ORIGINAL ARTICLE

Effect of Dried Ginger (*Zingiber officinale*) on Serum Proteins in Hyperlipidemic Patients

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ABSTRACT

Aim: To study the effect of dried ginger on serum proteins and to compare the pre and post interventional levels of serum proteins in hyperlipidemic patients.
Method: It was a randomized, single-blind, placebo controlled study in which 100 hyperlipidemic subjects, 50 in treatment group & 50 in placebo group, participated. Baseline sampling of subjects, with ginger in diet, was done before administration of first dose. Ginger capsules and placebo were administered orally to the respective groups, for 30 days. Blood samples were collected next day after administration of the last dose. Tests for serum proteins were performed on samples.. Data was reported as means ± SEM. Paired t-test was employed to compare means of pre and post intervention values. pvalue less than or equal to 0.05 was regarded as significant.
Result: Serum Total Protein levels of hyperlipidemic patients in treatment group were not affected significantly (p-value=0.720) whereas there was a significant increase (p-value=0.041) in Serum Albumin levels of hyperlipidemic patients in treatment group. However, in the placebo group, both the Serum Total Protein levels (p-value = 0.690) and Serum Albumin levels (p-value = 0.067) were not significantly changed.
Conclusion: This finding shows that dried ginger powder in a dose of 3g/day has no effect on serum total plasma proteins, but serum albumin is significantly increased.
Key words: Ginger, hyperlipidemia, serum proteins.

INTRODUCTION

Hyperlipidemia refers to the aberrantly raised concentrations of the plasma lipids[1]. Hyperlipidemia is distinguished by raised plasma levels of cholesterol and triglycerides, which leads to hypercholesterolemia and hypertriglyceridemia respectively[2]. Hyperlipidemia is highly prevalent in Pakistani population[3].

Hyperlipidemias are associated with fatty infiltration of liver and cirrhosis[4]. Therefore there is a tendency towards decreased functional capacity of liver in hyperlipidaemic patients. In compromised liver function there are low levels of serum proteins[5].

Connatural plant concoctions have always been used in abundance with association to their expedient effects on health. Ginger, by itself or in combo with other herbs, has been an integral part of more than half of all time-honored herbal remedies since ages[6]. Ginger, with the botanical name *Zingiber officinale,* is linked to Zingiberaceae family[7]. Zingiber has its origins in Greek word “zingiberis” and Arabic word “zinszebil”, meaning “known already to the ancients”. Whereas the routine name ginger gets its origin from sansikrit word Sringavera, “gringa” meaning horn and “vera” meaning body[8]. Many culinary and medicinal preparations employ the use of rhizome i.e., root of ginger plant. Ginger chemically exerts its effects by its component essential oils and pungent principals[9]. Essential oils are sesquiterpene hydrocarbons and monoterpenes[10] and punjent principles comprise of zingerone, gingerol and shogaol[11].

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Ginger is pragmatic in the treatment of varied pathologies, which encompass pain, hypertriglyceridemia, irritable bowel syndrome, cardiovascular diseases, hypercholesterolemia, gastric ulcer, cancer, and microbial infections[12]. Ginger has been employed for its alleviating effects on shortness of breath, symptoms of asthma, water retention, earache, nausea, vomiting and diarrhea, in oriental medicine too[13].

New classes of drugs to manage hyperlipidemia and their associated complications are being developed steadily. Need of the hour is exploration of all those healing compounds, whose advantages are more than its side effects. Cutting -edge inquest in the terrain of pharmaceutics and augmentation of latest and enhanced drugs with less deleterious effects is mandatory. On the basis of this, in the present study, we have studied the affect of dried ginger consumption on serum protein levels in hyperlipidemic patients.

MATERIALS & METHODS

This study was randomized, single-blinded and placebo controlled. It was conducted in the Department of Biochemistry, Postgraduate Medical Institute, in collaboration with Lahore General Hospital in duration of seven months. This study was conducted in accord with Helsinki declaration of human rights. Ethical and Review Committee of PGMI, Lahore granted the approval. A total of 100 subjects were included in the study, with 50 subjects in the treatment group and 50 subjects in the placebo group. The study was performed on subjects who were hyperlipidemic patients of either sex, with an age group of 35–60 years with fasting blood levels of plasma cholesterol higher than 200mg/dL, serum triglycerides higher than 150mg/dL, serum LDL more than 130mg/dL and Serum HDL level lower than 40 mg/dL[14]. Whereas, individuals who had history of diabetes, secondary, transient ischemic

attacks, hypersensitivity to ginger, receiving any other hypolipidemic drugs, malignancy, peptic ulcer and diseases of kidney & urinary tract were excluded. Pregnant ladies were also excluded. Subjects signed an informed consent prior to participation. They refrained from ingesting any other medications known to alter lipid levels for the period of enrolment. Their history along with dietary habits was recorded in a questionnaire. The subjects did not change their medication and dietary habits during the intervention phase. Locally grown dried ginger was identified and purchased from the market. Ginger root was oven dried at 70˚ C overnight, to remove any moisture and fungal growth. It was grinded, weighed and put in capsules in a sterile environment. Placebo capsules were prepared using lactose. Baseline sampling of subjects (fasting), with ginger they normally took in diet, was done before administration of first dose of ginger. Ginger capsules (3 g/day in two divided doses) and placebo capsules were administered orally to the subjects in treatment and placebo groups respectively, for 30 days[14]. Blood samples (fasting) were collected next day after administration of the last dose of ginger. Data was reported as means ± SEM. Paired t-test was employed to compare means of pre and post intervention values. p - Value less than or equal to 0.05 was regarded as significant.

RESULTS

In treatment group, the hyperlipidemic patients showed no significant change in Serum Total Protein levels (p-value = 0.720) but showed a significant increase (p-value = 0.041) in Serum Albumin levels. However, in the placebo group, there was no significant change ((p-value = 0.690) in Serum Total Protein levels and in Serum Albumin levels (p-value = 0.067).

Table 1: Result of treatment on total serum protein

Name of parameter	Ginger (treatment) Group		P value	Result	Placebo Group		P value	Result
	Baseline Mean±SEM	After treatment Mean±SEM			Baseline Mean±SEM	After treatment Mean±SEM		
Total serum protein (mg/dl)	7.138**±0.059**	7.118**±0.061**	0.720	Not significant	7.128**±0.059**	7.118**±0.061**	0.690	Not significant

Values are expressed as mean±SEM **and p value less than or equal to 0.05 is considered significant**

Table 2 : Result of treatment on Serum Albumin

Name of parameter	Ginger (treatment) Group		P value	Result	Placebo Group		P value	Result
	Baseline Mean±SEM	After treatment Mean±SEM			Baseline Mean±SEM	After treatment Mean±SEM		
Total albumin (mg/dl)	**4.662±0.131**	**4.740±0.106**	0.041	Not significant	**4.560±0.196**	**4.660±0.106**	0.067	Not significant

Values are expressed as mean±SEM **and p value less than or equal to 0.05 is considered significant**

Fig. 1: Bar graph of effect of treatment on total serum protein

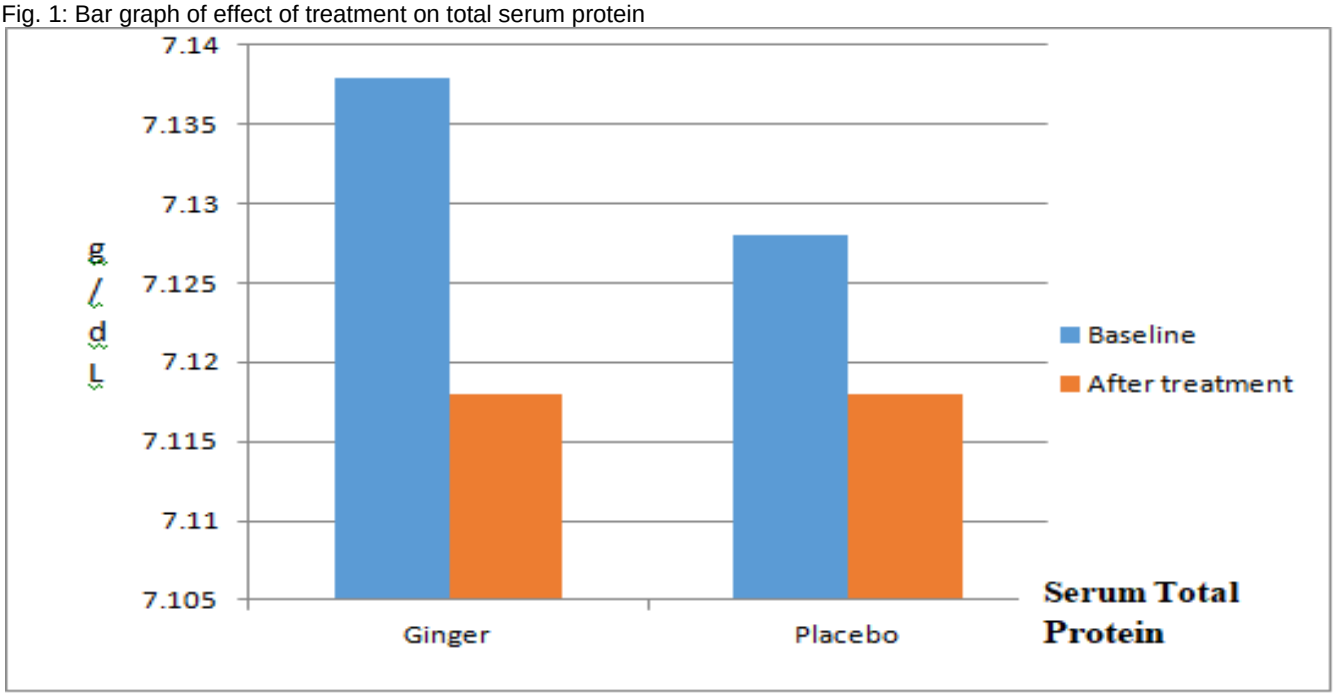
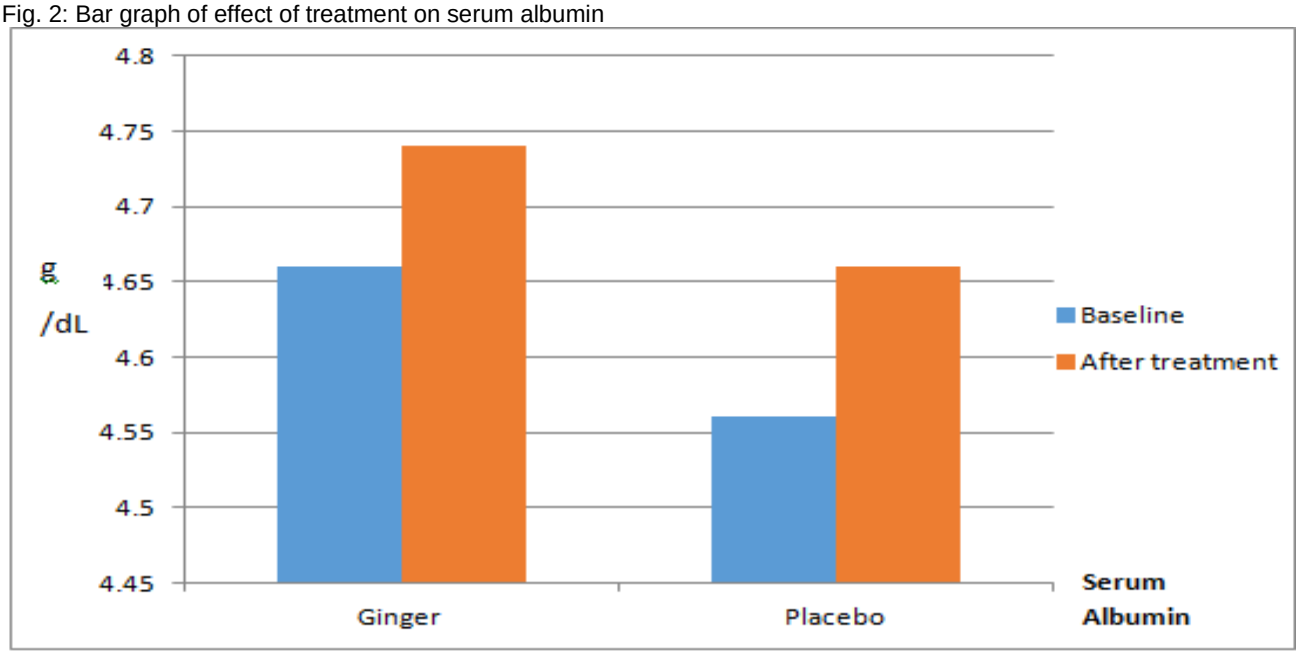


Fig. 2: Bar graph of effect of treatment on serum albumin



DISCUSSION

This research was intended to gauge the fallout of dispensation of powder of dried rhizome of ginger (*Zingiber officinale*) to hyperlipidemic volunteers. Hyperlipidemia refers to the aberrantly raised concentrations of the plasma lipids[1]. It embodies different metabolic disorders secondary to many diseases. It is distinguished by an elevation in the plasma concentrations of triglycerides and cholesterol, which leads to hypertriglyceridemia and hypercholesterolemia respectively[2]. Hyperlipidemia is highly prevalent in Pakistani population[3]. Hyperlipidemias are associated with fatty infiltration of liver and cirrhosis[4]. Therefore there is a tendency towards decreased functional capacity of liver in hyperlipidaemic patients. In compromised liver function there are low levels of serum proteins[5].

This research was carried out to gain insight into the influences the dried ginger powder might have on serum proteins. The serum Albumin levels showed a compelling raise (p-value = 0.041), after consuming 3 grams of ginger orally, for 30 days. An investigative study conducted by Modaresi and coworkers[15], also showed parallel results. The alcohol extract of *Zingiber officinale* significantly increased the levels of albumin and serum total protein in mice.

A conceivable explanation for this raise in serum proteins could be that the functional capacity of hepatocytes, which are the sites where albumin is synthesized, is being improved by ginger extract administration[15]. The ginger also had a preservating affect on liver cells. This was successfully exhibited in a research by Kazeem *et al*[16]. All this evidence points to the fact that the compromised function of liver can be reduced in hyperlipidemics by ginger consumption.

CONCLUSION

Various aesculapian properties of Zingiber officinale have been reported. It had been used for the treatment of many ailments like high cholesterol levels, migraine, morning sickness, inflammation, asthma and infections. This research culminated that dried ginger powder, if consumed in a dose of 3g/day, can significantly improve serum albumin levels in hyperlipidemic patients, compared with the placebo group patients. Therefore, the intake of ginger-based diet can help to maintain the integrity of the liver and protect it against damage.

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