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.
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-webster strain, 20 - 25 g body weight) bred in the animal house of the Department of Pharmacy, Jahangimagar 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 into 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 (BaSO₄) 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 ileocecal 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 fluidly 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 off 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 devised 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. Data 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 ricinoleic 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>
<thead>
<tr>
<th>Plants</th>
<th>Parts</th>
<th>Quantity</th>
<th>Plants</th>
<th>Parts</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santalum album Linn.</td>
<td>Heart wood</td>
<td>48 g</td>
<td>Pterocarpus santalinus Linn. f.</td>
<td>Heart wood</td>
<td>48 g</td>
</tr>
<tr>
<td>Coleus rotundus K. C. Jacob</td>
<td>Root</td>
<td>48 g</td>
<td>Cissampelos pareira Linn.</td>
<td>Root</td>
<td>48 g</td>
</tr>
<tr>
<td>Cynara scolymus Linn</td>
<td>Flower</td>
<td>48 g</td>
<td>Swertia chirata Buch. Ham</td>
<td>Whole plant</td>
<td>48 g</td>
</tr>
<tr>
<td>Gmelina arborea Linn</td>
<td>Stem bark</td>
<td>48 g</td>
<td>Ficus bengalensis Linn.</td>
<td>Stem bark</td>
<td>48 g</td>
</tr>
<tr>
<td>Nympheae stellata Wild.</td>
<td>Flower</td>
<td>48 g</td>
<td>Vitis vinifera Linn.</td>
<td>Dried fruit</td>
<td>960 g</td>
</tr>
<tr>
<td>Prunus cerasoides D. Don.</td>
<td>Stem</td>
<td>48 g</td>
<td>Sugar</td>
<td>-</td>
<td>4.8 kg</td>
</tr>
<tr>
<td>Symposco racemosa Roxb</td>
<td>Stem bark</td>
<td>48 g</td>
<td>Molasses</td>
<td>-</td>
<td>2.4 kg</td>
</tr>
<tr>
<td>Rubia cordifolia Linn.</td>
<td>Stem</td>
<td>48 g</td>
<td>Water</td>
<td>-</td>
<td>2.45 l</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Group</th>
<th>Latent Period</th>
<th>1 h</th>
<th>2 h</th>
<th>3 h</th>
<th>4 h</th>
<th>5 h</th>
<th>6 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (n = 6)</td>
<td>12.67 ± 3.18</td>
<td>40.80</td>
<td>51.30</td>
<td>18.39</td>
<td>14.44</td>
<td>10.49</td>
<td>6.55</td>
</tr>
<tr>
<td>Chandanasav (n = 6)</td>
<td>24.5 ± 5.37 (0.087)</td>
<td>16.33</td>
<td>20.41</td>
<td>12.94</td>
<td>6.12</td>
<td>7.47</td>
<td>4.08</td>
</tr>
</tbody>
</table>

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

2006 Oriental Pharmacy and Experimental Medicine 6(2), 157-160
Table 3. Effect of Chandanasav on BaSO$_4$ induced gastrointestinal motility$^*$

<table>
<thead>
<tr>
<th>Group</th>
<th>15 min study</th>
<th>30 min study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total length</td>
<td>% traversed</td>
</tr>
<tr>
<td>Control (n = 12)</td>
<td>49.6 ± 1.5</td>
<td>70.9 ± 2.5</td>
</tr>
<tr>
<td>Chandanasav (n = 7)</td>
<td>51.4 ± 0.9(0.397)</td>
<td>31.1 ± 1.6(0.124)</td>
</tr>
</tbody>
</table>

$^*$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$^*$

<table>
<thead>
<tr>
<th>Group</th>
<th>Onset of sleep</th>
<th>Duration of sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (n = 10)</td>
<td>4.6 ± 0.72</td>
<td>58.4 ± 8.73</td>
</tr>
<tr>
<td>Chandanasav (n = 10)</td>
<td>2.9 ± 0.10(0.043)</td>
<td>102.1 ± 5.31(0.000)</td>
</tr>
</tbody>
</table>

$^*$Values are expressed as Mean ± S.E.M (P value) in min

Table 5. Effect of Chandanasav on the pain perception test$^*$

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

$^*$Values are expressed as Mean ± S.E.M (P value) in sec

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.

REFERENCES

Anonymous. (1992) Bangladesh National Formulary of Ayurvedic Medicine, National Unani and Ayurvedic Formulary Committee Bangladesh, Board of Unani and Ayurvedic System of Medicine, Bangabandhu Avenue, Dhaka.


Karim MR. (2002) Comparative Pharmacological Studies Ayurvedic Medicines Used in Renal Disorders, M.Pharma thesis submitted to the Department of Pharmacy, Jahangirnagar University, Dhaka.


OPEM Registration Form

Please check the box

☐ Combined Paper & Online Version

<table>
<thead>
<tr>
<th>a fixed time from:</th>
<th>Volume</th>
<th>Number</th>
<th>Month</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscription Rates</td>
<td>a year</td>
<td>two years</td>
<td>three years</td>
<td>lifetime</td>
</tr>
<tr>
<td>Individuals</td>
<td>☐ US$ 15 (W18,000)</td>
<td>☐ US$ 25 (W30,000)</td>
<td>☐ US$ 30 (W36,000)</td>
<td>☐ US$ 300 (W360,000)</td>
</tr>
<tr>
<td>Institutions</td>
<td>☐ US$ 60 (W72,000)</td>
<td>☐ US$ 100 (W120,000)</td>
<td>☐ US$ 150 (W180,000)</td>
<td>☐ US$ 1,500 (W1,800,000)</td>
</tr>
</tbody>
</table>

☐ Online Version Only

<table>
<thead>
<tr>
<th>a period &amp; entrance fee</th>
<th>a year</th>
<th>two years</th>
<th>three years</th>
<th>lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐ US$ 10 (W12,000)</td>
<td>☐ US$ 20 (W24,000)</td>
<td>☐ US$ 25 (W30,000)</td>
<td>☐ US$ 250 (W300,000)</td>
</tr>
</tbody>
</table>

☐ Paper Version Only

<table>
<thead>
<tr>
<th>Subscription Rates</th>
<th>a year</th>
<th>two years</th>
<th>three years</th>
<th>lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals</td>
<td>☐ US$ 12 (W14,000)</td>
<td>☐ US$ 22 (W26,000)</td>
<td>☐ US$ 27 (W32,000)</td>
<td>☐ US$ 270 (W320,000)</td>
</tr>
<tr>
<td>Institutions</td>
<td>☐ US$ 50 (W60,000)</td>
<td>☐ US$ 90 (W100,000)</td>
<td>☐ US$ 140 (W168,000)</td>
<td>☐ US$ 1,400 (W1,680,000)</td>
</tr>
</tbody>
</table>

Required fields are marked with*

*First Name ____________________________
*Last Name ____________________________
Title ________________________________
Institution __________________________
Department __________________________
*Country _____________________________
*City _________________________________
*Street Address (If you’re American) ____________________________ Province ____________
*ZIP/Postal Code _________________________
*E-mail Address _________________________
*Phone Number _________________________
Fax Number ___________________________
## Payment

- **Bank**: The Korea Exchange Bank
- **Account**: 378-22-00274-0
- **Depositor**: Kim Hyung-Min (Oriental Pharmacy and Experimental Medicine)

<table>
<thead>
<tr>
<th>Questions or comments concerning:</th>
<th>Please contact:</th>
</tr>
</thead>
</table>
| Subscription Information and Customer Service | **Jae-Young Um**  
Oriental Pharmacy and Experimental Medicine  
Department of Pharmacology  
College of Oriental Medicine  
Kyung Hee University  
1 Hoegi-Dong, Dongdaemun-Gu, Seoul 130-701,  
Republic of Korea  
Tel: 82-2-961-9262  
Fax: 82-2-967-7707  
E-mail: opem@khu.ac.kr |
| Submitting a Manuscript & Editorial Policy, and Submitted Manuscript Status | **Hyung-Min Kim**  
Department of Pharmacology  
College of Oriental Medicine  
Kyung Hee University  
1 Hoegi-Dong, Dongdaemun-Gu, Seoul 130-701,  
Republic of Korea  
Tel: 82-2-961-9448  
Fax: 82-2-967-7707  
E-mail: opem@khu.ac.kr |
| Journal Production  
(Manuscripts That Have Been Accepted for Publication) | **Kyung Hee University Press**  
Kyung Hee University  
1 Hoegi-Dong, Dongdaemun-Gu, Seoul 130-701,  
Republic of Korea  
Tel: 82-2-961-1016/7  
Fax: 82-2-962-8840  
E-mail: khup@khu.com  
Homepage: http://khup.com |
| Article Reprint Queries and Orders | **Jae-Young Um**  
Oriental Pharmacy and Experimental Medicine  
Department of Pharmacology  
College of Oriental Medicine  
Kyung Hee University  
1 Hoegi-Dong, Dongdaemun-Gu, Seoul 130-701,  
Republic of Korea  
Tel: 82-2-961-9262  
Fax: 82-2-967-7707  
E-mail: opem@khu.ac.kr |
INSTRUCTIONS TO AUTHORS

The Oriental Pharmacy and Experimental Medicine publishes original articles related to the observation and experimental investigation of the biological activities and clinical application of natural substances of all cultures. The Oriental Pharmacy and Experimental Medicine will accept the following contributions: Original research articles; mini-reviews; short communications; case reports; letters to the Editors. Only papers written in English will be considered. Authors are invited to submit manuscripts (original and two copies) to the Editor-in-Chief. Editor-in-Chief is willing to accept e-mail submissions if they are in an appropriate format. Submissions may be sent by e-mail to ophem@khu.ac.kr providing that the manuscript is in MS Word, figures are in MS Word or MS Power Point, and tables are in MS Word or Excel. This is the only on-line, electronic submission possibility for Oriental Pharmacy and Experimental Medicine at this time, however this will change in the future.

Contributions are accepted on the understanding that it has not been published, and that it is not under consideration for publication elsewhere. Papers accepted become copyright of the Journal. It is expected from the authors that they submit only data that have arisen from animal experimentation carried out in an ethically proper way by following guidelines as set by the World Health Organization. The Editors will not accept manuscripts which violate these principles.

Important Information
1. Submission of a paper will be held to imply that the manuscript contains original unpublished work and is not being submitted for publication elsewhere.
2. Manuscripts submitted under multiple authorship are reviewed on the assumption that all listed authors concur with the submission and that a copy of the final manuscript has been approved by all authors and tacitly or explicitly by the responsible authorities in the laboratories where the work was carried out.
3. It is understood that with submission of this article the authors have complied with the institutional policies governing the humane and ethical treatment of the experimental subjects, and that they are willing to share the original data and materials if so requested.
4. Conflict of Interest? Full Disclosure: In addition to complete contact/address of employer/institutional affiliation for all authors, all other relationships that may be perceived to potentially conflict the objectivity of any author must be fully disclosed in a footnote to the manuscript.

Manuscripts should be typewritten on one side of A4 paper only, with a 4-cm margin, be doublespaced and bear the title of the article, the name(s) of the contributor(s), the name and address of the institute where the work was done and a shortened title(not more than 50 spaces). Corresponding author’s telephone and fax number, and e-mail address, if available, should be provided. An Abstract of 100-250 words should be included at the beginning of the paper. A list of 3-6 Key words is essential for indexing purposes. These keywords should be typed at the end of the abstract. The text of a research paper should be divided into Introduction, Materials and Methods, Results, Discussion, Acknowledgements, and References.

Disks It is not necessary to submit a diskette with the original submission, but authors must be aware that an electronic version will be required if the paper is accepted for publication. Hence, authors are encouraged to prepare typescripts using IBM compatible PC(other systems are not available). The preferred wordprocessor is Microsoft Word for Windows. Accepted authors will be asked to provide the diskette with versions in ASCII code on addition to the original wordprocessed versions and a new hard-copy version. Please do not split the article into separate files(title pages as one file, text as another, etc.). The final version of the hard copy and the file on disk must be the same. Specify the type of computer and wordprocessing package used and label the disk with authors name, the name of the file and the number of manuscript on the disk. Abbreviations may be used in the abstract, but they are to be defined in the abstract. Abbreviations used in the text are to be defined in the first time they appear in the text.

Tables should be typed on separate sheets and should be given Arabic numbers. Their heading should briefly describe their content.

Figures should be given Arabic numbers. The author’s name, figure number and an arrow clarifying orientation should be marked in pencil on the reverse of each illustration. If possible, please send digital versions of your figures. Ideally these should be saved as EPS or TIFF, but please note that it may not be possible to modify them. Always enclose a hard copy of digitally supplied figures. If not supplied in a digital format, diagrams should be drawn in black on plain white paper. It is important to allow for reduction to fit a single column, 7.5 cm wide, or at most a double column, maximally 16 cm wide. Any symbols used must be legible after reduction in size. Legends should be typed on one sheet, separate from the figures. Drawings and photographs should be include a statement of magnification. Color prints are charged to the author.
References should be referred to by a name and year chronologically in the text in parentheses (e.g.: Kim and Lee, 1998; Kim, 1999; Kim et al., 1999) and listed alphabetically at the end of paper. Examples:

Journals:

Books:

Article in Book:

Free Copy A copy of the Journal containing the published article is sent to the corresponding author.

Reprints (Twenthy offprints) will be provided free of charge for each paper, but additional copies may be purchased if ordered on the printed card which will be sent to the author who corrects the proofs.