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THE EFFECT OF AYURVEDIC DRUGS WHEN USED AS DISEASE MODIFYING ANTIREUMATIC DRUGS (DMARD'S) IN AMAVATA (RHEUMATOID ARTHRITIS)

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ABSTRACT
The Disease Modifying Anti-Rheumatic Drugs (DMARD'S) are therapeutic agents which rapidly reduce the intensity of inflammation and facilitate induction of remission. The sages of Ayurveda invented many remedies to combat this disease. Here an effort is made to evaluate once again the efficacy of some of the remedies. Ama and Vata are the two chief pathognomonic factors in causing Amavata. Ama has the qualities of heaviness (guru), unctuousness (Snigdha), immobility (Sthira), bulkiness (Sthula), and sliminess or stickiness (Pichhila). Vata has the properties of lightness (Laghu), dryness (Ruksha), movement (Chala), subtleness (Sukshma), and clearness (Vishada). Ama is the undigested food which results due to Mandagni (sluggish digestive fire) which is caused due to various reasons. All types of metabolic fires (Agnis) become sluggish in this disease. The stagnant Ama is called Ama visha. Ama is the substance which is the resultant of improper digestion of the food due to hypo-functioning of the gastric juices (Jatharagni). The drugs having the qualities of Tiktam (astringent), Deepana (appetizer) and Katu (pungent) modify the disease due to their qualities. The purgation property (Virechana guna) modifies the process of disease. Castor oil (Eranda Tailam) cures Vata diseases. It has been observed that after administration of Castor oil, the fluid from the inflamed joints and tissues has been drained away. Castor oil relieves pain, reduces inflammation and swelling, increases lymphatic circulation, reduces flatulence, stimulates the liver and the gall bladder, and reduces toxins. A scientific study on the effect of castor oil on humans found castor oil to be an antitoxin, and as having an impact on the lymphatic system enhancing the immune functioning of the body. Panchakola churnam is anti-inflammatory; it is an anti-oxidant, an immunomodulator, and a rejuvenator too. Hingu Triguna Tailam is digestive, carminative, analgesic and anti-rheumatic.
Keywords: Amavata (Rheumatoid Arthritis), Eranda Tailam, DMARD's, Immunity, Rejuvenation

INTRODUCTION

The modern times have witnessed advancement in the treatment of Rheumatoid Arthritis. The DMRAD's are therapeutic agents which rapidly reduce the severity of inflammation. Today the goal of the treatment is complete remission.[1] Ayurveda is also a time-tested Health Science serving the mankind since ages. The sages of Ayurveda invented many remedies to combat this disease.

Chakrapani was the pioneer to lay down the line of treatment of Amavata (in the book titled Chakra Duttam, Amavata Rogadhikara, authorized by him).[2]

Definition of Ama

In Ayurvedic classics various definitions of Ama were mentioned. Due to the improper functioning of Kayagni (metabolic activity), the first of the tissues, or Lymph (Adya Ahara Dhatu/Rasa Dhatu) formed in the Amashaya (Stomach) is known as Ama.[3,4] Other meanings of this word (Ama) found in Ayurvedic literature are:

Charaka says that the undigested food which resulted due to various actions of Mandagni attain Shuktatwa (fermentation) leading to a set of toxic states called Amavisha.[5]

From the above definitions it is clear that Agni (metabolic fire) plays an important role in the production of Ama.

Agni & Ama

All types of metabolic fires (Agnis) become sluggish in this disease. First of all, diminished fire (Jatharagni Mandya) leads to improper digestion resulting in formation of Ama. As other types of fire, viz metabolic fire (Dhatvagni), and the fire of five elements (Pancha Bhootagni or simply known as Bhutagni) depend on the digestive fire (Jatharagni) for their augmentation. Their strength comes down due to the poor strength of metabolic fire (Dhatvagni) and thus proper nourishment to the tissues (Dhatus) does not take place. Only the production of the tissue mixed with undigested substance (Amarupa Dhatu) and Phlegm (Kapha) occurs. Undigested food residue (Ama) produced due to diminished digestive fire (Agnimandya) results in blocked passages (Srotorodha) and get settled in phlegmatic areas like joints (Sleshmasthana).

Ama Visha (The toxin of Ama)

The stagnant Ama, which is expelled neither through the upper passage (Oordhva marga) nor through the Lower passage (Adhomarga) from the Stomach (Amashaya), undergoes fermentation. The product so formed is called Amavisha (the toxin of Ama).[5,6,7] Ama is a resultant of improper digestion or partial digestion of the food due to hypo functioning of the digestive fire (Jatharagni).

The role of Ayurvedic drugs as DMARD's

The procedures like fasting (langhanam), sudation (swedanam) are adopted in which drugs are not used. The drugs having the qualities of astringent (tiktam), appetizing (deepana), pungent (katu) modify the disease. Virechana (purgation) and Vasti karma (medicated enema) which belong to the five purifying procedures (panchakarma) modify the process of disease.[8]

Ayurvedic drugs as DMARD's

Eranda Tailam (Castor oil)

Eranda Tailam has the property of hotness (Ushnam). Due to its property of hotness it digests the Ama (undigested food residue); due to its penetrative property (Teekshana guna) it disintegrates the Ama; due to its subtle nature (sookshma guna) it enters the deeper tissues, and purifies the passages. It cures Vata and particularly purges the bowels. It expels the disease causing impurities down the gut. Due to the above qualities the Eranda tailam drains out Ama dosha.[9] It cures low back pain (Amaja kati

shoola).[10] Bhavamishra praises Eranda Tailam comparing it to the lion which kills the elephant of Amavata causing diseased condition of the body.[11] Charaka says, it removes many impurities from the body (bahudoshas) through purgation (Virechana).[12]

Apart from the purgation property, it has been observed that there has been considerable reduction in and relief from the inflammation and swelling of joints and tissues. Thus by regular use of Castor oil for a few days, it initiates action on the affected parts and reduces the inflammation and thus it helps in curing the disease.

Dosage: 2 teaspoonfuls – 6 teaspoonfuls in tea or boiled milk.

Caution

Castor oil should not be used indiscriminately by patients suffering from infections of the kidney, bladder, bile duct, and intestines, or by those suffering from Jaundice. It should not be used by pregnant or lactating women. No health hazards or side effects have been noticed if this oil is administered properly in prescribed doses. Long-term use of this oil can lead to loss of electrolytes, in particular, Potassium ions. This can result in hyper aldosteronism, and inhibition of intestinal motility.

Contraindications

This drug should not to be administered to children less than 12 years.

Overdoses of this oil can lead to gastric irritation accompanied by queasiness, vomiting, colic, or severe diarrhea.

Castor oil is a vegetable oil obtained from the castor seed. Its colour ranges from colourless to very pale yellow liquid with mild or no odour or taste. Its boiling point is 313 °C (595 °F) and its density is 961 kg/m3.[13] It is a triglyceride in which approximately ninety percent is Ricinoleic acid; Oleic and linoleic acids are the other significant components.[14]

Table 1: Castor oil

Average composition of Castor oil	
Name of the acid	Percentage Range
Ricinoleic acid	85 to 95
Oleic acid	6 to 2
Linoleic acid	5 to 1
Linolenic acid	1 to 0.5
Stearic acid	1 to 0.5
Palmitic acid	1 to 0.5
Dihydroxystearic acid	0.5 to 0.3
Others	0.5 to 0.2

The United States Food and Drug Administration (FDA) has categorized castor oil as "generally recognized as safe and effective" (GRASE) for over-the-counter use as a laxative with its major site of action, the small intestine.[13] Ricinoleic acid is the main component of castor oil and it has anti-inflammatory effects.[14]

There are several ways to take it orally

1. Mix 2 tablespoonfuls of the oil in 1 cup of warm water and drink it in the morning empty stomach.
2. It can be also being mixed in tea or coffee, or warm fruit or vegetable juice (not in a microwave oven). Dosage: 2 tablespoonfuls.
3. In severe Rheumatoid Arthritis cases, boil 1 glass of water with 1/4 spoonful of dry ginger powder. Strain, cool and add 2 spoonfuls of the oil to the liquid before drinking. The best times for oral ingestion are early in the morning on empty stomach or just before going to bed. Start with 1 tablespoonful and increase it to 2 or 3 tablespoonfuls over 1 to 2 weeks.

Castor Oil possesses various healing properties

- Relieves joint pains
- Reduces inflammation
- Reduces swelling
- Increases lymphatic circulation
- Reduces flatulence
- Stimulates the liver and the gall bladder
- Reduces toxins

Harvey Grady made a scientific study of the effect of topical application of castor oil on humans. His studies found castor oil to be an antitoxin, and as having an impact on the lymphatic system enhancing the immune functioning of the body. A two-hour topical application caused an increase in the number of T-11 cells and a large increase in total lymphocytes in the blood within a 24-hour period following the treatment. Lymphocytes are responsible for protecting the body from pathogens and their toxins.[15] Thus it boosts the body's defence mechanism, finds T-cells, and kills viruses, bacteria, fungi and cancer cells.

Pancha kola choornam (Table 2)

Pippali *(Piper longum* Linn.)

Recent research confirms the effectiveness of Pippali in a variety of situations. Several studies have shown immunostimulatory and antigiardial effects of Pippali.[17] Some chemical constituents are natural steroid-like substances like Piperolongiminin.They act as anti-inflammatory substances.[32]

Pippali root (Mulam)

Pippali roots' anti-inflammatory and analgesic effect is nearly equal to that of Ibuprofen according to a study on animals. This indicates that *Piper longum* Linn root has weak opioid but potent NSAID (non-steroidal anti-inflammatory) type of analgesic activity.[18] The Pungent (Katu), Hot (Ushna), Penetrative (Teekshna), Dry(Ruksha), Light (Laghu) properties (guans) act against vitiated Air Humour (Vata) and Phlegm (Kapha).[32]

The Pippali and Shunti have rejuvenating (Rasayana) property and therefore restore the cellular integrity. In this way, this formulation with versatile properties acts synergistically and relieves inflammations, edema and restores the structures of the body to normalcy, improves appetite, and relieves flatulence.

Chavya *(Piper retrofractuam* Vahl*.)*

Ignites the digestive fire in stomach and thus increases metabolism of the body.

Chitra Mulam *(Plumbago zeylanica* Linn)

Plumbagin or 5-hydroxy-2-methyl-1, 4-naphthoquinone is an organic compound with the chemical formula, $C_{11}H_8O_3$. It is regarded as a toxin. Plumbagin is a yellow dye formally derived from naphthoquinone. It is named after the plant genus Plumbago which is anti-inflammatory.[19]

Shunti (*Zinziber officinale* Roxb.)

It acts as Immunomodulatory, anti-inflammatory in arthritis. In Ayurveda, Ginger is used as an anti-inflammatory remedy for arthritis[20] as detailed below:

i. *In vitro* data: Ginger extracts block the formation of

inflammatory compounds such as Thromboxane, Leukotrienes and Prostaglandins.[21]

ii. Animal data: In the rat model of chronic severe inflammatory arthritis, Ginger oil effectively reduced swelling and inflammation[22]. Ginger compounds also had antipyretic effects comparable to Aspirin in rats.[23]

iii. Human data: A study on seven patients with Rheumatoid Arthritis reported improved symptoms following administration of supplemental ginger. In another case series of 56 patients (28 with Rheumatoid Arthritis, 18 with Osteoarthritis and 10 with muscular discomfort) who were given powdered ginger supplements, more than three-quarters of the arthritis patients reported varying degrees of relief in pain and swelling. All the patients with muscular discomfort experienced relief.[24]

Antioxidant action

i. *In vitro* data: In human aortic endothelial cells, Zingerone demonstrated significant antioxidant effects on Low Density Lipoproteins.[25]

In human erythrocyte membranes, ginger extracts inhibited lipid peroxidation by 72%.In human chondrocytes, ginger's volatile oil effectively prevented the production of Hydrogen Peroxide usually induced by Fulvic acid.[26]

ii. Animal data: In rats which were fed a high fat diet, supplementation with ginger provided significant antioxidant effects, raising the tissue concentrations of Superoxide Dismutase and Catalase, and reduced Glutathione.[27]

The efficacy of the Panchakola ingredients was proved in the above work. Hence the Pancha kola choornam proved to be highly effective as a DMARD. It was found to be anti- inflammatory, and antioxidant. It was also found to be an immunomodulator and a rejuvenator. Thus it was found to be useful in the treatment of Amavata.

Dosage: Powder: 2-4 gms with hot water, twice daily.

Side effects: No side effects

Contraindications: Pitta Vikriti (Fire element vitiation), Hyperacidity, Gastric ulcer, Gastritis, Hematemesis and Bleeding Disorders.

HinguTriguna Tailam: Yogaratnakaram; Ama Shoola Chikitsa (Table 3)

Asafoetida/Hingu (*Ferula narthex*)

Dried *Asafoetida* consists mostly of a resin (25 to 60% of the total mass, 60% of which is esters of ferula acid) and a complex carbohydrate part (25 to 30%). The essential oil (10%) contains a wealth of sulphur compounds, mainly (R)-2-butyl-1-propenyl disulphide (50%), 1-(1-methylthiopropyl) 1-propenyl disulphide and 2-butyl-3-methylthioallyl disulphide. Furthermore, di-2-butyl trisulphide, 2-butyl methyl trisulphide, di-2-butyl disulphide and even di-2-butyl tetrasulphide have been found.

Biomedical action

Asfoetida is digestive, carminative, antihelminthic, antispasmodic, analgesic, emmenagogue, and expectorant. It lessens all inflammations. It is stomachic, laxative, analgesic, and anti-rheumatic.[28]

Garlic (*Allium sativum* Linn.)

It improves appetite. It is a gastric stimulant. It is carminative. Oil prepared from Garlic used in Rheumatic pains reduces inflammation over joints.[29] Garlic inhibits free radical generation and augments Antioxidant enzyme activity in vascular endothelial cells. Free radicals contribute to endothelial cell injury, increase microvascular permeability and tissue damage, and play a critical role in mediating various pathological processes such as inflammatory diseases. Several studies indicated that treatment of endothelial cells with SOD (Super Oxide Desumatase and /or CAT (Catalase) decreased damage caused by free radicals. Wei and Lau (1998) showed that the Aged Garlic Extract (AGE) inhibited $H_2O_2$and O_2 generation and augmented SOD, CAT and GPX (Glutathione Peroxidase) activities. The results suggest that AGE may be an effective antioxidant in preventing endothelial cell damage and may therefore play a significant role in defense against radical mediated disorders.[30]

Saindhava Lavanam (Rock salt)

Saindhava lavanam is carminative and digestive. It regulates the functioning of the connective tissues and restores comfortable movement of joints and muscles. It reduces chronic joint inflammation, and joint disorders such as osteoarthritis and rheumatoid arthritis. It improves taste. It is cooling and aphrodisiac. It is subtle (Sookshma) and hence penetrates quickly. It alleviates the three humours (Tridoshaghnam).[31]

This formulation of the Hingutriguna Tailam has three actions - like stomachic (Deepana), digestive (Pachana) and purgative (Adhobhagahara). All the drugs having hot and penetrative properties (Ushna, teekshana gunas) stimulate appetite; with digestive quality (pachana guna) Hingutriguna Tailam disintegrates the Ama in the tissues and joints. The Garlic (Rasona) with its rejuvenation property (Rasayana guna) restores the cellular integrity, and thereby disease modification occurs. Eranda Tailam expels the impurities (doshas) accumulated in the tissues. In this way this formulation has multiple effects.

According to the modern studies the three constituents of Hingutriguna Tailam have immunomodulatory, antioxidant, anti-inflammatory, and free radical antagonistic properties which all together prevent further progress of the disease as they act synergistically in this formulation. The properties of Eranda Tailam have already been mentioned above.

Dosage: 10 ml daily once in the morning on empty stomach with hot water.

Side effects: No side effects.

Precautions: Persons of bilious nature (Pitta prakriti) should avoid its use for longer periods of, say, more than one month.

Contraindications: Same as for Eranda Tailam and Pancha kola Choornam.

CONCLUSION

The above study reveals that the drug Eranda Tailam and other two formulations, viz the Hingutriguna Tailam and Panchakola choornam have definite role to play in modifying the disease Amavata. The drug having the properties of Hot (ushna), Penetrative (teekhsna) disintegrates the undigested food residue (Ama). Due to Dry (Ruksha), Light (laghu) properties (gunas) they dry up the excess fluid accumulation in the joints and tissues. Due to The Subtle (sookshma) property (guna) the drug

enters deep into the joint spaces and tissues. Due to the Rejuvenating property (Rasayan guna) the drug rejuvenates cells and maintains cellular integrity, and thereby prevents erosion of bones and modifies the process of disease. Thus these drugs and formulations are definitely a boon to the ailing people. A pilot study to study the effects of Eranda Tailam has already been started. The results are expected soon.

Table 2: Pancha kola choornam[16]

SN	Name of the Drug	Qualities (Gunas)	Chemical Constituents	Action
1	Pippali *(Piper longum* Linn.*)*	Pungent (Katu)	Piplartine	Eliminates Phlegm(Kapha hara)
2	Pippali Mulam	”	”	”
3	Chavyam *(Piper retrofractuam* Vahl.*)*	Pungent (Katu), Hot (Ushna)	Piperine, piplartine	Eliminates Phlegm and Air humour (KaphaVataghna)
4	Chitra Mulam *(Plumbago zeylanica* Linn.*)*	Light (Laghu), Dry (Ruksha), Penetrative (Teekshna), Hot (Ushna)	Plumbagin	Eliminates Phlegm and Air humour (KaphaVataghna)
5	Shunti *(Zinziber officinale* Roxb.*)*	Light (Laghu), Dry (Ruksha), Penetrative (Teekshna), Hot (Ushna)	Zinziberene	Eliminates Phlegm and Air humor (KaphaVataghna)

Table 3: Hingu Triguna Tailam

SN	Name of the Drug	Qualities (Gunas)	Chemical Constituents	Action
1	Hingu (Asafoetida) *Ferula narthex*	Pungent (Katu), Light (Laghu) Hot (Ushna), Penetrative (teekshna)	Asaresinotannol	Eliminates Phlegm and Airhumour (KaphaVataghna)
2	Eranda tailam (castor oil) *Ricinus communis* Linn.	Snigdha, teekshna Ushna, sukshma	Ricinoliec acid	EliminatesAirhumour combined with undigested food residue (Sama vata hara), downward elimination(Adhobhagahara)
3	Saindhava lavanam Rock salt	Penetrative (Teekshna), Light (Laghu) Hot (Ushna), Subtle (Sukshma)	Sodium chloride	Appetizer (Deepana), Digestive (Pachana)
4	Rasona *(Allium sativum* Linn.*)*	Penetrative (Teekshna), Sliding (Sara)	Sulphides	Eliminates Phlegm and Air- humour (KaphaVataghna)

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