

Regression of cardiac hypertrophy in hypertensive patients - Comparison of Abana with propranolol

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ABSTRACT

The effect of Abana and propranolol on left ventricular hypertrophy in hypertensive individuals was studied by echocardiography. The study showed an improvement in cardiac function as indicated by an increase in ejection fraction and fractional shortening in both the Abana- and propranolol-treated groups. A decrease in cardiac mass with propranolol was seen at 12 weeks and was maintained upto 36 weeks. With Abana, the reduction in mass was seen from 18 weeks onwards and lasted up to 42 weeks. In 5 patients on Abana and 2 on propranolol, the trial was continued for a further period of 84 weeks, but the effects seen after 84 weeks were not significantly different from those at 60 weeks.

Key words: Abana; propranolol; hypertension; echocardiography

INTRODUCTION

Left ventricular hypertrophy (LVH) is a common sequel of hypertension¹. Blood pressure reduction may lower the risk of LVH², but drugs given to control blood pressure (BP) may not necessarily halt the process of hypertrophy. Hypertensive patients with LVH have higher plasma norepinephrine levels, indicating a trophic influence of catecholamines on cardiac muscle mass³. Short-term studies with propranolol have shown a regression of LVH in hypertensive patients, along with a reduction in norepinephrine levels⁴. Our earlier long-term study showed that though β -adrenergic blockers like propranolol were capable of causing regression of cardiac hypertrophy, the action did not last for the entire period of the study⁵. A herbomineral preparation, Abana (The Himalaya Drug Co., Bangalore, India), containing many useful drugs in their optimum concentration, is used as an antihypertensive⁵ and hence, it would be worthwhile to study its effect on cardiac hypertrophy.

MATERIAL AND METHODS

A 60-week study was conducted on male hypertensive patients in the age group of 50-65 years, having systolic blood pressure (SBP) 150-170 mmHg and diastolic blood pressure (DBP) of 90-100 mmHg. Written informed consent was obtained from the patients before including them in the trial. Hypertensive patients suffering from diabetes, cardiac failure, cardiomyopathies and valvular diseases were excluded. The criteria for hypertrophy were the following echocardiographic parameters⁷.

- i) Left ventricular internal dimension in systole (LVIDs) 5 cm.
- ii) Left ventricular mass (LVM) 120 g/m².
- iii) Posterior wall thickness 11 mm.

An equal number of patients were assigned to either Abana, 2 tablets 3 times a day for 6 weeks, followed by 1 tablet 3 times a day, or propranolol given in the antihypertensive dose range of 40-120 mg/day. Other drug treatments were similar in the 2 groups.

Assessments of drug therapy on variables such as BP and echocardiography were made every 6 weeks. Echoes were read by a person unaware of the treatment given to the patient.

From the measurement of ventricular dimensions, assessment of cardiac function and volumes were made using the following formulae:

$$1 \text{ LVM} = (\text{LVIDd} + 2 \text{ PWT})^3 - (\text{LVIDd})^3 \times 1.05$$

$$\% \text{ FS} = \frac{\text{LVIDd} - \text{LVIDs}}{\text{LVIDd}} \times 100$$

$$\text{EF} = \frac{\text{EDV} - \text{ESV}}{\text{EDV}}$$

where LVM is the left ventricular mass, LVIDd and LVIDs are the left ventricular internal dimensions in diastole and systole respectively.

PWT is the posterior wall thickness; FS is the fractional shortening; EF is the ejection fraction; EDV is the end diastolic volume, and ESV is the end systolic volume.

Statistical analysis of the data was done by Student's 't'-test.

RESULTS

The baseline parameters such as BP and echocardiography were similar in the age-matched patients of both groups. Table 1 shows the assessment parameters at the start of the trial, during the maximal effect and at the end of therapy with Abana and propranolol. The extent of decline in BP was greater and faster with propranolol, compared with Abana. However, the reduction in LVID, LVM and improvement in cardiac function, as noted by an increase in ejection fraction and fractional shortening, were similar irrespective of the type of therapy, although the maximal effect was seen at 12 weeks in the case of propranolol and at 18 weeks with Abana. At the conclusion of the 60-week trial, the improvement seen with drug therapy during the trial declined considerably and the values were outside the normal limits.

Table 1: Effect of propranolol and Abana on different echocardiographic parameters (mean ± SEM)

	Propranolol			Abana		
	Before	30 weeks	60 weeks	Before	30 weeks	60 weeks
SBP (mm)	154.00 ± 5.00	122.00 ± 6.00 ^b	126.00 ± 2.00 ^b	152.00 ± 7.00	134.00 ± 3.00	136.00 ± 6.00
DBP (mm)	96.00 ± 3.00	80.00 ± 5.00	83.00 ± 2.00	97.00 ± 6.00	86.00 ± 2.00	88.00 ± 3.00
LVIDd (cm)	5.60 ± 0.00	4.20 ± 0.30 ^a	5.10 ± 0.20	5.80 ± 0.20	4.40 ± 0.10 ^b	5.20 ± 0.40
LVIDs (cm)	4.80 ± 0.70	3.70 ± 0.80	4.20 ± 0.60	4.70 ± 0.90	3.60 ± 0.70	4.40 ± 0.30
PWT (mm)	12.60 ± 0.80	9.80 ± 1.90 ^a	11.60 ± 0.90	13.00 ± 0.70	10.10 ± 1.30	10.80 ± 1.00
IVS (mm)	12.70 ± 1.70	9.60 ± 0.80 ^a	11.30 ± 0.60	12.90 ± 2.00	9.90 ± 1.10	11.70 ± 1.50
% FS	21.60 ± 4.20	30.00 ± 2.20	23.90 ± 3.10	22.40 ± 5.20	30.30 ± 1.80	24.10 ± 4.80

n=20 patients in each group

Statistical significance ^ap<0.05, ^bp<0.001 as compared with their respective initial readings.

SBP: Systolic blood pressure; DBP: Diastolic blood pressure; LVID: Left ventricular internal dimensions;

PWT: Posterior wall thickness; IVS: Inter-ventricular septum; FS: Fractional shortening.

The single most important parameter of cardiac hypertrophy is LVM. Figure 1 shows that the decrease in cardiac mass at 12 weeks with propranolol was maintained up to 36 weeks. With Abana, the reduction in mass seen from 18 weeks onwards, lasted up to 42 weeks. In both groups, from 42 weeks onwards, the cardiac mass started increasing above normal. The DBP remained below 90 mmHg (both during and after the period of reduction) but the LVM started increasing. In 5 patients on Abana and 2 on propranolol, the trial was continued for a further period of up to 84 weeks, but the effects seen at 84 weeks were not significantly different from those at 60 weeks.

DISCUSSION

M mode echocardiography is an accurate method of assessing left ventricular function⁸. Echocardiographic estimates correlate well with those laid down by the American Society of Echocardiography⁹ and left ventricular function in these patients improved with drug treatment, according to the criteria laid down¹⁰. Cardiac hypertrophy is dependent on increased sympathetic tone and sympatholytic drugs have been reported to cause reduction in hypertrophy. Abana is an Ayurvedic herbal preparation containing several important herbs (Table 2) and its overall effect is to cause down regulation of β -receptors⁶. Hence, the trophic influence of the sympathetic system on cardiac mass and size is reduced. If a decrease in BP is taken as an indicator of decrease in sympathetic tone, then regression of hypertrophy does not depend solely on decrease in sympathetic tone¹¹ as even with good blood pressure control, improvement in cardiac function and reduction in cardiac volumes and mass throughout the study were not permanent.

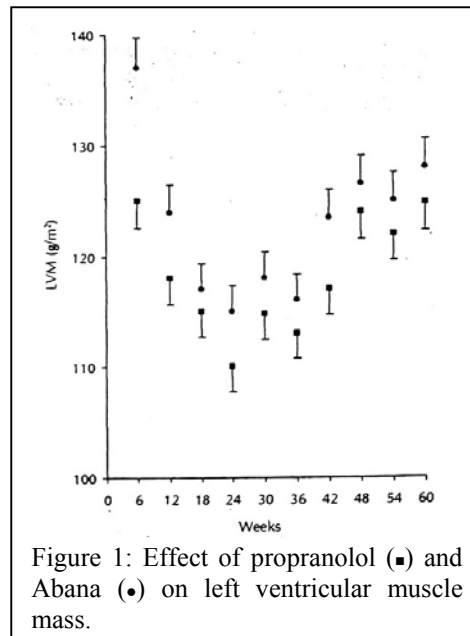


Figure 1: Effect of propranolol (■) and Abana (●) on left ventricular muscle mass.

Table 2: Ingredients of Abana

Ingredients	Mg	Ingredients	Mg
<i>Terminalia arjuna</i>	30	Shankh bhasma	10
<i>Withania somnifera</i>	20	Makardhwaj	10
<i>Nepeta hindostana</i>	20	<i>Cyperus rotundus</i>	5
Dashamoola	20	<i>Acorus calamus</i>	5
<i>Tinospora cordifolia</i>	10	<i>Embelia ribes</i>	5
<i>Emblica officinalis</i>	10	<i>Syzygium aromaticum</i>	5
<i>Terminalia chebula</i>	10	<i>Celastrus paniculatus</i>	5
<i>Eclipta alba</i>	10	<i>Santalum album</i>	5
<i>Glycyrrhiza glabra</i>	10	<i>Elettaria cardamomum</i>	5
<i>Asparagus racemosus</i>	10	<i>Foeniculum vulgare</i>	5
<i>Boerhaavia diffusa</i>	10	<i>Rosa damascene</i>	5
Shilajeet	20	<i>Cinnamomum cassia</i>	5
<i>Centella asiatica</i>	10	Abhrak bhasma	5
<i>Convolvulus pluricaulis</i>	10	Pearl pishti	5
<i>Ocimum sanctum</i>	10	Agata pishti	5
<i>Nardostachys jatamansi</i>	10	Jade pishti	5
<i>Piper longum</i>	10	Ruby pishti	5
<i>Carum copticum</i>	10	Coral pishti	5
<i>Zingiber officinale</i>	10	<i>Crocus sativus</i>	2
Jaharmohra	10		

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