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Original Research Paper

Ayurveda

ANTI-HYPERTENSIVE EFFECT OF *Moringa oleifera lam*. LEAVES DECOCTION – A PILOT STUDY

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ABSTRACT Hypertension is the major cause of CVDs and stroke around the globe and is estimated to cause about 12.8% of all the deaths. The worldwide occurrence of hypertension has increased from 4.5%, to 7% from 2007-2010 (WHO-2008; AU-2013). Several in-vivo studies have been done in rats to prove the safety and efficacy of leaves *of Moringa* (Shigru) an Ayurvedic shrub in hypertension[1]. Safety and efficacy studies did not show any toxicity till a dose of 100 mg/kg body weight[2]. This pilot study was conducted on 10 human subjects diagnosed with spontaneous hypertension. The paper was presented as a poster in the 104th Indian Science Congress held at Tirupati, Andhra Pradesh. The study has proved that the decoction of *Moringa oleifera* leaves are effective in reducing blood pressure.

KEYWORDS : Anti hypertensive, Moringa leaf, Blppd Pressure

Introduction

Moringa belonging to the Moringaceae family, popularly known as the 'miracle tree' in Africa has been in use in India for thousands of years ago. It is a small or medium sized tree, native of the sub-Himalayan parts of India, cultivated along the tropical and the sub-tropical areas of the world. Traditional herbal medicines use almost all parts of the plant. The leaves and pods are widely consumed in India. *Moringa* leaves are rich source of minerals and vitamins. A cup of chopped Morringa leaves contains 2 grams Vitamin B6: 19% of the Recommended Dietary Allowance (RDA), Vitamin C: 12% of the RDA, Riboflavin (B2): 11%, Iron: 11%, Vitamin A (from beta-carotene): 9% and Magnesium: 8% of the RDA. Several in-vitro and in-vivo studies were conducted to establish the anti -hypertensive effect of Moringa leaves. Various studies done in wistar rat strains, mice, guinea pigs etc have proved that repeated oral administration of Moringa leaves in the form of aqueous extract has reduced the hypertension significantly[1].

Method

The study was carried out as an open label single armed pilot trial. Ten patients were diagnosed as spontaneous hypertension was selected after three assessments of blood pressure done on three different dates and times for the study. Patients within the age group of 40-80 yrs diagnosed with spontaneous hypertension with systolic BP- ranging from 130-220mmhg and diastolic ranging from 80-120mmhg were included for the study, provided their Mean Arterial Pressure (MAP) was within the range of 70 to 110mmhg. Patients with other systemic pathology were excluded. Routine blood examination, LFT, RFT, and ECG were done to rule out other systemic illnesses. No other antihypertensive drug was given to the patients during the study. Even no dietary modifications, exercise or other concomitant medication were advised. The patients were asked to follow their same lifestyle as before. The drug was administered in decoction form. 20 g of Moringa leaves were boiled in 1 liter of water till it is reduced to 750 ml. It was then filtered and given to drink sip by sip in a day. BP was checked daily but assessment was done once a weak. The drug administration continued till the end of 5 weeks.

Result

Patient Code	Age /Sex	BP in mmhg (BT)		BP AT1		BP AT2		BP AT3		BP AT4		BP AT5	
		Sys	Dias	Sys	Dias	Sys	Dias	Sys	Dias	Sys	Dias	Sys	Dias
SWM001	73/ F	160	80	150	80	144	80	140	80	134	80	132	80
SJM002	80/F	210	70	180	70	170	70	160	70	150	70	150	70
BBY003	75/F	152	82	148	72	142	80	126	80	124	80	112	60
RJI004	56/F	162	90	160	90	158	90	156	90	144	84	126	82
GKN005	62/M	152	98	142	94	136	90	132	90	128	88	122	84
UGH006	40/M	174	120	152	110	148	104	144	98	138	88	134	84
STA007	50/F	190	100	158	90	140	80	132	82	120	80	120	80
SDM008	59/F	150	90	148	88	142	86	138	82	124	80	110	70
AKA009	48/F	172	90	166	88	160	86	150	84	140	80	120	78
UKI010	52/F	190	100	188	94	172	90	160	88	140	86	130	80
MEAN ± S. E	59.5 ± 12.99	171.2 ± 18.02	92 ± 12.99	159.2 ± 14.12	87.6 ± 9.47	151.2 ± 12.23	85.6 ± 8.79	143.8 ± 11.64	84.4 ± 6.93	134.2 ± 9.35	81.6 ± 5.04	125.6 ± 11.09	76.8 ± 7.33

Both the systolic BP and diastolic BP were reduced in all the patients during each assessment. At the end of fifth week the BP both systolic and diastolic had reduced down to the near normal limits in all of them. In a few the BP level had fallen below 120/80 at the end of fifth week. None showed any allergic signs, giddiness or weakness. Decoction of *Moringa oleifera* leaves was effective in reducing hypertension especially systolic BP. Eight out of ten patients were females. It was effective in both the sexes. Their mean systolic and diastolic BP and standard deviation were calculated, and plotted against the graphs given below (fig 1& 2). Statistically 'Paired-t test' was done to analyze the efficacy and it was found significantly effective with P >0.001 for systolic BP.

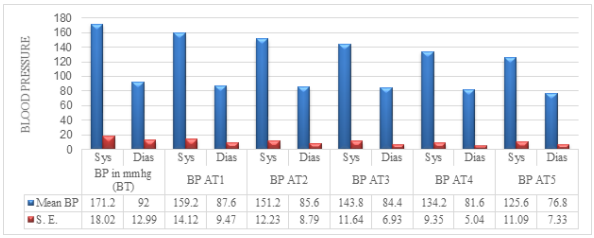

Fig 1: Mean and S. E of Blood pressure after each week of Treatment

Discussion

In this study Moringa leaves decoction were given in a dose, equal to the dietary supplement. In practice two different varieties of Moringa are used as dietery supplement, *Moringa Oleifera* and *Moringa stenopetala,* both having their own distinct properties. Phytochemical screening of the extracts by the methods described by Tiwari et al (2011)[3] showed properties same as that explained in the Ayurveda Pharmacopoea of India(API)[10]. Carbohydrate, Protein, Carotene and Ascorbic acid were the major constituents. The endogenous plant enzyme myrosinase produces isothiocyanates, nitriles, and thiocarbamates by the enzymatic catabolism of glucosinolates .These compounds are known for strong hypotensive and spasmolytic (muscle relaxant) effects (Anwar et al) [4]. The Isothiocyanates and Thiocarbamates of *moringa oleifera*, molecules with a cyanide and sulfur group (rbitc, niaziminins a-b) was able to bring down the blood-pressure in anesthetized rats at a dose of 3mg/kg by 35-40%.[5] In a rat model of monocrotaline-induced pulmonary hypertension, injections of the leaf extract at 4.5mg/kg appear to cause a reduction in blood-pressure associated with vasodilatation and increased antioxidant potential.[6,7]In another study *Moringa oleifera* leaves extract produced dose dependant diuretic action[8]. This can also be one of the reason for the antihypertensive effect. The exact chemical constituent behind this action was not isolated.

Histopathological investigations had supported liver and kidney marker parameters to rule out toxicity. It was observed that the extracts of leaves and flowers of *Moringa olifera* could significantly prevent the progression of hepato-cellular damage.[9]

FIG 3

Fig 4

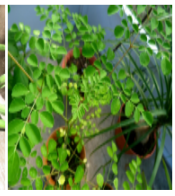

Fig 5

According to Ayurveda hypertension may be considered as the vitiation of blood(raktha) and vyana vata (circulation) Because of its *pithahara* and *vatahara* properties Moringa is assumed to have an impact on *raktha* (blood) and its pressure exerted on the vessel walls when in circulation thus reducing the blood pressure.

Conclusion

Through this pilot study it was proved that the decoction of Moringa oleifera leaves is effective in reducing spontaneous hypertension especially systolic BP without causing reasonable hypotension, side-effects or toxicity. In-depth studies and further investigations are suggested to identify and isolate the phyto-constituents responsible for the anti-hypertensive activity of the plant .

Further studies are being initiated to fix the standard dose and to find a potable and palatable dosage form for the drug.

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