ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Brain Tonic Activity of Shankhavali Churna

Bera K M [*], Ghule R S, Kapdiya N S, Shah M B, Upadhyay U M.

302, Shri Haridarshan Flats, Opp. Kaya Beauty Clinic, Behind Suryanagar, Waghodia Road, Baroda.

ABSTRACT

Brain tonic activity of Shankhavali churna was studied. Decoction (DSC) of Shankhavali churna was prepared. DSC (300 mg/kg) was administered intraperitoneally in Wistar albino rats using elevated plus maze (EPM) and step through (ST) paradigm models. Scopolamine (0.3 mg/kg) was used to induce cognitive dysfunction and piracetam (100 mg/kg) as standard nootropic drug. In elevated plus maze DSC increased transfer latency (TL) and inflexion ratio (IR). There was increase of the step-through latency in step-through model by DSC. DSC also reversed the effect of scopolamine in both experiments. It is concluded that Shankhavali churna shows significant brain tonic activity.

Keywords: Braintonic, Decoction, Piracetam, Scopolamine, Shankhavali churna.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Ayurvedic medicines are becoming more popular in recent year with their over increasing acceptability in both developing and developed countries [1]. Because of advantages like fewer side effects, economic and easy availability, the ethanological study of medicinal plants has attracted the attention of modern workers to study the various aspects of Herbal drugs with their physiological impact on human health and their pharmacological aspects [2]. Shankhavali churna has been valued in Ayurveda as a memory enhancer. It consists of shankhpuspi, vidang, vaj, galo, apamarg, ginger, harde, bramhi and shatavari in the powder form [3]. Present study was undertaken to evaluate the memory enhancing activity of shankhavali churna to check for its activity as claimed traditionally. The present study is an effort to establish brain tonic activity of Shankhavali churna.

MATERIALS AND METHODS

Preparation of extract

The decoction was prepared by mixing 50 gm churna with 100 ml of distilled water and boiled up to one fourth volume. The extract was evaporated up to dryness and residue was collected.

Animals

Albino rats of wistar strain of either sex (200-250g) were used for the present study. All animals were housed at ambient temperature (22 ± 2ºC), relative humidity (60 ± 5%) and 12h/12h light dark cycle. Animals had free access to standard pellet diet (commercial rat cubes from Pranav Agro Industries Ltd; Baroda, India) and water ad libitum. The protocol of the experiment was approved by the institutional animal ethical committee as per the guidance of the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Ministry of Social Justice and Empowerment, Government of India. Animals were divided into different groups.

Drugs and Chemicals

Piracetam (Baroda) and scopolamine (Sigma Pvt. Ltd.) were used for study. DSC, piracetam and scopolamine dissolved in distilled water and administered intrapertoneally.

ISSN: 0975-8585

Evaluation of brain tonic activity

An elevated plus maze [4-7]

An elevated plus maze consisting of two open arms (30×5× 2.5 cm) and two enclosed arms (30×5×15 cm) was used. The maze was elevated to the height of 50 cm. The animals were housed into groups of six under standard housing conditions (Table.1). Animals were fasted overnight prior to drug administration and during the experiment. All experiments were carried out during the light period (08:00–16:00 h). All animals received 10 days training before giving drugs. Rats were placed individually at the end of an open arm facing away from the central platform and the time it took to move from the end of open arm to either of the closed arms (transfer latency, TL) was recorded. After completion of training female rats received vehicle, DSC (300 mg/kg) and standard drug piracetam (100 mg/kg), scopolamine (0.3 mg/ kg) will be administered 30 min before their placement on the elevated plus maze as before and TL was noted again. The TL was expressed as retention after 24 h by calculating the ‘‘inflexion ratio (IR)’’ using the formula

$$IR = L_1 - L_0 / L0$$

Where L_0 = transfer latency after 24 h and
L_1 = initial transfer latency in seconds.

The retention of learned task was studied after 24 h as transfer latency on the elevated plus maze. The effect on transfer latency was expressed by IR. Increase in IR after 24 h indicated improved retention of learned task. The procedure would be conducted preferably in a sound proof room.

Table 1: Group specification for brain tonic activity

Group No	GROUP	Animals No
1	Normal received vehicle	6
2	Received Scopolamine	6
3	Standard received Piracetam	6
4	Received scopolamine + Piracetam	6
5	Received scopolamine + aqueous extract of churna	6

Step through model [8, 9]

Female rats with 200-300 g weight were used. The test apparatus consists of a small chamber connected to a larger dark chamber via a guillotine door. The small chamber was illuminated with a 7 W/12 V bulb. Animals were fasted overnight prior to drug administration and during the experiment. All experiments were carried out during the light period (08:00–

ISSN: 0975-8585

16:00 h). The test animals were given an acquisition trial followed by a retention trial 24 h later. In the acquisition trial the animal was placed in the illuminated compartment at a maximal distance from the guillotine door, and the latency to enter the dark compartment was measured. Animals that do not step through the door within a cut-off time 180 s were not used. Immediately after the animal enters the dark compartment, the door will shut automatically and an unavoidable foot shock (Foot shock 1.5 mA; 2 s – rat) was delivered. The animal was then quickly removed (within 10 s) from the apparatus and put back into its home cage. The procedure is repeated with test drug (300mg/kg), standard drug piracetam (100 mg/kg) and scopolamine (0.3 mg/kg) will be administered 30 min prior to experimentation by intraperitoneal route. The time to step-through means latency during the learning phase was measured and the time during the retention test was measured and measure the inflexion ratio as describe above.

Statistical analysis

Results are presented as mean(s) ± SEM (Standard Error of Mean). Statistical differences between the means of the various groups were evaluated by SPSS statistical software, using one-way analysis of variance (ANOVA) followed by Turkey's test and linear regression analysis. Data were considered statistically significant at P value ≤ 0.05.

RESULTS

Elevated plus maze

There was increased Transfer latency (TL) (fig.1) and Inflextion ratio (IR) (fig.2) by DSC (300 mg/kg) treated rats as compared to vehicle and scopolamine treated rats (Table.2).

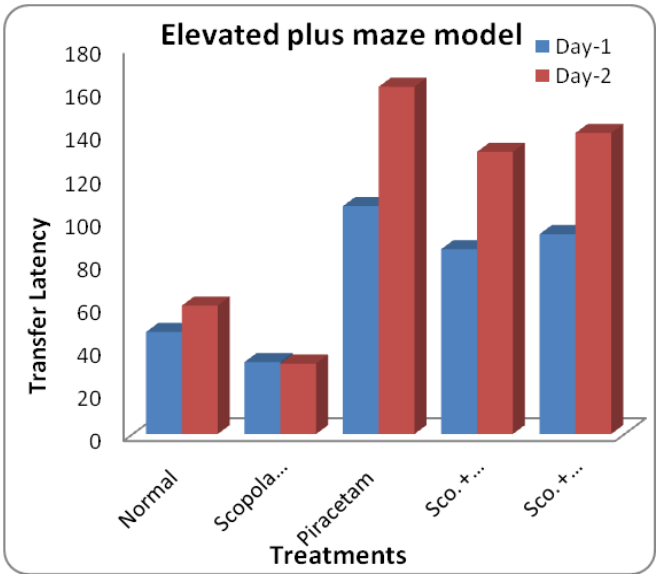

Fig. 1: Effect of decoction of shankhavali churna on transfer latency in elevated plus maze

ISSN: 0975-8585

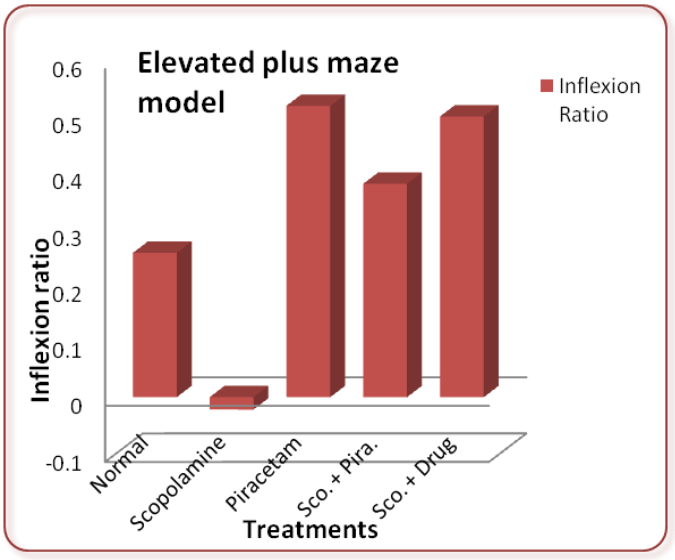

Fig. 2: Effect of decoction of Shankhavali churna on inflexion ratio in elevated plus maze

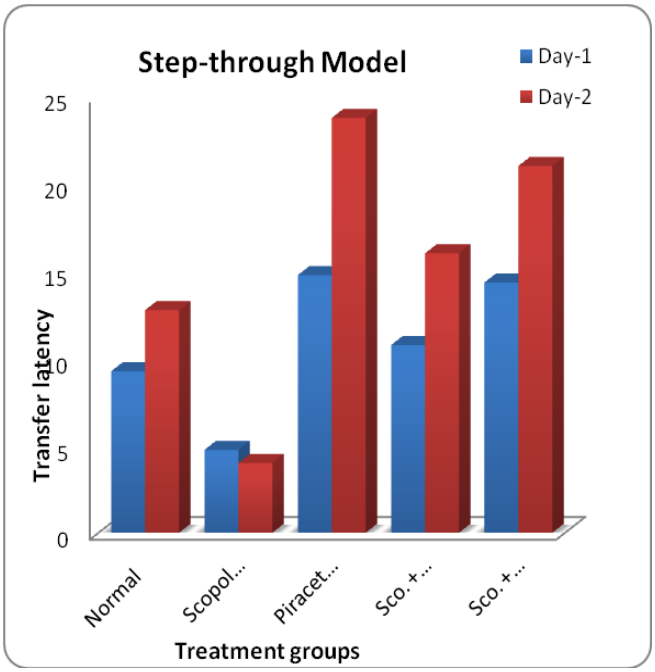

Fig. 3: Effect of decoction of Shankhavali churna on transfer latency (step-through latency) in step-through model

ISSN: 0975-8585

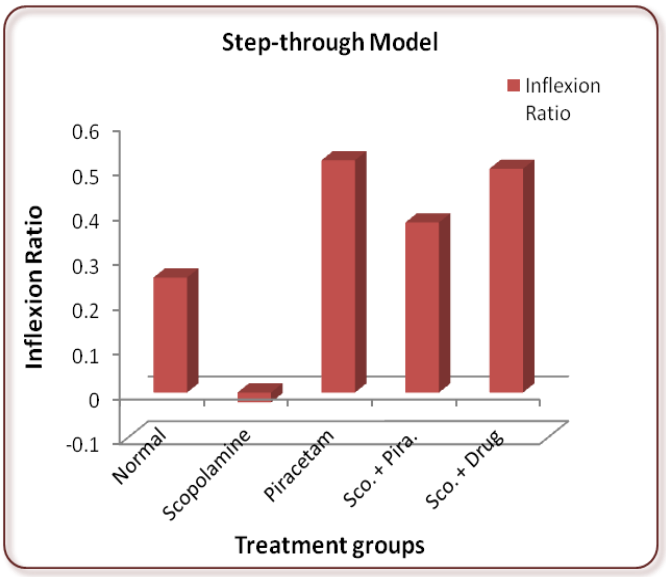

Fig. 4: Effect of decoction of Shankhavali churna on inflexion ratio in Step-through model

Table 2: Effect of aqueous extract of shankhavali churna on transfer latency and inflexion ratio in Elevated plus maze

Elevated Plus maze Test			
Treatment (mg/kg)	Transfer latency (sec)		
	Day 1	Day 2	Inflexion ratio
Normal	47.5±2.08	59.75±8.18	0.257±0.15
Scopolamine	33.5±9.32	32.75±9.48	0.022±0.03
Piracetam	106±9.69	161.5±12.06	0.519±0.22
Scopolamine + piracetam	86±14.69	131.2±21.74	0.380±0.40
Scopolamine + Drug	93±16.83	140.0±12.78	0.500±0.38

N=6 in each groups. Data represented as Mean ± S.E.M
Data was analyzed by ANOVA **(**F-value-5.0119)

Table 3: Effect of decoction of Shankhavali churna on transfer latency and inflexion ratio in step-through model

Step-through model			
Treatment (mg/kg)	**Step-through latency (sec)**		**Inflexion ratio**
	Day 1	**Day 2**	
Normal	9.25±0.5	12.75±0.95	0.378±0.15
Scopolamine	4.75±0.95	4±0.81	-0.157±0.30
Piracetam	14.75±2.06	23.75±4.43	0.610±0.23
Scopolamine + piracetam	10.75±0.5	16±0.81	0.488±0.18
Scopolamine + Drug	14.33±1.03	21±3.78	0.465±0.23

N=6 in each groups. Data represented as Mean ± S.E.M
Data was analyzed by ANOVA (F-value-4.1982)

Step through model

In this test a prolongation of the step-through latencies was specific to the experimental situation. An increase of the step-through latency will defined as learning. There was increase of step-through latency (fig.3) and Inflextion ratio (IR) (fig.4) by aqueous extract (300 mg/kg) treated rats as compare to vehicle and scopolamine treated rats (Table.3).

DISCUSSION

Nootropics or memory enhancers constitute a class of psychotropic agents. The brain tonic activity of churna was evaluated by elevated plus maze and step through model. The amnesia induce by scopolamine was antagonize by the AE of shankhavali churna so it proved the brain tonic activity of churna. Scopolamine is antimuscaranic agent it decrease the level of acetyl choline in brain and produces the amnesia. Piracetam a standard drug act by increase the Ach level in brain and also reduce the brain content of GABA.

REFERENCES

[1] Singh VK, Govil JN, Hashmi S, Singh G. Recent Progress in medicinal plants 2003; 7: 339-341.
[2] Sharma SK, Govinl JN, singh VK. Recent Progress in medicinal plants 2005; 10: 473-475.
[3] Vaid Gopalji KT. Vaidak Chikitsasar vol-ll utararth. 1936, pp. 145.
[4] Kulkarni SK, Joseph P. Indian drugs 1998; 35 (9): 536-541.
[5] Chintawar SD, Somani RS, Veena SK, Kasture SB. J Ethanopharmacol 2000; 81: 299-305.
[6] Mohan M, Banker A, Birdi T, Bharambe P,Kaul S, Patel A. J Natural Remedies 2006; 6(2) : 153-435.
[7] Une HD, Sarvieya VP, Pal SC, Kasture VS, Kasture SB. Pharmacology, Biochemistry and Behaviour 2001; 69: 439-444.
[8] Lee S, Yang-sun M, Kwan-Hee Y. J Ethanopharmacol 1999; 69: 1-8.
[9] Vogel HG. Drug Discovery and evaluation. Pharmacological Assay 2002; 434-435.