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An Experimental Evaluation on *Vedanasthapana* (Analgesic) Effect of *Gandha Prasarini* (*Paedaria Foetida* Linn.) And Ratnagandhi (C*aesalpinia Pulcherrima* Linn.Sw.) - A Comparative Study

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Abstract:
Pain is a major public health issue throughout the world. Both acute and chronic pain is often poorly managed. Persistent pain and many physical and psychological changes and complications associated with it constitute a major health problem. Chronic pain is now considered as a new disease in its own light.[1] In Ayurveda the concept of Vedana - sense of sensation is discussed in different terminology. Among two type of Vedana-Dukhathmaka Vedana is considered as a disease and need treatment. In classics many drugs have been told to have property of pain management. Thus the plants Gandha prasarini (*Paedaria foetida* .Linn*)* & Ratna Gandhi *(Caesalpinia pulcherrima* .Linn.Sw.*)* have been taken for the study.

KeyWords : Vedanasthapana, Analgesic,Gandha prasarini (*Paedaria foetida* .Linn*)* Ratna Gandhi *(Caesalpinia pulcherrima* .Linn.Sw.*)* , Eddy's hot plate.

Introduction:

Human beings have been using plants as therapeutic agents for thousands of years. According to W.H.O estimate, around 80% of the world population use plants or their active principles for their primary health care. Pain, an unpleasant sensory and emotional experience arising from actual or potential tissue damage. According to Ayurveda the mind and the body together with the sense organs are the sites of manifestation of vedana. However the parts of the body which do not have any consciousness like kasha , loma , anna , mala and objects of senses are excluded. In shareera sthana Acharya Charaka has used the word vedana in the sense of sensation and two type of vedana he mentioned: sukhatmaka and Dukhathmaka vedana. Dukhathmaka vedana is considered as roga and needs treatment. Vedanasthapana , Shoola prashamana, Angamarda prashamana gana are also mentioned in sutrasthana.[2]

Causative factors:

Vayu is the major cause or pain. The involvement of vata must be in it, without vata vedana never develop [3.] Impairment of intellect, retention power and memory, maturity of kala and karma and unwholesome contact with object of senses are considered t be the causative factors of dukkha. For eg; In asatmendriyartha samyoga, the tactual sense is impaired by the heena yoga (non utilization), atiyoga (excessive utilization) and mithyayoga (inadequate utilization) of the touchable. [2]

Concept of Vedanasthapana

The drug which is used to remove the pain (vedana) of particular part of the body or which restore the normal tactile sensations or tactile functions is known as Vedanasthapana.

Objectives:

Comparative evaluation of Vedanasthapana (Analgesic) effect of Gandha prasarini (Paedaria foetida Linn.) and Ratna gandhi (Caesalpinia pulcherrima Linn sw.) on albino mice by using Eddy's hot plate method.

Material Methods :

The present study is aimed to compare the efficacy of *Gandha prasarini and Ratna Gandhi* was selected in Albino mice for Analgesic activity. The way of ascertaining weather the drug has the ability to relieve pain or not, in an animal has been a perplexing one for the experimental pharmacology.

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Collection and Preparation of drugs

Source of drugs:

The botanically identified 900gm fresh panchanga of *Gandha prasarini* Was collected from Udupi *and* 500gm fresh bark of *Ratna Gandhi was* collected from the forest areas of Koppa.

Preparation of drugs:

The freshly collected parts of the drugs were cut in to small pieces, dried under shade and powdered. To remove the bigger particles and make the powder homogenous, sieving was done through fine mesh and finally both the powders are well preserved in air tight containers

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PHYSICO-CHEMICAL STUDY (Standard Protocol)

***Paedaria foetida* and *Caesalpinia pulcherrima* stem bark:**

Test	***P.foetida***	***C.pulcherrima***
Total ash	9.52%	8.50%
Water soluble ash	3.75%	3.35%
Acid insoluble ash	2.21%	2.15%
Water soluble extraction	22.20%	15.50%
Methanol soluble extraction	11.50%	10.75%
Moisture content	10.82%	8.2%

Qualitative Study

Qualitative parameters	**Test**	***P.foetida***	***C.pulcherrima***
Carbohydrate	Fehling's test	++	+++
Protein	Biuret test	+	+
Alkaloid	Dragendorff's test	++	++
Cardiac glycoside	Kellie-Kiliani test	+++	+++
Flavonoids	Shinoda test	++++	+++
Tannin	Potassium dichromate test	+++	++
Antraquinone glycoside	Borntrager's test	+++	+
Steroids	Salkowski test	++++	++
Triterpinoids	Libermann-Burchard reaction	++++	+++

Source of Animals

Twenty four albino mice of either sex were procured in the Animal house attached to A.L.N Rao Memorials Ayurvedic Medical College, Koppa.

1.	**Sample**	24 Albino mice of either sex will be randomly selected.
2.	**Inclusion Criteria**	Healthy, active mice of either sex each weighing in between 20-25gm
3.	**Exclusion criteria**	Pregnant and diseased mice, mice weighing below 20 g or above 25 g and mice under trial for other experiments will be excluded.

Dose Fixation

The generalized dose for the animals has been calculated based on the conversion formula and preparations were administered according to this formula mice dose/kg.bd.wt = 0.0026x50xhuman dose. According to Sharangadhara, the human dose of Kashaya is Two Pala (96 ml)[4]

0.0026 x 50 x 96ml /kg.bd.wt

0.0026 x 50 x 96 / 20 (mice wt. in gm.) = 0.612ml.

Group	No. of Albino mice	Drug	Form	Dose
Control group	6	Distilled water	-	-
Standard group	6	Diclofenac sodium	Suspension	0.13 ml/25gm bd. Wt.
Trial drug I.	6	Panchanga of *Paedaria foetida*	Kashaya	0.6 ml/25gm bd. wt.
Trial drug II.	6	bark of *Caesalpinia pulcherrima*	Kashaya	0.6 ml/25gm bd.Wt.

Mode of administration of drugs

Administration of drug through 2ml disposable syringe with 21 gauze stainless steel needle with a smooth tip to prevent injury to the esophagus which bent in the middle to facilitate its smooth entry inside the throat.

Analgesic Study:

Hot plate method: (Eddy and Leimbach 1953)

In this method heat is used as source o pain, mice are individually placed on hot plate maintained at constant temperature.

Procedure and Criteria for assessment of results:

a) 24 healthy albino mice of either sex selected randomly after considering the all criteria explained above.
b) They were weighed and four groups having 6 mice were kept in separate cages.
c) Mark them on their fore head for individual identification.

d) Basal reaction time will be recorded by placing individual animal on hot plate, maintained at constant temperature (55^0c) and reaction of animal such as paw licking or jump response is taken as the end point.
e) Basal reaction time will be recorded at 15, 30, 60,120 minutes of interval. Normally mice shows hind paw licking and jump response in 6-8 seconds.
f) As the reaction time increases after administration of trial drug 25 sec is taken as maximum analgesic and the animals are withdrawn from the hot plate to avoid injury to the paw.
g) After oral administration of trial drugs repeat the procedure and taken 4 readings.
h) The analgesic increases the reaction time. The observations made for each animal was taken. Finally reaction time percentage at each interval will be calculated.

Experimental Study

The study was conducted in prophylactic phases; the different readings (in 15th,30th ,60th,120th minutes) observed during the experimental study on Wister strain albino mice are exhibited in the following tables and charts.

Paw licking or jump response (whichever comes first) 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 ANOVAs test & Un paired t test.

Observations:

Table 1 : Showing the significant difference between all the groups- Anova:

Time	Source of variation	Sum of squares	d.f	Mean squares	F ratio	P value
15^{th} min	Between	36.452	3	12.151	11.825	<0.001
	Residual	20.551	20	1.028		
	total	57.003	23			
30^{th} min	Between	52.719	3	17.573	16.271	<0.001
	Residual	21.593	20	1.080		
	total	74.312	23			
60^{th} min	Between	79.136	3	26.379	40.052	<0.001
	Residual	13.172	20	0.659		
	total	92.309	23			
120^{th} min	Between	108.319	3	36.106	70.200	<0.001
	Residual	10.287	20	0.519		
	total	118.605	23			

The difference in the mean values among the treatment groups are greater than would be expected by chance, so there is a statistically significant between all the 4 groups (<0.001).

Significant difference between the groups from 15th, 30th ,60th and 120th minute.

Groups	Time interval	P Value	Interpretation
Control & Trail drug 1	15 min	0.001	To confirm effect of *Gandha prasarini* comparing with control group. The p value was just significant (0.001) at 15th minute and is Highest significant (<0.001) at 30th, 60th and at 120th minute. Trial drug 1 i.e. *Gandha prasarini* shows significant difference with control group.
	30 min	<0.001	
	60 min	<0.001	
	120 min	<0.001	
Control & Trail drug 2	15 min	0.003	To confirm effect of *Ratna Gandhi* comparing with control group. The obtained p value shows that the trial drug 2 i.e. *Ratna Gandhi* has significant difference with control group.
	30 min	0.005	
	60 min	0.007	
	120 min	0.008	
Trail drug 1 &Trail Drug 2	15 min	0.270	Comparing the effect of trial drug 1 & trial drug 2. On observing p value it shows that trial drug 1 is insignificant with trial drug 2 at 15th and 30th min, means both drugs have equal effect at that interval of time. At 60th min. trial drug 1 is significant and at 120th min. it is highest significant as compare to trial drug 2.
	30 min	0.141	
	60 min	0.011	
	120 min	<0.001	
Standard drug & Trail drug 1	15 min	0.002	The standard drug Diclofenac sodium is significant with trial drug 1 i.e. *Paedaria foetida* at 15th, 30th min. of time and it is highly significant at 60th, 120th min. of time with trial drug 1.
	30 min	0.007	
	60 min	<0.001	
	120 min	<0.001	
Standard drug & trail drug 2	15 min	0.006	The standard drug shows significant results with trial drug 2 i.e. *Caesalpinia pulcherrima* at 15th, 30th, minute of time and is highly significant at 60th, 120th min.
	30 min	0.003	
	60 min	<0.001	
	120 min	<0.001	

Discussion

In the context of vedana-sthapana, the word "vedana" means sensation but not pain i.e. both sukhatmaka and dukhatmaka. So, here the word "vedana" in pathological sense can be defined as "The abnormal or Dis-agreeable sensation especially pain which is perceived or it is the sensation which is lost or both due to vata vruddi or vata kshya respectively."

The word "sthapana" means which stabilizes restores or brings back to normal. In the context of Vedana-sthapana, the abnormal sensation (Dukhathmaka) has to be removed and normal sensation (sukhatmaka) has to re-established. So here "Sthapanam" indicates management of vedana in both perspective i.e. Vikara prashamana and prakruti sthapana (swastha rakshana.)

Hence, in the context of Vedana-sthapana the priority of Acharya Charaka might be sthapana of vedana rather than just vedana shamana.

Except Katphala, all other drugs mentioned under vedana-sthapana gana are possessing Kashaya rasa, sheeta virya, kapha-pitta shamaka, Vatakara properties. According to author P.V.Sharma the vedana-sthapana effect of this gana is due to their prabhava,[5] but these drugs in real sense useful in conditions where the sensation is lost due to vata kshya and hence they helps in sthapana of normal sensation by doing vata vruddi, that's why the drugs belongs to this group are all having Kashaya rasa, sheeta virya.

The trial drug *Gandha prasarini* has reported abundant presence of Triterpinoids, Flavonoids, and Steroids and Cardiac glycosides, tannin and Anthraquinone glycosides in moderate amount. In *Ratna Gandhi* the Triterpinoids, flavonoids and Cardiac glycosides are present in moderate amount. So presence of Terpinoids and Flavonoids in both the trial drugs is of therapeutic significance.

Presence of Phyto-constituents like Terpinoids and Flavonoids has been found to be responsible for analgesic activity [6].

Therefore, it is possible that the inhibitory effects on analgesic effects observed in these trial drugs may be attributed in part to its Flavonoids content.[7]

Conclusion:

Gandha prasarini is comparatively better in action in comparison with *Ratna Gandhi* and it should be confirmed with more number of samples in clinical Study.

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