Despite such successes, very little of this traditional knowledge has been documented in developing countries, and ethnoveterinary knowledge has had no place in mainstream veterinary medicine. In recent years, however, increasing attention has been paid to ethnoveterinary knowledge and local veterinary practices^[2].

2. OBSERVATIONS

2.1 Ayurveda and Veterinary Ayurveda

Ayurveda, the eternal science dates back its utility to mankind. It is a perfect material science which helps in achieving total health including social, mental, physical and spiritual. The affluent knowledge in the science gives pivotal importance to preventive and curative aspects.

Ayurveda is a traditional science, having a history of 4,000 years. It is not meager a medical science, it is the science of life, which includes animals and other living creatures on the earth. The science of animals is called as *Mrugayurveda*^[3] (Ayurveda for Animals) or veterinary Ayurveda, the science of plants is called as *Vrukshayurveda* (Ayurveda for plants), and the science of birds is called as *PakshiAyurveda* (Ayurveda for birds).

Ayurveda is the science of life. Where there is the existence of life, there comes Ayurveda. The principles of Ayurveda for all the creatures on the earth are similar and applicable. The principles and practice for human health are held good for animals. So the basic principles of *Mruagayurveda* will also be *Tridosha* theory (three humoral theory), *Sapthadhatu* theory (seven tissue elements theory), *Trimala* theory (three waste material theory) and *Panchamahabootha* theory (five basic element theory).

The complete integrated relation of body, sense, mind and the soul (spirit = self-perception) is referred to as "Ayu". These principles also apply to the animals, as all these components are present in animals^[4].

2.2 Aims and Goal of Ayurveda

Preserving the health of the healthy, alleviating (reducing) the disease of the diseased. The ultimate aim of Ayurveda is to guide every human being to maintain and promote health and prevent ailments^[5].

2.3 Health according to Ayurveda

Balanced of *Doshas* (*Vata*, *Pitta*, *Kapha*), *Agni* (digestive fire), *Dhatu* (body tissues) and *Mala kriya* (excretions). Equilibrium status of (*Prasanna*) of Soul (*Atma*), 5 sense 5 organs of actions (*Indriyas*), minds (*Mana*)^[6].

As mentioned in ancient Ayurvedic texts, early veterinary medicine focused on animal welfare, treatment therapies, management, and surgery. *Salihotra* was the first to be credited as an animal healer and wrote Ayurveda materia medica in veterinary medicine. Keeping all these elements applicable to animals we are able to establish the relationship between the diseases and the management by the traditional system of medicine i.e. Ethnoveterinary practices. One classical example to quote is Mastitis vis a vis *Sthanavidhradi* (breast abscess/mastitis).

2.4 Sthanavidhradhi (breast abscess/mastitis)

Sthanya (breast) is considered as *upadhatu* of *Rasa dhatu* (lymphatic system). It mainly consists of *Twak* (skin), *Kandara* (connective tissues), *Mamsa* (muscle tissue), *Rasavahini* (lactiferous ducts) and *Granthis* (glandular lobes or acini) with an adequate number of *Rakthavahinis* (blood vessels). Disease afflicting to all these components end up in *Sthanyajavikara* (breast diseases) called as *Sthanavidhradhi* (mastitis). *Sthana* is also a site for *Shotha* (inflammation), *Vrana* (ulcers), *Granthis* (benign tumors) and *Arbuda* (malignant tumors)^[7].

The etiopathogenesis, clinical features, and treatment of all these conditions are similar to the diseases of any other body parts. Though *Sthanavidhradhi* (breast abscess/mastitis) is similar to other *Vidhradhi* (abscess) there is a slight difference in the line of treatment. Due to this reason Sushruta, Madhava and Bhavaprakasha described these disorder sunder *Sthana* (breast/udder diseases). In Vagbhata also there is a short description of *Sthanavidhradhi* along with general abscess. Kashyapa has described a disease with the name of *Sthana* or *Sthanakeelaka* (thread like appearance in the breast) instead of *Sthanavidhradhi*. Except for the difference in etiology, clinical features etc of *Sthanakeelaka*.

Sthana and *Sthanavidhradhi* are identical hence all the names related to *Sthana* are one and the same.

Classification of *Sthanavidhradhi* based on the involvement of *Dosha* (body humor) and *Nidana* (etiology) are as follows^[8]

Vataja Sthanavidhradhi: *Vata* humor type (acute inflammation).

Pittaja sthanavidhradhi: *Pitta* humour type (acute suppuration).

Kaphaja sthanavidhradhi: *Kapha* humor type (chronic abscess).

Sannipathaja Sthanavidhradhi: Combination of all 3 humors

Rakthaja Sthanavidhradhi: Blood manifestation

Abhigathaja Sthanavidhradhi: External injury/ microbial type

2.5 Nidana (etiology)

2.5.1 Consumption of stale (*Ama*), excessive hot (*Ushna*) and dry foods (*Rooksha*).

2.5.2 Consumption of food that produces a burning sensation (*Vidahi* and *Pittakaraka Ahara*).

2.5.3 Sleeping over uneven surfaces (external injury).

2.5.4 Wrong food habits and wrong regimen (confining to the one place not having enough movements).

2.5.5 Not properly feeding the baby (calf).

2.5.6 Injury to the organ (Udder).

2.6 Samprapti (Pathogenesis)

As there is no *Vishesh* *Samprapti* (special pathogenesis) for *Sthanavidhradhi* *Samanya Samprapti* (general pathogenesis) of *vidhradhi* can be taken into consideration.

By indulging in foods, which are stale, of hot potency, dry, this increases the *pitta dosha* (of acidic nature). Improper sleeping habits, improper lifestyle and all those activities which cause vitiation of *rakta*, produces a swelling localized in the skin, muscle, adipose tissue, bone, tendon, ligaments etc.

Such a swelling when lodged in the breasts of the woman in her reproductive age, either a pregnant or a female who has just delivered forms a breast abscess, which is not seen in young females.

The channels in the breasts in a pregnant, as well as a female who has just delivered, are dilated and so are vulnerable for the manifestation of internal abscess of the breasts. In virgins, due to the minuteness of the breast channels, there is no possibility of breast abscess to occur.

The term *dosha* signifies the *dushanasvabhāva* (the nature of vitiation) and so they are the basic triggering factors in the disease causation. These are *vata*, *pitta*, and *kapha*. These, in turn, vitiate the tissue elements such as blood, muscle fat etc and manifests in the form of diseases. The same *doṣa* can produce a plethora of diseases due to the fact that it is dependent on the following factors.

2.7 Samprapthi Ghatakas (components of pathogenesis)

Doṣa (humours): *Pitta pradhanatridosha* (*Pitta* humor)

Dushya (tissue elements): *Rasa* (lymph), *Raktha* (blood) and *Mamsa* (muscle tissue)

Srotas (channels): *Sthanyavaha Srotas* (lactiferous channel)

Agni (Digestive element): *Jataraghi* (Gastrointestinal enzymes) and *Dhatwagni* (tissue enzymes)

RogaMarga (disease pathogenesis): *Madhyama* (middle)

2.8 Lakshanas (clinical features)

Swelling, breast engorgement, pain, inflammation and unbearable pain on touch (tenderness) of the female breast. Others include indigestion, lassitude, uneasiness, anorexia, arthralgia, headache, pain, and stiffness of body parts, nausea, fever thirst, retention of urine, diarrhea.

No stage wise explanation in the text as mentioned above the disease has to be understood in terms of *doṣa* predominance.

Āyurveda emphasizes on the disease and the individual with the disease. The individual with the disease is examined by *darshana*, *sparshana* (clinical examination) and *prashna* (history taking). The disease is understood by the *nidana* (etiological diagnosis), *pragrupa* (prodromal symptoms/signs), *rupa* (signs/symptoms, morphological diagnosis), *samprapthi* (pathogenesis, clinical diagnosis) and by *upashaya* (trial and error method). In the case of an abscess, the color of discharge and the

smell of the discharge indicate the predominance of particular *doṣa*(s). Management is based on the *doshic* predominance besides considering the stage of the disease and the diseased.

In the case of unsuppurated abscess, bringing suppuration by means of application of heat etc is the way of expelling the pus and the unwanted debris. But in the case of *Sthanavidradhi*, as the breast tissue is very delicate, application of excess heat etc. are contraindicated. If applied it destroys the delicate soft tissue and pus gets formed quickly. On the other hand, mild application of heat as per requirement is advisable (heat generated by rubbing the palm). Oral administration of drugs as per the *dosha*. These drugs expel the *dosha* through bowels and urine.

Surgical methods are to be adopted in case of suppurated breast abscess. The operation is performed by avoiding injury to milk ducts, nipple, and areola.

During all stages of the breast abscess, the breast should be milked out.

2.9 Signs and symptoms

Local changes: Reddish/blackish swollen udder with extreme pain and tenderness at times, hard and warm to touch.

Milk changes: Milk is often yellow or curdled, has blood tinge at times, and also a few suspended particles seen in the milk of the affected udder.

The three stages of this disease are

Samavastha: When the *doshas* have just lodged themselves in the breast – heaviness in the breasts, slight pain, anorexia, etc.

Pachyamanavastha: When the *doshas* start getting expressed – tenderness in the breasts, swelling, fever (slight), reddish or blackening of the udder.

Pakvavastha: When the *doshas* are fully expressed –extreme pain and tenderness, swelling, fever, etc.

2.10 Different types and its signs and symptoms

Vataja Type: Black or reddish in color, hard, stiff, roughly associated with severe pain, has very unusual types of beginnings such as swellings and suppurations which are slow in nature.

Pittaja Type: Resembles the ripe fruit of *udumbara* (fig) associated with fever, burning sensation, sudden onset and quick suppuration after ruptures yellow discharges come out.

Kaphaja Type: Resembles earthen late (slightly protuberant in the center with wide base), is yellowish white, cold in touch, stiff, mild pain, develops and suppurates gradually, has itching and discharge white after rupture.

Sannipathaja Type: Multiple colors (black, white, yellow) varied pains (piercing pain, Burning sensation, and itching), discharges

of thin, yellow or white, raised, irregular, incurable and suppurates irregularly.

Abhigataja Type: when a person consumes non-congenial diet gets an injury, the heat of the injury excited or spread by Vayu withholding *Raktha* and aggravates *pitta*. Fever, Thirst and burning sensation and also will have *pittaja* type of *lakshanas*.

Rakthaja Type: Very acute in nature, resembles early stages of gangrene.

2.11 Management

2.11.1 The treatment prescribed for abscess holds good here also along with *Vrana* (wound) treatment.

2.11.2 At the beginning for suppuration, poultice or sudation should not be used. Suppuration should be enhanced by the oral use of appropriate drugs or diet.

2.11.3 Once suppuration of this is established, the instrumentation should be done protecting lactiferous ducts, areola, and nipples.

2.11.4 Repeated milking should be done in all the stages; i.e., inflammation, beginning of suppuration and suppuration of the abscess.

2.11.5 Drugs capable of suppressing the Pitta and cold drugs should be used.

2.11.6 Bloodletting with the help of leeches should be done.

2.12 Samprapthivightana (Principles of Treatment)

2.12.1 *Agni deepana* (improve enzymatic activity): Improves the status of metabolism.

2.12.2 *Amapachana* (metabolise the end toxins): Cleanses the toxins of whole animal and udder.

2.12.3 *Pitta* and *Rakthashamaka* (Pacification): Pacifies the aggravated *Pitta dosha* and *Rakthadoosha*

2.12.4 *Srotoshodaka* (Purifier): Cleanses the channels of lactiferous glands.

2.12.5 *VranaShodaka* and *Ropaka* (Wound cleanser): Cleanses the wounds (lactiferous).

2.12.6 *Shothahara* (Anti-inflammatory): Pacifies the inflammation due to infection.

2.12.7 *Krimihara* (Antimicrobial): Decreases the microbial load.

A desk research was carried out on all these practices to find out the safe and efficacious practices using Ayurveda texts. Four assessment workshops were conducted. The participants of the workshops were modern Veterinary, Ayurveda and Siddha doctors, NGO representatives from 24 organizations, community members, and local ethnoveterinary healers.

Totally 103 health conditions were prioritized based on matrix ranking using various criteria such as commonly occurring, economic loss, contagious, causing the death of the

animal and costly treatment. One such formulation is for *Sthanavidhradi* or mastitis, the formulation consists of 3 ingredients *Aloe vera* L. (*Kumari*), *Curcuma longa* L. (*Haridra*) and Calcium hydroxide (*Chunnam*).

Aloe vera L. (*Kumari*) is a wonder herb, having healing properties from the skin to reproductive. It has the properties of *Deepana* (digestive), *Pachana* (carminative), cold in potency (pacifies *pitta*), *Pitta* and *Rakthashamaka* (pacifies *Pitta* and *Raktha*), *Krimighna* (anti-microbial), *Vranashodaka* and *Vranaropaka* (cleanses wounds), *Shothahara* (anti-inflammatory)^[9].

Curcuma longa L. (*Haridra*) is an herb is used in Indian culinary purpose. It is having the properties of *Deepana*, *Pachana*, *Uttejaka* (stimulant), *Rakthashodaka* (blood purifier), *Shothahara* (anti-inflammatory), *Krimighna*, *Vranashodaka* and *Vranaropaka*^[10]. *Calcium hydroxide* is again used along with paan and areca nut. It is having the properties of *Srotoshodaka* (channel cleanser), *Shothahara*, *Rakthashodaka*, *Vranashodaka* and *Vranaropaka*^[11].

Mastitis is compared with *Sthanavidhradi* as described in Ayurveda. *Sthanavidhradi* is a disease of *Pitta* origin, the drugs used in this formulation are potent *Pitta shamaka*. Hence the disease Mastitis (*Sthanavidhradi*) can be efficiently managed with this formulation.

This formulation consists of *Aloe vera* L., *Curcuma longa* L. and Calcium hydroxide which are having the properties of *Agni deepana*, *Amapachana*, *Krimighna*, *Vranashodaka*, *Vranaropaka* and *Shothahara*, *Srotoshodaka*; so this formulation holds good in combating the disease Mastitis.

2.13 Medicines

2.13.1 Application of root of *Citrullus colocynthis* relieves pain.

2.13.2 Application of *Curcuma longa* and *Datura metel* cures immediately.

2.13.3 Heated iron should be dipped in water. Drinking these water cures *Stanaroga* immediately.

2.13.4 Formulations

2.13.4.1 *Karanjadyaghrutha*

2.13.4.2 *Triphalaguggulu*

2.13.4.3 *Guggulutikthakaghruth*

2.14 Diet

Before suppuration: *Lashuna* (*Allium sativum* L.)- bulbs, *Kulattha* (*Dolichus biflorus* L.)- seeds, *Shigru* (*Moringa oleifera* Lam.) - leaves, *Karavellaka* (*Momordica charantia* L.) - fruit, *Punarnava* (*Boerhavia diffusa* L.) - entire plant, *Chitraka* (*Plumbago zeylanica* L.) - root.

After suppuration: *Purana Raktha Shali* (old red rice), *Ghrutha* (ghee), *Taila* (oil), *Mudga yoosha* (soup of green gram), *Mamsa rasa* of *vanya jeevi* (meat soup of wild animals), *Kadali* (*Musa paradisiaca* L.)- *Kanda*, *Patola* (*Trichosanthes dioica* Roxb.) - fruit, *Cinnamomum camphora* (L.) J.Presl., *Santalum album* L. and boiled and cooled water.

3. CONCLUSION

In this article, it is tried to explain ethno and Ayurvedic understanding of the most economically devastating disease mastitis. Attempt has also been made to establish the link between Ayurveda and veterinary Ayurveda. This traditional system of India called *Mrugayurveda* (Ayurveda for Animals) or Veterinary Ayurveda is robust and time-tested. It has been in practice since age-old. This robust system of medicine can address the current challenges of mainstream medicine. Many herbs and formulation from Ethno knowledge and Ayurveda were in practice in ancient India. So it is important to validate and reintroduce these time-tested formulations and herbs for animal health.

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