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CARDIOVASCULAR EFFECTS OF BACOPA MONNIERI (L.) PENNEL EXTRACT IN RABBITS

SHAHID RASHID*, FIRYAL LODHI*, MANSOOR AHMAD and K. USMANGHANI****
*Department of Pharmacology, University of Karachi, Karachi-75270, Pakistan
**Department of Pharmacognosy, University of Karachi; Karachi-75270, Pakistan

ABSTRACT

The effects of the crude ethanolic extract of whole plant of *Bacopa monnieri* have been evaluated on left ventricular contractility, heap me and coronary flow in isolated rabbit hearth showed cardiac depressive activity in all parameters, like quinidine.

In folkloric medicine *Bacopa monnieri,* known as "Brahmi Boti", is reported to be used for the cure of insanity, epilepsy, as a potent nerve tonic, cardiotonic and diuretic (Chatterji *et al.,* 1963, Chopra *et al,* 1986). Earlier workers have isolated a number of chemical compounds such as brahmine, herpestine, bascoside A & B, betulic acid, D-mannitol, stigmasterol, B-sitosterol, stigmasterol, monnierin (Dutta & Basu 1963, ibid 1968) nicotine, 3-formyl-4-hydroxy-2H-pyran (Schulte *et al.,* 1972), bacogenin A_1-A_4, arabinose and glucose (Chatterji *et al*., 1965, Basu *et al.,* 1967, Kulshreshtha *et al,* 1973a & b, Kulshreshtha *et al.,* 1974, Chandel *et al.,* 1977), jujubacogenin and pseudojujubacogenin (Kawai *et al.,* 1974), *B. monnieri* has been cited by Dey and Dutta (1966) as psychotropic agent. Investigations by Ganguly and Malhotra (1967, a, b) have shown that the extract of *B. monnieri* had a weaker tranquilizer effect than chloropromazine. The alcoholic extract of the entire plant was found to have anticancer activity against Walker carcinosarcoma 256 in rat (Bhakuni *et al,* 1969). No activity of this plant has been reported so far on cardiovascular parameters, we have programmed a research to study the activity of extract of *B. monnieri* on isolated heart.

Materials and Methods

Plant Material

The whole plants of *B. monnieri* (250 g) were collected from Karachi in July 1988. Fresh plant material after chopping was soaked in EtOH for about four weeks. The alcoholic extract was evaporated under reduced pressure and the syrupy residue obtained was dissolved in small quantity of H_2O and subjected to freeze drying. In this way 25 g powder crude extract was afforded which was used for cardiovascular sunning

Method

Rabbits (1-2 Kg) of either sex were used. Heart was mounted according to the method described by Langendorff (1895) with modifications of Arabi & Rashid (1982), and perfused at 37°C with McEwen's solution (NaCL: 7.60 g/l, KCl: 0.42 g/l, $CaCl_2$: 0.24 g/l, NaH_2CO_3: 2.10 g/l, glucose: 2.00 g/l, sucrose 4.50 g/l), bubbled with oxygen. The following parameters were recorded by means of an isotonic transducer (Harward). 1) force of contraction (height in mm), 2) heart rate (beats/min), 3) coronary flow (m1/min). Pressure of perfusion was kept at 45 mm Hg approximately. The activity of the *B. monnieri* extract was compared with that of galantine. The levels of significance were calculated with Student "t" test method (Bailey, 1976).

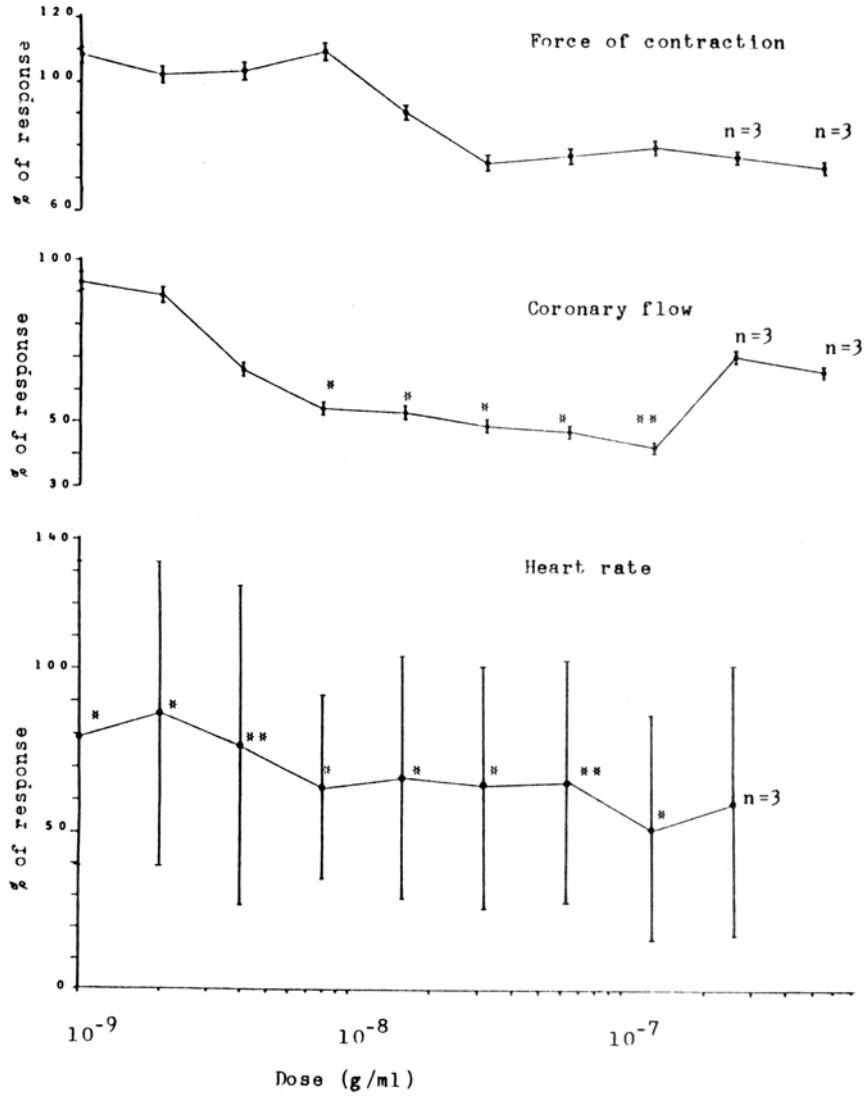
Results and Discussion

The effect of crude extract of *B. monnieri* on a) force of contraction of left ventricle b) heart rate, and c) coronary flow, of isolated rabbit heart are shown in fig, 1. Results are expressed as mean percentage of the responses of 5 experiments. Left ventricular force of contraction has been slightly raised at initial doses up to 8 ng/ml and then a fall was observed. Maximum fall (25%) was seen at 32 ng/ml. These results were statistically non-significant in comparison with controls. Heart rate & coronary flow showed a significant fall. Maximum fall (50%) was observed in both parameters at 132 ng/ml ($1.3 \times 10^{-+}$ g/ml).

Overall effect of the crude extract of *B. monnieri* on these parameters depression though some early non significant pressor responses in left ventricle contraction were seen.

The plant extract has been reported as a toxic one, and LD 50 by intraperitoneal route on mice was found to be 50 mg/kg. These results also showed a relation between the effects of all these parameters. Contraction of coronary vessel reduces the flow which may in turn decreases the supply of oxygen and nutrients to the heart, and therefore give rise to depression of contraction and heart rate.

Results of the quinidine sulphate (n =3) on 1) force of contraction, 2) heart rate, and 3) coronary flow are shown in Fig. 2. These results exhibited a dose dependent decrease in heart rate and force of contraction which were more prominent at higher doses (i.e. from 100 mg/ml to 800 pg/ml); but coronary flow showed initially a slight increase of 10% at 200 pg/ml and then a decrease. Both increase and decrease were non significant.


Force of contraction
% of response
120
100
60
n=3
n=3
Coronary flow
% of response
100
50
30
n=3
n=3
Heart rate
% of response
140
100
50
0
n=3
10^{-9}
10^{-8}
10^{-7}
Dose (g/ml)

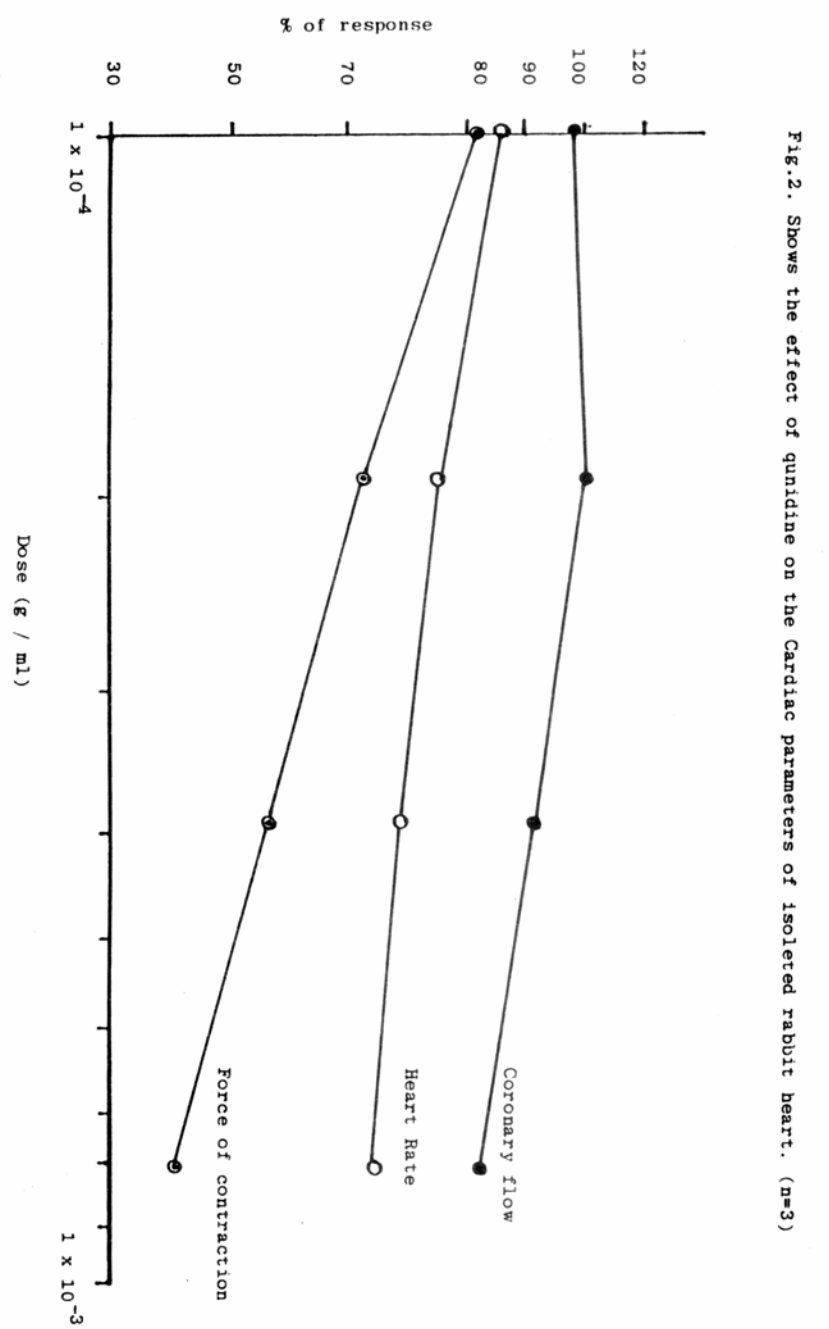


Fig.2. Shows the effect of qunidine on the Cardiac parameters of isoleted rabbit heart. (n=3)

The pattern of the effect of *B. monnieri* on isolated heart preparation resembles with the activity of quinidine, except that higher doses have been used in the case of quinidine. Quinidine is generally regarded as a myocardial depressant drug as it depresses, excitability, conduction velocity and contractility. It also produces peripheral vasodilatation in large doses (Goodman & Gillman, 1975). The activity of this extract has been also reported like that of Chloropromazine (Ganguly and Malhotra, 1967), and it seems that it acts directly on the myocardium.

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