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Research Article

COMPARATIVE EXPERIMENTAL EVALUATION OF TWO DIFFERENT DOSAGE FORMS OF VEDANASTHPANA MAHAKASHAYA GANA

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Abstract

Various studies have eventually showed its dominance in pathology as well as in medicine. The concept of Ayurveda is one of the primordial aspects to be properly evaluated for understanding scientifically. From literary review it is clear that vedana (pain) is an abnormal disagreeable sensation. Vedanasthapana is the removal of vedana when it is present and bringing the body back to normalcy. Hence vedanasthapana drugs mentioned by Acharya Charaka were selected to prepare various dosage forms to compare its analgesic effect. The present evaluation through experimental studies on mice over the usage of Vedanasthpana Mahakashaya gana in kashaya and vati dosage forms have been carried out for the evaluation of its analgesic effects. The study showed that both the dosage forms have analgesic effect experimentally.

Key words: Vedanasthapana Mahakashaya; Vedanasthapana; Pain; Analgesic.

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INTRODUCTION

Pain is an unpleasant experience and is a most common sign to differentiate various ailments. It is the physical or psycho-physical suffering, a specific sensation localized in a particular part of the body. Vedana (pain) is a natural warning signal and helps to prevent further permanent or serious damage. In Ayurveda there are a lot of herbal drugs which are good pain killers but needed to be proved scientifically. Charakokta vedanasthapana Mahakashaya has the ten drugs which are effective in relieving pain when used either in single or in compound formulations.[1]

The drugs told in vedanasthapana Mahakashaya are Sala (*Shorea robusta* Gaertn.f.),[2] Katphala (*Myrica nagi* Thunb.),[3][4] Kadamba (*Anthocephalus indicus*),[5] Padmaka (*Prunus cerasoides*),[6] Tumba (*Zanthoxylum armatum*),[7] Mocharasa (*Salmalia malabarica*),[8] Sirisha (*Albizzia lebbeck* Benth),[9] Vetasa (*Salix carprea* Linn.),[10][11] Elavaluka (*Prunus cerasus* Linn.),[12][13] Ashoka (*Saraca asoca*).[14]

Hence to prove vedanasthpana property (analgesic) of the mahakashaya gana the kashaya dosage form and vati dosage were prepared pharmaceutically for the trail. With modern parameters a comparative study with kashaya and its vati dosage forms were carried out experimentally to evaluate the analgesic effect vedanasthpana mahakashaya gana kashaya.

METHODOLOGY

Pharmaceutical study

Collection of drugs - All the raw drugs needed for the preparation were collected from Koppa, Udupi, Mumbai and Trivandrum market. All the drugs were identified according to Ayurvedic standards and were certified by Botanist.

Vedanasthapana gana kashaya

Ingredients of vedanasthapana gana kashaya are Sala, Katphala, Kadamba, Padmaka, Tumba, Mocharasa, Sirisha, Vetasa, Elavaluka, and Ashoka.

Method of preparation

Ten different drugs of Vedanasthapana gana were collected, cleaned and weighed. Each drug 50 g were taken and pounded in Pounding machine to coarse powder and added with 8l of water and boiled until it gets reduced to 1/4th (2 L). This Kashaya was filtered through a clean cloth.

Observation - Kashaya was liquid in consistency and brown in colour with characteristic odour.

Vedanasthapana gana vati

Apparatus used were Khalwa yantra, Pulverizer. All the 10 drugs of Vedanasthapana Mahakashaya each 50gms were taken and powdered separately using pulverizer and finally mixed homogeneously. Kashaya from same drugs was prepared for the purpose of Bhavana. The powdered drugs were put in Khalwa yantra, and then levigation was done by adding the Kashaya, until the mass becomes fit for rolling the pills. Then the pills of desired size were molded and are dried under shade.

Observation - Vati are hard after drying, brown in colour and having the weight of 350mg each with characteristic odour.

Experimental study

Experimental models to evaluate nociceptive / analgesic effect

Pain is not a simple sensation caused by a specific stimulus but rather a complex reaction and experience with a multi dimensional

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quality. Hence, pain can be viewed as a complex experience, comprising of a sensory component referring to the qualitative sensory experience elicited by the stimulus and a reactive component that refers to the accompanying affective and emotional response.

Response to the nocieptive stimulus:

Whereas humans can express and distinguish a wide variety of painful sensations, animals can only display autonomic or somato-motor responses. Somato-motor responses like tail flick and writing are frequent reflexes in eliciting analgesic effect. Repeated presentation of the nociceptive stimulus can modify the response due to local alterations, tissue injury, inhibition and conditioning.

Commonly used nociceptive tests: Based on the nature of the stimulus, it can be divided into four categories: Chemical, Electrical, Mechanical and Thermal. Acetic acid, Acetylcholine, Hypertonic saline, Lipoxidase, Oxytocin are the chemical agents used. The various electrical stimulus are Electrical stimulation of the tail, Flinch- jump test, Trigeminal nerve stimulation, Shock titration technique, Tooth pulp stimulation. The various Mechanical stimulus are Tail- clip method, Tail compression test, Inflammatory pain, Toe squeezing technique. The Thermal stimulus are Tail immersion test, Hot plate method, Tail flick method

Tail flick method (D' Amour & Smith-1941)

The technique is usually used in rats and mice. The animal is restrained with the help of a plastic holder, cloth holder or in a metal chamber. Radiant heat from an electric source is focused on the marked end of the tail and time of the reaction is noted. Then the drug is administered and the tail flick latency is measured at 30-minute intervals. Animals used should be young to minimize the heat insulating effect of keratinization of the tail.
The area of the tail stimulation is important, as the distal tail section is more sensitive to the analgesic effect than the proximal section. Repeated testing at short intervals might affect tail- flick latency.

MATERIALS AND METHODS

The present study was aimed to compare the efficacy of the preparation Vedanasthapana Mahakashaya in albino mice by the following method- tail flick using analgesiometer, developed by D'Amour, F.E & Smith, D.L, 1941.

a) Experimental animals

Experiments have been carried out on 18 healthy albino mice, weighing in between 20-25 grams, by using tail-flick method. Animals were procured from the experimental house attached with the institute. They were kept in cages under identical conditions with 12 hrs light and 12 hrs dark cycles. The animals were fed as per standard requirements and they were kept in well-ventilated rooms under hygienic conditions.

b) Animal selection criteria

Normally a mouse withdraws its tail within 4-7 seconds. A cut-off period of 10-12 sec. was observed to prevent any damage to the tail. Any animal failing to withdraw its tail from the heat source within 4-7 sec. was rejected from the study.

c) Dose fixing: Mice dose = 0.0026 x 50 x human dose in mg/ kg wt.

d) Grouping: 18 mice were divided into 3 groups for the experimental study, each group consisting of 6 animals. GROUP-I was administered Ibuprofen suspension at a dose of 2 mg. GROUP-II was administered Kashaya at a dose of 0.156 ml orally.

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GROUP-III was administered Vati (powdered) at a dose of 0.04 mg.
GROUP-I is the Standard group, GROUP-II and GROUP-III are the trail groups.

e) Equipments: The analgesic activities of the samples were measured by using analgesiometer (tail flick method).

f) Procedure: The basal pain threshold (basal reaction time) of each individual animal was noted by placing the tip (last 1-2 cm) of the tail in the groove of the analgesiometer, just above the resistant wire, passing a current of 5 amps to heat the wire and the time interval between switching the analgesiometer and tail withdrawal from the heat source (tail flick response) was noted. Three such observations were made for each animal and the mean was taken.

The trial drug was given orally and the reaction time was noted at regular intervals i.e. 30, 60, 90, 120 & 180 minutes in each group. When the reaction time reaches 10 sec. it is considered as maximum analgesia and the tail was removed from the source of heat to avoid tissue damage

Observation: The tail flick responses in all the four groups were noted separately and subjected to statistical analysis in order to evaluate the analgesic activity of the compounds (by using student 't' test).

RESULTS

Tail flick response at the end of 30 minutes shows that group one (GI) is mildly significant ($p<0.1$) where as the other two groups GI and GII are insignificant ($p>0.1$). Tail flick response at the end of 60 minutes shows that group one (GI) is mildly significant ($p<0.1$) where as the other two groups GI and GII are insignificant ($p>0.1$). Tail flick response at the end of 90 minutes, it is observed that group one (GI) is mildly significant ($p<0.1$), group two (GII) is moderately significant ($p<0.05$) where as GIII is insignificant ($p>0.1$).
Tail flick response at the end of 120 minutes it is observed that GII is moderately significant ($p<0.02$) where as the other two groups – GI, GIII are insignificant ($p>0.10$). Tail flick response at the end of 180 minutes it is observed that group two (GII) is moderately significant ($p<0.01$). GIII is mildly significant ($p<0.1$) and group one (GI) is insignificant ($p>0.1$). (Table 1)

By comparing G1 and GII it was observed that G1 = GII in 30, 60 and 90 minutes and GII is moderately significant over G1 at the end of 120 minutes ($p<0.02$) and GII is highly significant over G1 at the end of 180 minutes ($p<0.001$). (Table 2)

By comparing the GI and GIII it is observed that GI = GIII at the end of 30, 60, 120 & 180 minutes ($p>0.1$) and GIII is mildly significant over GI at the end of 90 minutes ($p<0.1$). (Table 3)

By comparing the GII & GIII it is observed that GII = GIII at the end of 30, 60, 90 minutes ($p>0.1$), GII is moderately significant at the end of 120 minutes ($p<0.01$) and highly significant at the end of 180 minutes ($p<0.001$). (Table 4)

DISCUSSION

The above results proved the analgesic activity of Vedanasthapana Mahakashaya of Acharya Charaka at different time schedules through experimental models. During the course of the study few points were observed. They are: The analgesic activity of all the trial drugs increased from 90 min. and continued even at the end of 180 min. Kashaya in comparison with the standard drug was found more active at different levels. The efficacy of the kashaya is more than standard drug at the end of 120 min. The probable cause for this may be that t 1/2 of the standard drug.

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Table 1: Tail flick response

Tail flick response	Group	S.D	S.E	t - value	p- value
	I	0.048	0.019	2.346	p<0.1
at 30 minutes	II	0.051	0.020	0.621	p>0.1
	III	0.039	0.016	0.373	p>0.1
	I	0.054	0.022	2.169	p<0.1
at 60 minutes	II	0.0375	0.0153	0.391	p>0.1
	III	0.062	0.0254	0.393	p>0.1
	I	0.130	0.053	2.469	p<0.1
at 90 minutes	II	0.034	0.014	2.629	p<0.05
	III	0.039	0.016	0.678	p>0.1
	I	0.055	0.224	0.575	p>0.1
at 120 minutes	II	0.093	0.038	3.813	p<0.02
	III	0.010	0.0042	1.423	p>0.1
	I	0.044	0.018	0.457	p>0.1
at 180 minutes	II	0.311	0.1272	5.648	p<0.01
	III	0.021	0.0089	2.236	p<0.1

Table 2: Inter group comparison (G1 & GII)

Time	t- value	p- value
30	1.154	p>0.1
60	1.561	p>0.1
90	1.713	p>0.1
120	3.015	p<0.02
180	5.536	p<0.001

Table 3: Inter group comparison (GI and GIII)

Time	t- value	p- value
30	1.584	p>0.1
60	1.132	p>0.1
90	2.183	p<0.1
120	0.306	p>0.1
180	0.587	p>0.1

Table4: Inter group comparison (GII and GIII)

Time	t- value	p- value
30	0.267	p>0.1
60	0.132	p>0.1
90	0.278	p>0.1
120	3.66	p<0.01
180	5.492	p<0.001

The plasma levels of ibuprofen starts to decrease by 120 min., hence the analgesic activity of the standard drug cannot be expected at the end of 120 min. The trail drug in kashaya form had analgesic effect even at the end of 180 min which is a significant analgesic activity, which indicates that the 't1/2' of the compound is more. It has been observed that the analgesic activity is significant only in kashaya form.[15] The other trial drug i.e. Vati (pills) is moderately significant when compared to kashaya group GII.

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The vati dosage form may probably lose its therapeutically active principles during the pharmaceutical process. Because of the same Acharyas did not mention about the other dosage forms like vati of Vedanasthapana Mahakashaya, which indicates how scientific the ancient seers were. Disintegration time of vati is found as 4.30 hours, which is not an ideal quality for a tablet. Because of this prolonged disintegration time, the analgesic activity of the compound was found insignificant.

Probable mode of action

Vedansthapana gana consists of 10 drugs of which 90% alleviate pitta by tikta, kashaya and madhura rasa. 80% are having sheeta veerya and 70% are having properties that alleviate kapha. Because of the presence of madhura rasa and guru, snigdha gunas the combination does not provoke vata.

CONCLUSION

The trial drug Vedanasthapana Mahakashaya showed significant effect in kashaya dosage form than the Vati (pills) dosage form in the present experimental model Tail flick method (D' Amour & Smith-1941).

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