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# HYPOLIPIDEMIC EFFECTS OF ATORVASTATIN WITH EMBLICA OFFICINALIS (AMLA) IN PATIENTS HAVING HYPERCHOLESTEREMIA

Medical Science

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## ABSTRACT

Hyperlipidaemia indicates high level of fats (or lipids) in the blood. Hyperlipidemia is one of the major culprits for various cardiovascular and central nervous system disorders. Both genetic disorders and diet enriched with saturated fats and cholesterol, contribute to the elevated lipid levels in indian population as well as in many other developed countries around the world. The present study was undertaken for hypolipidemic effects of atorvastatin with *Emblicaofficinalis* (amla) in patients having hypercholesteremia. A prospective randomized open label study was done. Out of 93 patients, 45 patients (Group-A) were given two tablet of Amla (500 mg) daily, while the other 48 patients (Group-B) received one tablet of Atorvastatin (10 mg) daily for 16 weeks. All routine biochemical investigations including lipid profile were performed before starting the intervention as well as after completion of each treatment round i.e. at the end of 4 weeks, 8 weeks, 12 weeks & 16 weeks. Amla showed significant increase in HDL and decrease in triglyceride level ($P < 0.05$) at the end of 16 wks while atorvastatin has shown better effect on TC, LDL and VLDL ($P < 0.05$). There was no adverse drug event in either group. In our study on amla when compared with atorvastatin, amla has been shown better effect on TG and HDL while atorvastatin has shown better effect on TC, LDL and VLDL.

## KEYWORDS

Hyperlipidaemia,Atorvastatin, Heart disease, Atherosclerosis.

## 1.INTRODUCTION

Hyperlipidaemia indicates high level of fats (or lipids) in the blood. These fats include cholesterol and triglycerides. They are important for our body function but when they are too high, they can put people at risk for heart disease and stroke (JCEM, 2005). Hyperlipidaemia is one of the major culprits for various cardiovascular and central nervous system disorders. Both genetic disorders and diet enriched with saturated fats and cholesterol, contribute to the elevated lipid levels in our population as well as in many other developed countries around the world (Norma, 2005).

Hyperlipidaemia is also known as one of the most frequently implicated risk factor for development of atherosclerosis (Assman et al, 1992). A strong association exists between hyperlipidaemia and coronary artery disease (CAD), cerebro-vascular stroke and peripheral vascular disease (Miller et al, 1975). The hypolipidemic drugs have attracted considerable attention because of their potential to prevent cardiovascular disease by retarding the accelerated atherosclerosis in hyperlipidaemic individuals (Di Piro, 2002).

The current National Cholesterol Education Program (NCEP) for the management of patients with lipid disorder is of 2 types. One is population based approach, which is intended to lower blood cholesterol by dietary recommendations such as reduced total calories from fats to less than 305kCal and from saturated fats to less than 10%, consumption of less than 300mg of cholesterol per day and maintenance of desirable body weight (Executive summary, 2001).

The second is a patient based approach described in the 2001 report of NCEP. Adult Treatment Panel-III (ATP-III) which continues to focus on lowering LDL-C levels as the primary goal of the therapy (Nair & Chanda, 2007). The ATP-III report recognizes four classes of drugs that may be used to achieve lipid goals. These include HMG-CoA reductase inhibitors (Statins), Bile Acid sequestrants, Niacin, and Fibric acid derivatives (Sultan et al, 2004). Of these, Statins like Atorvastatin, Simvaststin etc. and Fibrates have shown greater promise (Mukherjee, 2002).

But the history of natural products is as old as mankind. The importance of traditional systems of medicine and of certain traditional medical practices has now been recognized all over the world. Being synthesized spontaneously at natural temperature and pressure, they are far more economic in production and ecologically far safer – right from production, throughout food cycle and down to biodegradation (Krishnaveni M &Mirunalini S, 2010).

Today, it is required to have an intelligent and pragmatic approach to evaluate selective drugs of herbal origin. Therefore, it should really matter for Pharmacologists to obtain information from traditional healers, about their remedies and to extract the active principles for development into drugs (Muthuraman et al, 2011). Fruits are amongst the first food items known to human beings. Fruits, whether fresh or dried, have always formed a part of the staple diet of human beings (Nayak et al, 2011). Amla consist of fresh or dried fruits of Emblicaofficinalis; it is one of the important herbal drugs used traditionally both as a medicine and as a tonic to build up lost vitality and vigor (Krishnaveni M &Mirunalini S, 2010).

EmblicaOfficinalisGaertn. or Phyllanthusemblica Linn (English : Indian gooseberry, emblicmyrobolan; Hindi: Amla) is an evergreen tree from family Euphorbiaceae which is highly prized in tropical Asia (Ambasta, 1986). Amla grows in tropical and subtropical parts of India, China, Indonesia and the Malay Peninsula (Golechha et al, 2012) (Srivasuki, 2012). The fruit is the richest known natural source of vitamin C (3000 mg/ fruit) (Sampath et al, 2012). The genus is natural to tropical Southeast Asia, particularly in Central and South India. It is commonly cultivated in gardens throughout India and grown commercially as a medicinal fruit (Prachi & Shilpa, 2010). 8.7 mg of vitamin C from amla is equivalent to 100 mg of vitamin C from synthetic sources (Arora, 1985).

The credit for initiating studies related to herbal extracts in our country goes to Sir Ram Nath Chopra and his team of dedicated workers, in Calcutta School of Tropical Medicine (CPCSEA, 2003). Amla (Emblicmyrobolan) is among the most important medicinal plants in the Ayurveda MateriaMedica and widely used in Indian medicines for the treatment of various ailments (Poltanov et al, 2009). The fruit also forms an important constituent of many Ayurvedic preparations such

as chyavanapraash and triphalaa and is regarded as "one of the best rejuvenating herbs"hence called Dhaatrii [literally, mother] or vayastha [literally anti-aging remedy] in Ayurvedic Sanskrit (Nadkarni, 1954).

All parts of E. Officinalis are used in clinical practice: e.g., Root bark in stomach ulcer; bark in gonorrhea, jaundice and diarrhea (Gulati et al, 1995). Leaves in conjunctivitis and inflammation (Kumar & Muller, 1999). Fruits as digestive, laxative and antipyretic (Biswas et al, 1999). In addition, it has been shown to reduce cholesterol level in experimental animals (Mathur et al, 1996) and in clinical studies (Jacob et al, 1988).

Apart from traditional uses, there are several reports in the pharmacological actions of Amla based on modern scientific investigations, especially anti-inflammatory (Madhuri et al, 2011), antimicrobial (Gurav et al, 2011), anti-oxidant (Poltanov et al, 2009), anti-carcinogenic (Sumanlata, 2013), anti-ulcerogenic (Rajeshkumar et al, 2001), anti-diabetic (Akhtar et al, 2011), analgesic (Jaijoi et al, 2010) and hepato-protective (Anil et al, 2012) action. E. Officinalis is also reported to possess chemo-modulatory, chemo-preventive, antimutagenic and immune-modulatory activities. These properties are efficacious in the treatment and prevention of cancer (Prasan et al, 2012).

Keeping in view of the above ideas, the present study was undertaken for an evaluation of the effect of E. Officinalis powder on the serum lipids level & comparing standard hypolipidemic drug Atorvastatin. in the patients of hyperlipidaemia type II at NIMS Medical College &Hospital.

## 2.MATERIALAND METHOD:

**2.1 Ethical clearance:** This study was carried out in the Department of Pharmacology at NIMS Medical College & Hospital Jaipur Rajasthan. The institutional ethical clearance was obtained from Ethical Committee of the college.

**2.2 Study population :-** The 250 Random patients were evaluated clinically and subjected to routine haematological and biochemical investigations to rule out associated medical ailments. After screening a total of 93 patients (45 in Amla group and 48 in Atorvastatin group) were enrolled in the present study. A written informed consent in their language was taken from these patient. Study pattern was explained to enrolled patient in their own language.

### INCLUSION CRITERIA

Those consenting to participate in the study were enrolled if there was :-

1. Presence of type II hypercholesterolemia (i.e., serum Total Cholesterol (TC)>240 mg/dl and serum Low Density Lipoprotein-cholesterol (LDL)>130 mg/dl).
2. Presence of at least two of the following risk factors of Coronary Heart Disease (CHD):

a. Family history of CHD,
b. Male >45 years or female >55 years (but not on oestrogen replacement therapy),
c. Smoking,
d. Hypertension,
e. Serum high density lipoprotein (HDL) <35 mg/dl,
f. Obesity (Body Mass Index >27).

### EXCLUSION CRITERIA

1. Patients with history of recent (within past 6 months)
2. Serious cardiovascular diseases (including stroke) or
3. Any endocrine disorder (thyroid) or
4. Concomitant serious disorder of the liver, kidney, heart, lung, muscle etc
5. Receiving any drug treatment
6. Patients with secondary hyperlipidaemia (except diabetes mellitus)
7. Pregnant and lactating women.
8. Porphyria or allergic disorder

**3.1 Data collection procedures and instruments:** The patients were evaluated for physical and cardiovascular parameters. All routine biochemical investigations including lipid profile were performed before starting the intervention as well as after completion of each treatment round (i.e., at the end of 4 weeks) i.e. at the end of 4 weeks, 8 weeks, 12 weeks & 16 weeks. All signs and symptoms previously identified or present and new signs and symptoms or adverse effects, if any, were assessed during as well as after completion of the treatment. Patients having systolic blood pressure >140 mm Hg and/or diastolic blood pressure >90 mm Hg were considered as hypertensive.Blood pressure known to be affected by atherosclerosis and other parameters of lipid profile and can be a confounding factor is assessment of correlation, i.e. whether blood pressure has been effected directly or through lipid (Ferrario et al, 2002). Blood pressure and Body Mass Index (BMI )were monitored only for safety purpose and to assess any deterioration of patient condition (Baral et al, 2006).

**3.2 Clinical Parameters:** For lipid profile,venous blood samples of 05 ml were collected in vacutainer after at least 12 hours of overnight fasting. The samples were centrifuged at 3,000 rpm for 10 minutes and serum was separated. Samples were analysed and values of TC and triglycerides were estimated as described previously, while HDL was calculated using the HDL kit and LDL and Very Low Density Lipoprotein (VLDL) were calculated by using Fried Ewald's formula.

**3.3 Statistical analysis:** Tukey's test (studentized version, $p<0.05$) was preferred for analysis in this study.

**4.Observation and Results:**93 patients were selected for the study as per inclusion and exclusion criteria. Of these, 45 patients (Group-A) were given two tablet of Amla (500 mg) daily at night for 16 weeks, while the other 48 patients (Group-B) received one tablet of Atorvastatin (10 mg) daily at night for 16 weeks.Atorvastatin provides sustained improvement by lowering cholesterol level. Though amla does it slowly and final outcome is not that better, an increased rate of improvement is notable if treatment continues. Amla& Atorvastatin showed significant decrease in TC at the end of 16 weeks is shown in Figure 1

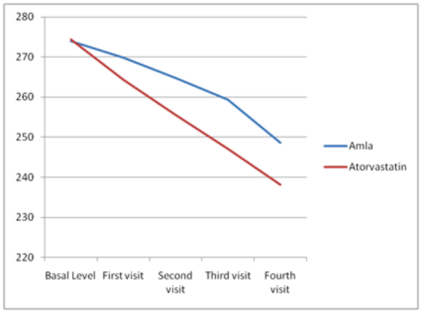


**Figure 1 : Variation of total cholesterol level (mg/ dL)**

### CONCLUSION

In the present study, 45 patients (Group-A) were given two tablets of *Amla* (500 mg) daily at night for 16 weeks, while the other 48 patients (Group-B) received one tablet of Atorvastatin (10 mg) daily at night for 16 weeks. In our study of amla compared with atorvastatin, amla has been shown better on TG and HDL while atorvastatin has shown better effect on TC, LDL and VLDL. There was no adverse drug event in either group, which could force achange or stoppage of regime or attrition of sampled population. Secondary parameters of physical wellbeing like blood pressure or body mass index showed no alarming change.

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