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Oriental Pharmacy and Experimental Medicine 2006 **6(2)**, 157-160

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Short Communication

Some pharmacological findings of non therapeutic importance of an Ayurvedic preparation Chandanasav

Sharmila Chakraborty, Sultana Rajia*, M Shahabuddin Kabir Choudhuri, M Faruk Hossain, Mafruhi Sattar and Tripti Shrestha

Department of Pharmacy, Jahangirnagar University, Savar, Dhaka-1342, Bangladesh

SUMMARY

Chandanasav is an Ayurvedic preparation slightly reduced the gastrointestinal motility at the 15 min time interval. It increased the latent period of castor oil induced diarrhoea, slightly decreased number of stool count and lowered the purging index values. Chandanasav significantly reduced the onset and increased the duration of pentobarbital induced sleeping time. No significant analgesic effect was observed from the hot plate study. Thus it may have mild constipating and central nervous system depressant activity without any effect on peripheral nervous system.

Key words: Ayurveda; Chandanasav; Gastrointestinal motility; Diarrhoea; Central nervous system

INTRODUCTION

The World Health Organization (WHO) estimates, however, that one third of the world's population still lacks regular access to essential drugs with figure rising to over 50% in the poorest parts of Africa and Asia. Fortunately, in many developing countries, traditional medicines offer a major and accessible source of health care. WHO has thus focussed its attention in the traditional medicine or complementary and alternative medicine into the national health care systems. WHO suggests research on the traditional medicine or complementary and alternative medicine to ensure the safety, efficacy and quality of them (Karim, 2002). The national health policy of Bangladesh also has the objectives to encourage systematic improvement in the practice of the indigenous system of medicine and for utilizing the additional manpower available in this sector. Particular attention should be given to scientific evaluation of indigenous and herbal drugs.

Ayurvedic medicines are the most popular form of alternative medicine being practiced in Bangladesh. Although tremendous progress has taken place in the field of modern medicine, but the practice and use of Ayurvedic medicine is being continued throughout the country even today. Chandanasav is a widely used ayurvedic medicine used in Bangladesh. Important therapeutic uses of Chandanasav are urinary and sexual disorders (Anonymous, 1992). The overall market position of Chandanasav in respect to sales among all the ayurvedic dosage forms is third. The research work was performed in an attempt to determine the non therapeutic importance of pharmacological effect of Chandanasav on the gastrointestinal tract and the nervous system.

*Correspondence: Sultana Rajia, Department of Pharmacy, Jahangirnagar University, Savar, Dhaka-1342, Bangladesh. Present address: 9/8 Evans Avenue, Eastlakes Sydney, NSW-2018, Australia. E-mail: pharm_rajia@yahoo.com

MATERIALS AND METHODS

The preparation

Chandanasav was collected from the Sree Kundeshwari Aushadalay and was prepared according to the Bangladesh National Ayurvedic Formulary (Anonymous, 1992). The in-process and quality control for the preparation was strictly controlled and monitored by the experienced officials of Shree Kundeshwari Aushadalay.

Animals

Male and Female mice (*Swiss-webstar* strain, 20 - 25 g body weight) bred in the animal house of the Department of Pharmacy, Jahangirnagar University, were used for the experiments. The animals were provided with standard laboratory food and tap water *ad libitum* and maintained at natural day night cycle. The animals were divided in-groups of 6 - 10, with each group balanced for sex and body weight. The preparation was administered per oral 40 ml/kg body weight. Control animals were administered with normal tap water.

Gastrointestinal motility test with barium sulphate ($BaSO_4$) milk

This experiment was carried out by method described by Chatterjee (1993). Barium sulphate milk (15% barium sulphate in 0.5% sodium carboxymethyl cellulose suspension) was given orally to the mice after 15 min of administration of the formulation or water to the groups. Each group of mice (n = 6) were sacrificed after 15 and 30 min of the administration of barium sulphate milk (10 ml/kg). The distances traversed by the barium sulphate milk were measured and expressed as a percentage of the total length of small intestine (from pylorus to the ileoceccal junction).

Castor oil induced antidiarrhoeal test

The method of Yegnanarayan *et al.* (1982) was followed. All the mice were screened initially by giving 1.0 ml of castor oil orally and only those showing diarrhoea were selected for further study. Test formulation pre-treatment was given orally 1 h before the mice were administered with the standard dose of 1.0 ml of castor oil. The animals were caged individually and examined for the presence of diarrhoea hourly for 6 h after the castor oil challenge. Diarrhoea was defined by the presence of fluidy materials in stool, which stained the absorbent paper placed beneath the cage. The number of respondents, the number of stools passed during the 6 h period were noted for each mouse. Purging index (PI) was calculated as follows:

Purging index, PI = [% Respondents × Average number of stools] / Average latent period.

Analgesic effect evaluation by hot plate method

The analgesic study was conducted by the "Hot Plate" method, described by Woolfe *et al.* (1944) and Wood (1985). Hot plate was maintained at a constant temperature of 55 ± 0.5°C. Each mouse was placed on the hot surface and the time of response to the thermal stimuli, indicated by the licking of hind and/or fore paws or by kicking of the legs or by trying to jump out, was recorded. The observations were made on 30, 60, 120, 180, and 240 min after oral administration of the preparation.

Hypnotic action of pentobarbital

Pentobarbital induced sleeping time test was carried out according to the method deviced Tedeschi and Tedeschi (1968) and Williamson (1996). The test preparation was administered per oral 30 min before the administration of pentobarbital (50 mg/kg body weight, i.p.). The animals were observed for the onset and the duration of sleep, as evidenced by the observation of the loss of righting reflex.

Statistical analysis

Statistical analysis was performed by SPSS 10.0 for Windows. Independent samples *t*-test was done as the test of significance. Values were considered significantly different if $P<0.05$. Datas were expressed as Mean±S.E.M.

RESULTS AND DISCUSSION

The ingredients of the Ayurvedic herbal formulation Chandanasav is listed in Table 1. The present study was performed for preliminary pharmacological evaluation of this formulation on the gastrointestinal tract and the nervous system.

Castor oil is an effective laxative it decreases fluid absorption, increases secretion of the small intestine and colon, and affects smooth muscle contractility in the intestine. Castor oil produces diarrhoea due to its active component recinoleic acid. Several mechanisms have been supposed to be involved in the diarrhoeal effect of castor oil. These include inhibition of intestinal Na^+, K^+-ATPase activity to reduce normal fluid absorption activation of adenylate cyclase or mucosal cAMP mediated active secretion, stimulation of prostaglandin formation, platelet activating factor and most recently nitric oxide has been claimed to contribute to the diarrhoeal effect of castor oil (Izzo, 1996). Chandanasav slightly reduced the number of stool count as represented in the purging index value in the castor oil induced diarrhoea study (Table 2) and increased the latent period of castor oil induced diarrhoea, however the rising was not statistically significant. The purging index values were lowered in Chandanasav group compared to the control group throughout the 6 h study period (Table 2). From the barium sulphate induced gastrointestinal motility test we observed that the Chandanasav slightly reduced the gastrointestinal motility at the 15 min time interval. The gastrointestinal motility after 30 min interval was observed unchanged (Table 3). The combined result of gastrointestinal motility test and castor oil induced diarrhoeal test suggests the mild antidiarrhoeal activity of Chandanasav may be related to the inhibitory effect of the propulsive movement of small intestine.

Chandanasav significantly quickens ($P < 0.05$) the onset of sleeping time and also significantly prolongs ($P < 0.001$) the duration of sleeping time (Table 4). The result suggests possible central nervous

Table 1. Composition of the ayurvedic formulation chandanasav

Plants	Parts	Quantity	Plants	Parts	Quantity
Santalum album Linn.	Heart wood	48 g	*Hedychium spicatum* Ham. ex. Smith	Rhizome	48 g
Coleus vettiveroides K. C. Jacob	Root	48 g	*Fumaria parviflora* Lam.	Whole plant	48 g
Cyperus rotundus Linn	Rhizome	48 g	*Madhuca indica* J.F. Gmel.	Flower	48 g
Gmelina arborea Linn	Stem bark	48 g	*Pluchea lanceolata* Oliver & Hiern.	Root	48 g
Nymphaea stellata Willd.	Flower	48 g	*Trichosanthes dioica* Roxb.	Leaf	48 g
Prunus cerasoides D. Don.	Stem	48 g	*Bauhinia variegata* Linn.	Stem bark	48 g
Symplocos racemosa Roxb	Stem bark	48 g	*Mangifera indica* Linn.	Stem bark	48 g
Rubia cordifolia Linn.	Stem	48 g	*Salmalia malabarica* Schott & Endl.	Exudates	48 g
Pterocarpus santalinus Linn. f.	Heart wood	48 g	*Woodfordia fruticosa* Kurz.	Flower	768 g
Cissampelos pareira Linn.	Root	48 g	*Vitis vinifera* Linn.	Dried fruit	960 g
Swertia chirata Buch. Ham	Whole plant	48 g	Sugar	-	4.8 kg
Ficus bengalensis Linn.	Stem bark	48 g	Molasses	-	2.4 kg
Piper longum Linn.	Fruit	48 g	Water	-	2.45 l

Table 2. Effect of Chandanasav on the castor oil-induced diarrhoea[a]

Group	Latent Period	Purging Index					
		1 h	2 h	3 h	4 h	5 h	6 h
Control (n = 6)	12.67 ± 3.18	40.80	51.30	18.39	14.44	10.49	6.55
Chandanasav (n = 6)	24.5 ± 5.37 (0.087)	16.33	20.41	12.94	6.12	7.47	4.08

[a]Values are expressed as Mean ± S.E.M (*P* value), latent period are in min

Table 3. Effect of Chandanasav on $BaSO_4$ induced gastrointestinal motility[a]

Group	15 min study			30 min study		
	Total length	Length traversed	% traversed	Total length	Length traversed	% traversed
Control (n = 12)	49.6 ± 1.5	35.2 ± 1.6	70.9 ± 2.5	52.3 ± 0.9	40.5 ± 2.0	77.5 ± 3.7
Chandanasav (n = 7)	51.4 ± 0.9(0.397)	31.1 ± 1.6(0.124)	60.7 ± 3.6(0.030)	52.5 ± 2.9(0.913)	39.7 ± 3.4(0.851)	76.5 ± 8.5 (0.897)

[a]Values are expressed as Mean ± S.E.M (*P* value), lengths are in cm

Table 4. Effect of Chandanasav on the hypnotic action of pentobarbital[a]

Group	Onset of sleep	Duration of sleep
Control (n = 10)	4.6 ± 0.72	58.4 ± 8.73
Chandanasav (n = 10)	2.9 ± 0.10 (0.043)	102.1 ± 5.31 (0.000)

[a]Values are expressed as Mean ± S.E.M (*P* value) in min

Table 5. Effect of Chandanasav on the pain perception test[a]

Group	30 min	60 min	120 min	180 min	240 min
Control (n = 10)	20.4 ± 1.03	18.4 ± 1.18	16.1 ± 1.04	15.4 ± 1.9	17.7 ± 1.3
Chandanasav (n = 10)	18.3 ± 1.10 (0.183)	16.6 ± 1.49 (0.356)	15.7 ± 1.46 (0.826)	18.6 ± 1.05 (0.058)	20.2 ± 1.4 (0.211)

[a]Values are expressed as Mean ± S.E.M (*P* value) in sec

system (CNS) depressant effect of Chandanasav. The preparation may exert central nervous system depressant effect by interfering with the functions of the cortex. No significant changes in pain perception was found in between the control and Chandanasav group (Table 5). Chandanasav didn't show any analgesic activity, thus Chandanasav may not have any effect on the peripheral nervous system as observed from the hot plate test.

CONCLUSION

Chandanasav showed mild antidiarrhoeal activity and central nervous system depressant activity without any effect on peripheral nervous system. Further studies are required to explore the mechanism of action of Chandanasav on gastrointestinal tract and central nervous system.

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