Review Article

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PAIN MANAGEMENT IN AYURVEDA WITH SPECIAL REFERENCE TO ANGAMARDA PRASHAMANA AND VEDANA STHAPANA MAHAKASHAYA OF CHARAKA: A REVIEW

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ABSTRACT

Pain management is a broader aspect in the field of Ayurveda and medical science. The modern science is in process of verifying a lot of herbal drugs for analgesic effect from plant kingdom and several drugs were in the process of getting the response also. In this aspect Charaka Samhita, the most trusted therapeutic oriented treatise of Ayurveda describes certain plant drugs exclusively with pain killing properties. In this reference angamarda prashamana and vedana sthapana groups are considered in which twenty specific plants have been enlisted by Charaka differentiating their pain killing effects like angamarda prashamana and vedana sthapana probably these two terms is having parallel corroboration with the antinociceptive and analgesic in modern system of medicine. Under these two groups twenty different plants were seen and all those individual plants were verified with experimental studies done so far. Though Ayurveda Pharmacopeal properties of those 20 plants are not identical to each other still it is matter of great astonishment how they could have been grouped for a specific purpose of action. In the present paper efforts were taken to verify from the experimental study to know the effect of Ayurvedic drugs and it was found amazing that those drugs described as angamarda prashamana are few in the group of antinociceptive properties and few are having analgesic effect. Similarly, vedana sthapana drugs were also found with some of them having antinociceptive and analgesic.

Keywords: Pain management, Angamarda prashamana, Vedana sthapana, Antinociceptive, Analgesic, Charaka.

INTRODUCTION

Exploitation of medicinal plants drug has led to the search of many useful compounds and their precursors. Medicinal plants and active principles isolated from the plants are of immense, importance to human civilization to fight against various diseases. Most developed countries are looking towards herbal medicine. In the light of this facts the research on various disciplines are coming forward with renewed zeal to exploit the flora described in Ayurveda texts. Scientific interest in medicinal plants described in Ayurveda developed in recent times due to increased efficiency of new plant derived drugs and rising concerns about the difficulties of conventional medicines.

Looking to the enthusiastic issue it is desired to verify certain plant drugs in Ayurveda in which painkiller stands the top as it is highly essential now-a-days for its numerous use by almost all the human and animal kingdom pain being the most important ailment. Several painkillers are available in market but with some known post using hazardous effects. It was a search whether it could be possible to find out the alternative and safe medicaments from Ayurveda. Attention was given to find out the similar action oriented plant drugs in Charaka Samhita, a dependable classical treatise in Ayurveda.

Charaka has described two separate groups of drugs in Sutra sthana 4th chapter as angamarda prashamana and vedana sthapana having individual identity. It is here to mention that Charaka has described two separate groups of drugs with different action but with separate groups that angamarda prashamana which is broadly known as drug for body ache whereas vedana sthapana known as anodynes or broadly known as pain killers. The above fact indicates the varieties of function of vayu and its characters of pain. It was also desired to see the difference between angamarda prashamana and vedana sthapana. Both the words are different in clinical practice. Literary angamarda prashamana means remission of bodily pain or body ache with the lethargic sensation etc. Similar terms are also found in Ayurveda like gatra-ruk, guru-gatrata, sarvang-grahanam, tanu-graha, asthi-sandi-shiroruja, toda, stabbdhata, gatrasadan etc. by different authoritative testimonial. According to Charaka "Anganammardanvatbhavamanubhavittiangamardanam'' which denotes special sensation in a body like mild pressure/pain transmitted from one part to another part.

So far Ayurveda hypothesis of pathology behind the angamarda and vedana is concerned it is clearly mentioned by Charaka (Ch.Su 20/12) that vayu is the cause for different type of pain in the body, when the normal physiological action is derailed by specific causative factor concerned[1]. Also Charaka has specified in Siddhi Sthana that whatever the pain is experienced in the body are being caused only by vayu[2].

In comparison to modern it may be correlated with nociception means the sensory nervous system response causing subjective experience of pain. Usually this nociception is clearly not defined as grievous pain. It is defined and determined by transient receptor protein (TRP) which is completely covered within the somato-sensory system within the brain. Integrally pro-proception, thermo-ciception, chemo-ciception and nociception

are integrally connected. Stimulation of sensory nerves cells due to intense chemical, mechanical, thermal stimulation called nociceptors produces a signal travels along with chain of nerve fibre by spinal cord to a brain. Nociception triggers a variety of physiological and behavioural response and usually triggers different type of pain. This nociception have a certain threshold and require a minimum intensity of stimulation before they trigger a signal. Once this threshold reaches, signal is passed along the action of neuron into the spinal cord and causes varieties of pain, but this nociceptive threshold testing method is the application of noxious stimulus to a human or animal subject. In order to study the gravity of pain this technique is used to study efficacy of analgesic drugs and to establish dosing levels and period of effect also. These conditions may be referred as angamarda in Ayurveda so far vata is concerned and variety of pain is concerned this can also be well co-related with nociception as per modern perspective.

Similarly, the word vedana denotes probably the sensation of more pain in comparison to angamarda. In Ayurveda the word vedana is used as synonym vyatha, ruka, peeda, shula, etc. and which is caused by vayu. Sushruta has clearly mentioned "narteanilatruka" which indicates there is no pain without involvement of vayu. So this can be similarly corroborated with the hyperalgesia or pain in general or anodyne. However, the exact mode of action or definition is not clear in Ayurveda probably due to lack of intensity marker. But if it is being compared with modern a triggering signal out of threshold of nociceptive stimulation or sensation may be termed as pain. So probably Charaka has differentiated the drugs used for mild pain and severe pain.

Similarly, in some condition excitation of pain fibre become greater as pain stimulus continues beyond the TRP threshold. The condition called hyperalgesia which may be correlated with vedana in Ayurveda as described by Charaka. Probably Charaka might have understood the difference between nociception and hyperalgesia for which he might have discussed angamarda prashamana and vedana sthapana separately. The description of angamarda prashamana and vedana sthapana drugs in Charaka has been put attention towards pain management.

The drugs which are used recently for controlling pain and inflammation are either opioid or non-opioid even though the drug gives immediate relief but they produce side-effect. Many medicinal plants have been used for a long time in Ayurveda for these effects mostly with non-adverse effects. Plants still represents a large untapped source of structurally novel compounds that might serve as led for the development of novel drugs. With this objective steps were taken to find out antinociceptive/ analgesic effect of angamarda prashamana and vedana sthapana drugs of Charaka.

Enumeration

In order to find out antinociceptive and analgesic action of plants in angamarda prashamana mahakashaya and vedana sthapana mahakashaya enlisted group of drugs of Charaka Samhita search was made and it was found that some of the plants/drugs of angamarda prashamana were found antinociceptive in action and some of plants were found as analgesic. Moreover, it was also found that few drugs were having both. The action of drugs found so having desired effect were enumerated below[3].

There are ten such medicinal plants under angamarda prashamana mahakashaya as Vidarigandha (*Desmodium gangaticum*), Prishnparni (*Uraria picta*), Brihati (*Solanum indicum*), Kantkari (*Solanum xanthocarpum*), Eranda (*Ricinus communis*), Kakoli (*Roscea procera* and *Fritillaria roylei*), Chandana (*Santalum album*), Usheera (*Vetiveria zizaniodes*), Ella (*Elettaria cardamomum*) and Yasthimadhu (*Glycyrrhiza glabra*) Similarly, there are ten medicinal plants under Vedana sthapana group as Saal (*Shorea robusta*), Katphala (*Myrica nagi*), Kadambha (*Anthocephalus cadamba*), Tumb (*Citrullus colocynthis*), Mocha rasa (*Bombax malabaricum*), Shirisha (*Albizia lebbeck*), Vetas (*Salix caprea*), Kumari (*Aleo barbandensis*), Ashoka (*Saraca asoca*)

Vidarigandha (*Desmodium gangitacum*)

It is a herb having distribution over lower Himalaya's regions. As per Ayurvedic text its rasa is madhura, tikta and guru with snigdha guna along with Ushna veerya and madhura vipaka. Charaka has included Angamarda prashamana along with shothahara qualities probably due to anti-inflammatory property. It is one of the important drugs among laghupanchmula and is extensively used as ingredient of dashamoola. Apart from this Sushruta has also described its therapeutic use in hridya shula (angina) and as pain relieving agent in vatarakta (gout).

So far modern experimental studies are concerned the antinociceptive, anti-inflammatory study have been done on its water decoction of root, which was found effective in experimental animals. In the pharmacological profile of *Desmodium gangitacum* was studied in which significant result found with anti-inflammatory and analgesic effect of its water decoction of root and aerial part along with antinociceptive action also.[4] Moreover, in another study its effect was studied on smooth muscle, was found having anti-inflammatory activities in albino rats.[5] From the above experimental studies the result so found was highly active in reducing inflammation especially in arthritis which was also studied with the decoction of the drug and it may be corroborated with the Angamarda prashamana mahakashaya qualities mentioned by Charaka.

Prishnparni (*Uraria picta*)

It is otherwise called as prithakparni is one of the angamarda prashamana groups along with its shotha hara qualities (anti-inflammatory) mentioned by Charaka. Susruta has grouped in vidarigandhadi gana[6] and haridradi gana which is also accepted by Vagbhata and described in Atharvaveda. Its rasa is madhura and tikta having snigdha guna with ushna virya and madhurvipaka[7] as per Ayurvedic pharmacopoeia.

It was also verified from chemico-pharamacological experiments to verify its antinociceptive or analgesic effect; it was found that a study has been conducted on laghupanchmula in which *Uraria picta* was one of component having analgesic-hypnotic activity observed in rats, which authenticate analgesic-hypnotic effects of laghupanchmula formulation and its uses in Ayurvedic system of medicine for pain management under tail-flick of hot plate test. It denotes the administration of laghupanchmula decoction is highly potent in relieving pain due to sedative property which is corroborated with the neuro-muscular disorders[8].

Brihati (*Solanum indicum*)

It is otherwise known as vartaki is one of the angamarda prashamana groups in Charaka which is also a component of laghupanchamula and apart from this Charaka has mentioned the property as shothahara (anti-inflammatory). In Kaidaivnighantu two varieties of brihati are described but the identified one is *Solanum indicum* which is in practice having katu, tikta rasa, ruksha guna, ushna veerya and katu vipaka as per Ayurvedic pharmacopoeial properties[9].

The antinociceptive and analgesic effect of *Solanum indicum* was verified through phytochemical and pharmacological studies in which it was statistically found significant in a study as an analgesic.[10] Experimental evidences shows that *Solanum indicum* fruit extract possesses analgesic and anti-inflammatory effect. In the study the central analgesic activity was determined in rats, which were treated with the extract of the drug along with control drug aspirin in which drug was found having analgesic activity more in comparison to control drug. In the above experimental study the conclusion was drawn that the fruit extract of *Solanum indicum* indeed possesses analgesic effect and CNS depressant activity as depicted in animal study. It denotes its specific analgesic effect with anti-inflammatory action required for neural pain along with neuro-muscular management.

Kantakari (*Solanum xanthocarpum*)

The other plant under angamarda prashamana group of drugs mentioned by Charaka and otherwise called as vyaghri. In Raj nighantu eight varieties of kantkari is described. As per Ayurvedic pharmacopeia it has katu and tikta rasa with Tikshna and ruksha guna, ushna virya with katu vipaka. Charaka has more specified with its diversified actions as shotha hara (anti-inflammatory).

In reviewed experimental and pharmacological studies, it was found that the methanolic extract of *Solanum xanthocarpum* arial parts given orally showed significant antinociceptive activity[11] which probably corroborates with the angamarda prashamana qualities described by Charaka.

Eranda (*Ricinus communis*)

It is best known as gandharwahastha in Ayurveda. It is described as an ingredient of angamarda prashamana group of drug. Qualities mentioned by Charaka apart from its root as vata hara (neurotropic) (Ch.Su.25) Usually there are two varieties of eranda i.e. white and red described in different texts in the name of urubuka (white) and panchangula (red). Eranda possesses katu, madhura rasa, snigdha guna, ushna virya and madhura vipaka as per Ayurvedic pharmacopeia. Mostly the root, seed /oil are used for medicinal purpose in vata vyadhi (neurological disorder), katishula (lumbago) due to pain as important symptom.

The drug was also verified through experimental phyto-chemical studies done earlier to find out its antinociceptive and analgesic effect. The Compound ricinolic acid, the main component of castor oil showed remarkable analgesic and anti-inflammatory effect in a study which corroborates vedana sthapana qualities as mentioned by Charaka. It provides an analgesic effect similar to NSAID's and can be considered to be used in neuro-muscular and inflammatory conditions.[12]

Chandana (*Santalum album*)

It is an aromatic drug often been utilized in all sort of auspicious function, Charaka has included Chandana in Angamarda prashamana group. There are several variations as described in classical texts. However, in practice two varieties are taken in use. As per Ayurvedic pharmacopeia it is having tikta and madhur rasa laghu, Ruksha in guna with sheeta veerya and katu vipaka.

It was verified from an experimental study that it possesses anti-oxidant, analgesic and anti-inflammatory activity especially the methanolic extract of wood was screened for analgesic and anti-inflammatory activity with various dosages and compared with diclofenac sodium as saturated which showed maximum result compared with control group and was statistically significant.[13]

Moreover, the drug was also studied on CNS with analgesic activity using hot-plate analgesia meter in comparison with standard diazepam and pentazocine as standard drug. It was concluded in the study that *Santalum album* had more prominent CNS effect for analgesia and sedation.[14] Similarly the sedative effect of sandalwood oil was also studied on albino mice in another study which has found encouraging result. From the above experimental studies it is apprehended that *Santalum album* contains muscle relaxant effect[15] probably corroborating to angamarda prashamana qualities described by Charaka. Moreover the wood of the plant as pain killing property for fever, headache and inflammation in Ayurvedic classic and result so found is identical to pain management sequences.

Usheera (*Vetiveria zizanioides*)

It is also called as khaskhas grass. According to Ayurvedic pharmacopeia this drug has tikta and Madura rasa with laghu, Ruksha guna having sheeta virya with katu vipaka. It is known from ancient time that its root is used for various disease conditions to verify its antinociceptive and analgesic effect studied so far if any with reference to angamarda prashamana described by Charaka.

The ethanolic extract of *Vetiveria zizanioides* in different doses produced significant in habitation of pain response and caused the analgesic and anti-inflammatory activities.[16] In an another study *Vetiveria* popularly known as khaskhas grass was taken for study for its analgesic and anti-inflammatory action. However in several studies it was found having promissory source of anti-inflammatory and analgesic effect.[17,18] It also strengthens the idea of pain killing effect as described in angamarda prashamana Dravyas of Charaka.

Ella (*Elletaria cardamom*)

It is one of the important aromatic-plant drugs mentioned in angamarda prashamana group. It is an aromatic condiment in Ayurveda. However, there are two varieties usually found in the name if sukshmaella (small ella) and bhritaella (big ella). According to Ayurvedic pharmacopeia it is having katu and madhur rasa laghu, ruksha guna, sheeta veerya with katu vipaka. Steps were taken to verify the antinociceptive and analgesic effect of *Elletaria cardamom*. An investigation of an analgesic activity of oil extracted from *Elletaria cardamom* seeds proved the antinociceptive action.[19] It may be advisable to be used in paediatric pain management as per the judicious administration of the physician.

Yasthimadhu (*Glycyrrhiza glabra*)

It is another component of angamarda prashamana group. This is an important drug told as medhya by Charaka. However, it has been named accordingly having its availabilities in different places. As per Ayurvedic pharmacopeia it is having madhura rasa, guru and snigdha guna, and sheeta virya and madhura vipaka.

The drug was verified with its antinociceptive and analgesic effect in an experimental study done so far. According to the study the antinociceptive activity of aqueous and methanolic extract of *Glycyrrhiza glabra* was found statistically significant in mice exhibiting the antinociceptive effect by central and peripheral activity[20]. *Glycyrrhiza glabra* has proven to have anti-inflammatory and analgesic effect. In an another study *Glycyrrhiza glabra* exhibited dose dependent antinociceptive response in tail flick test.[21,22] From the above studies it was understood that the antinociceptive action of *Glycyrrhiza glabra* is probably identical to the qualities of angamarda prashamana as

described in Charaka. It can also be considered for pain management in Panchakarma therapy.

Kakoli

It has been taken as one of the component of angamarda prashamana group still stands as a controversial drug and not still clear and identifiable in parallel with modern to taxonomy due to lack of its identity in Ayurveda. Kakoli is sheeta in virya having guru and madhura guna and is used as tonic as per Ayurvedic pharmacopeia. In this reference it is to mention here that Kakoli is being identified as *Roscoea procera* and *Fritillaria roylei* in different places; since due to lack of identification the evaluation done in any case could not be matched.

Sala (*Shorea robusta*)

It is an important Indian medicinal plant incorporated in vedana sthapana group of Charaka. So far Ayurvedic pharmacopeia is concerned it possesses kashaya and madhura rasa, ruksha guna, sheeta veerya and katu vipaka. Steps were taken to verify analgesic activity of drug and it was found that the analgesic activity was studied by making use of different central and peripheral pain model such as hot plate and tail flick test and the extract of *Shorea robusta* was found significant central and peripheral analgesic effect.[23]

Katphala (*Myrica nagi*)

It is another drug of vedana sthapana group and possesses kashya, tikta and katu rasa, laghu and tikshana guna, katu vipaka and ushna veerya as per Ayurvedic Pharmacopeia the steps were taken to verify the analgesic effect through an experimental studies done so far or not. However it was noted that the crude extract of *Myrica nagi* was tested for its analgesic activity by different test methods and the extract showed effectiveness with its analgesic activity in comparison with standard drug aspirin. However, looking to its mode of effect it would be highly beneficial for different type of pain management and especially in supra clavicular diseases (urdhavajatrugata roga).[24]

Kadamba (*Anthocephalus cadamba*)

It is also drug under vedana sthapana group and it has multiparous action in different diseases loading to its Ayurvedic Pharmacopeia properties like kashaya, madhura and lavana rasa, ruksha guna, sheeta virya and katu vipaka. In order to ascertain the analgesic effect certain references were verified in which antinociceptive action of kadamba was found that an alcoholic extract of a kadamba was tested for evaluating a peripheral as well as central analgesic mechanism comparing to diclofenac sodium and the result showed significant analgesic effect which can be corroborated to musculoskeletal pain management in Ayurveda.[25] Moreover, in another study the analgesic and anti-inflammatory activity of a kadamba was found a more significant analgesic activity and anti-inflammatory activity in wrister rats.[26] So the vedana sthapana qualities of kadamba as described by Charaka can be well corroborated with the exhibited significant analgesic effect as per study report found so far.

Mochrasa (*Bombax ceiba*)

It is an important drug used by the traditional physician for different ailments but Charaka has exclusively grouped in vedana sthapana group of drug looking to its probably analgesic effect of drug. As per Ayurvedic Pharmacopeia it possesses madhura, kashya rasa, laghu, snigdha, pichchhila guna, sheeta veerya and madhura vipaka. On search of experimental /clinical study it was found that negligible analgesic and anti-inflammatory in one study[27] whereas, in another study the crude plant extract showed significant analgesic effect in acetic acid induced writhing and hot plate rest in mice. Moreover, it's proved anti-oxidant effect due to presence of magnifier and could be helpful in managing neural pain i.e. diabetic neuropathy as a rasayana component in Ayurvedic concept.[28]

Shirisha (*Albezzia lebbeck*)

It is famous in Ayurveda texts for its vishaghana and antitoxic property which has been mentioned by Charaka but exclusively he has mentioned it as one of the component in vedana sthapana. According to Ayurvedic pharmacopeia it possesses kashaya, tikta, madhura rasa, laghu, ruksha, tiksna guna, katu vipaka and ushna (anushna) virya which was taken to understand through its biological activities in experimental studies. Though the genus *albezzia* comprises approximately 150 species but *Albezzia lebback* of Indian origin used in Indian folk medicine was taken for study. The effect of different extract of *lebback* on pain sensation was tested using hot plate method with different dose schedule under the hot plate test in comparison to analgesic drug aspirin. After screening it was found having analgesic effect showing increasing percentage of pain threshold. Its analgesic effect was observed in pain management of neuromuscular and inflammatory condition. In addition to this it can also be used in surgical and para surgical procedure, pain management due to its anti-inflammatory effect.[29] Since it is described in Ayurveda as a drug of choice for combating different type of poison probably due to neural pathway blocking effect as evident in a study having its anti-histaminic property by neutralising the histamine directly or due to corticotropic action by raising cortisol levels in plasma[30]. Again the rasayana and anti-oxidant effect of the drug has been proved which might also be responsible for managing pain.[31] Moreover, its analgesic effect could also be helpful in pain management of gynaecological disorders due to presence of its estrogenic action leading to anti-fertility effect observed in the study.[32]

Vetas (*Salix caprea*)

It has got various varieties of uses in Indian folk practices but the scope of use is very limited and depends upon various conditions and practitioners accordingly. Its tikta, Kashaya rasa, laghu guna, katu vipaka and sheeta veerya as per Ayurveda Pharmacopeia qualities, it is used for various purposes but Charaka has included in vedana sthapana group which was verified from available experience/clinical studies having analgesic effect. The references are insufficient to corroborate with the analgesic effect though it has been reported as a pain-killing.[33]

Kumari (*Aloe-barbadensis*)

It is also called as kumari and is very common plant having numerous medicinal effects and Charaka has specified in vedana sthapana group. According to Ayurvedic pharmacopeia it possesses tikta, madhura rasa, guru, snigdha, pichchhila guna, sheeta veerya and katu vipaka. It was tried to explore its effect from /clinical/experimental studies and was found that it possesses analgesic and anti-inflammatory activities that could be mediated via modulators of pain and inflammation or through central activity.[34] However; description of Charaka is definitely worthy enough to establish the drug as vedana sthapana or pain killing in neuromuscular conditions. In another study leaf aqueous extract showed dose dependent use increase in tolerance to thermal stimulus comparable to indo-methacin.[35]

Asoca (*Saraca asoca*)

It is a drug of choice for several gynaecological effect of drug used by traditional healers having its pharmacological properties like kashaya, tikta rasa, laghu, ruksha guna, sheeta veerya, katu vipaka and steps were taken to find out any analgesic effect of this plant. It was observed that analgesic activity of *Saraca asoca* leaf extract constituents capable of relieving or modifying responses to pain. Though the detail work is needed to isolate active constituents and pharmacodynamics studies with understanding the mechanism of action of plant extract.[36] Also in an another study leaf aqueous done on the stem back of *Saraca asoca* the extract exhibited the central analgesic effect at doses of 300 mg/kg and 500 mg/kg as compared to control group and antinociceptive efficacy being greater at the higher drug dose.[37]

DISCUSSION

From the above comparison based on documentation indicates that Charaka mentions specific ten drugs as angamarda prashamana and ten drugs for vedana sthapana which were correlated with antinociceptive and analgesic effect. From the above studies reviewed, it will be worth full to mention here that though drugs as mentioned in angamarda prashamana and vedana sthapana having multiple pharmacopeia effect in addition to pain relieving qualities (antinociceptive and analgesic). But those qualities have not been taken to verify or to re-establish through modern investigations due to multifarious area of action and uses. It is also important to mention here that Charaka has specifically grouped some drugs having similar properties like angamarda prashamana and vedana sthapana apart from their other pharmacopeia properties. So this was aim of this paper to verify the probable, similar at par related modern medical terms of angamarda prashamana and vedana sthapana qualities that with the antinociceptive or analgesic effect.

CONCLUSION

From the above review it exhibits that those medicinal plants described in Charaka Samhita for a specific medical condition i.e. angamarda prashamana and vedana sthapana are based on fact from the evidences so collected, the drugs found individually having those antinociceptive/analgesic effect cannot be told or claimed having an antinociceptive/analgesic effect as a whole when all are combined together, no such study could be available. Moreover, it was found interesting that those two groups of drug having diversified actions in different field of pain management like neuro-muscular, inflammatory various paediatrics, gynaecological, supra clavicular disease conditions apart from its anti-oxidant effects. However, it has shown the way for future study for wider aspect of research to evaluate the therapeutic efficacy of the entire drugs of angamarda prashamana and vedana sthapana group as a whole as described in Charaka. It would be worthwhile to mention here that the above two groups have been specifically described in Charaka could be taken as an authoritative source of pain management herbs in Ayurveda. The conclusion has been made in the paper that both the groups of drugs should be taken for further research to re-establish their efficacy in pain management.

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