

Dual effects of aspirin and Garcinia Cambogia on human blood viscosity

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Abstract

Background and objective: Prevention of bacterial adhesion is an attractive target for the development of new therapies in the prevention of bacterial infection. The aim of this study is to investigate the effects of pomegranate peel extract, vitamin C, combination of pomegranate peel extract and vitamin C & gemifloxacin on adhesion of *E.coli* to uroepithelial cells.

Methods: This study was conducted in the Department of Pharmacology, college of Medicine, AL-Mustansiriya University in 2009. Twenty patients with peripheral vascular diseases enrolled in this study. Those patients randomly allocated equally into two groups; group (A) received aspirin oral tablets 300 mg/day and group (B) received aspirin oral tablets 300 mg/day plus *Garcinia cambogia* oral tablets 500mg/day. The duration of therapy was two weeks. In this study, measurements were done for total blood viscosity, packed cell volume, serum fibrinogen, and serum cholesterol, before treatment as control and after one and two weeks of treatment.

Results: After 2 weeks treatment with aspirin there was significant reduction in plasma fibrinogen ($p < 0.05$). Combined aspirin and *Garcinia Cambogica* treatment for 2 weeks produce significant reduction in all blood viscosity parameters ($p < 0.05$) except the packed cell volume which was not affected ($p > 0.05$).

Conclusion: Aspirin and *Garcinia cambogia* produced significant and better effects than aspirin alone on blood viscosity.

Keywords: Blood viscosity, Aspirin, *Garcinia cambogia*

Introduction

Blood is a magnificent and complex fluid containing many chemical compounds to perform many functions. It constantly changes and adapts to meet the body requirements. Epidemiological, case control and clinical studies have clearly shown a relationship between blood viscosity and classical cardiovascular risk factors (cholesterol, arterial blood pressure, smoking)¹. Blood viscosity affected by many parameters such as hematocrit (packed cell volume), platelet aggregation, fibrinogen level and lipid profile². *Garcinia Cambogia* is a yellowish pumpkin shaped tropical tree fruit native to the country of India. It is well-known that hydroxycitric acid (HCA) is the principle acid found in the

Garcinia Cambogia fruit³. Several studies have demonstrated that HCA is a competitive inhibitor of adenosine triphosphate citrate lyase, the enzyme that catalyzes the extra- mitochondrial cleavage of citrate to oxaloacetate and acetyl coenzyme A⁴. This action of HCA should reduce the acetyl coenzyme A pool, thus limiting the availability of 2-carbon units required for fatty acid and cholesterol biosynthesis⁴. In vitro and in vivo studies show that HCA inhibits the actions of citrate cleavage enzyme, suppresses de novo fatty acid synthesis, increases rates of hepatic glycogen synthesis, and decreases body weight gain⁵. The aim of this study is to evaluate the effect of aspirin alone and aspirin with

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Garcinia Cambogica in combination on blood viscosity and its parameters.

Methods

This study was carried out in Department of Pharmacology, College of Medicine, Al-Mustansiriya University, Baghdad – Iraq, 2009. The study was approved by Local Scientific Committee of the institution. Twenty patients with peripheral vascular diseases enrolled in this study. Duration of their disease ranged between 1 -5 years. The age of patients ranged between 42 – 65 years with mean age of 59.4 ± 7.4 year, 15 males, and 5 females. They randomly divided into two groups:

Group A (7 males + 3 females) received aspirin 300 mg/day.

Group B (8 males + 2 females) received aspirin 300 mg/day + *Garcinia Cambogica* 500 mg/day.

All possible risk and adverse effects were explained to patients and written informed consent was obtained from them. The duration of treatment was two weeks. The laboratory tests of hematocrit (PCV), serum cholesterol and fibrinogen as well as blood viscosity measurement were performed to each one of the participants on the day 1 as baseline record and after one and two weeks of treatment. The blood viscosity was measured to each one by the method of Dunkan⁶. Accordingly, whole blood viscosity was determined using capillary viscometer (Schott gerate type 51720/111, 0.9 mm diameter, 17 cm length and 1 ml bulb size, Germany) in the shear stress of 208 seconds⁻¹. In this study a high level of shear stress (208 seconds⁻¹) was selected for two reasons: First, the correlation between estimated and actual viscosity is strongest at high levels⁷, and second, high levels of shear stress correspond best to the hemodynamics in arterioles and pre-capillary vessels where viscosity is most likely to influence flow⁸. All measurements were carried out at 37°C by incubating the viscometer in water bath. All data were analyzed using the statistical package of social

sciences (SPSS) version 15 for windows program on the computer. Data were given as mean \pm standard deviation (SD). Student t-test was used to compare mean values between groups. Statistical significance was accepted as p value < 0.05 .

Results

This study showed that treatment with aspirin (300 mg/day) alone produce non-significant effects on blood viscosity parameters during the first week of treatment ($p > 0.05$), Table 1. While treatment with aspirin (300 mg/day) plus *Garcinia cambogica* (500 mg/day) for one week produce significant reduction in whole blood viscosity and plasma fibrinogen ($p < 0.05$) with non-significant reduction of PCV and plasma cholesterol ($p > 0.05$), Table 2.

Table 1: The effects of aspirin 300 mg/day on blood viscosity parameters after 1 week of treatment

Parameters	Before Mean \pm SD	After 1 week Mean \pm SD	p value
Whole blood viscosity	6.22 \pm 0.44	6.015 \pm 0.47	> 0.05
PCV	43.4 \pm 3.08	43.30 \pm 3.130	> 0.05
Cholesterol	210 \pm 32.90	192.2 \pm 18.10	> 0.05
Fibrinogen	434.9 \pm 113.4	443.6 \pm 117.2	> 0.05

Table 2: The combined effects of aspirin 300 mg/day and *Garcinia cambogica* 500 mg/day on blood viscosity parameters after one week of treatment

Parameters	Before Mean \pm SD	After 1 week Mean \pm SD	p value
Whole blood viscosity	5.863 \pm 0.51	4.588 \pm 0.52	$< 0.05^*$
PCV	42.6 \pm 3.06	42.7 \pm 2.16	> 0.05
Cholesterol	224 \pm 32.73	217.5 \pm 6.59	> 0.05
Fibrinogen	452 \pm 107.3	296.5 \pm 16.8	$< 0.05^*$

*Significant changes.

Furthermore After two weeks of treatment with aspirin (300 mg/day) alone, there were non-significant changes in blood viscosity parameters except for fibrinogen which

showed significant reduction ($p < 0.05$), Table 3. Whereas treatment with aspirin (300 mg/day) plus *Garcinia cambogia* (500 mg/day) for two weeks produce significant reduction in all blood viscosity parameters ($p < 0.05$) except PCV which showed non-significant reduction ($p > 0.05$), Table 4.

Table 3: The effects of aspirin (300 mg/day) on blood viscosity parameters after two weeks of treatment.

Parameters	Before Mean \pm SD	After 1 week Mean \pm SD	p value
Whole blood viscosity	6.22 \pm 0.44	5.953 \pm 0.46	> 0.05
PCV	43.4 \pm 3.08	43.1 \pm 2.56	> 0.05
Cholesterol	210 \pm 32.90	192.0 \pm 18.14	> 0.05
Fibrinogen	434.9 \pm 113.4	298.5 \pm 116.8	< 0.05*

* Significant changes.

Table 4: combined effects of aspirin 300 mg/day and *Garcinia cambogia* 500 mg/day on blood viscosity parameters after two weeks.

Parameters	Before Mean \pm SD	After 2 week Mean \pm SD	p value
Whole blood viscosity	5.863 \pm 0.51	3.90 \pm 0.56	< 0.05*
PCV	42.6 \pm 3.06	42.2 \pm 2.05	> 0.05
Cholesterol	224 \pm 32.73	158 \pm 11.71	< 0.05*
Fibrinogen	452 \pm 107.3	281 \pm 90.34	< 0.05*

* Significant changes.

Consequently dual administration of aspirin and *Garcinia cambogia* produced significant and better effects than aspirin alone especially after the second week of treatment on blood viscosity parameters, Figure 1.

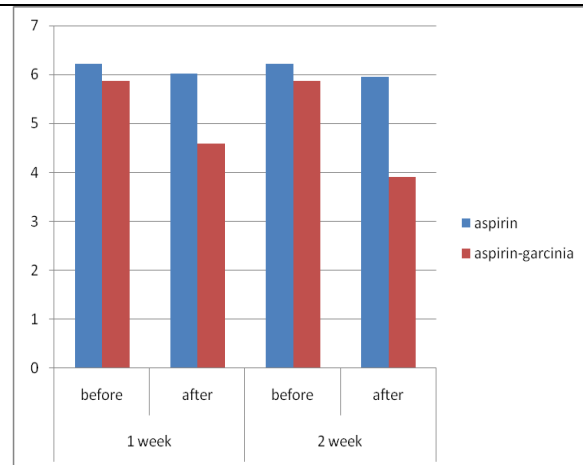


Figure 1: Effects of aspirin alone and aspirin with *Garcinia cambogia* on whole blood viscosity during first and second week of treatment.

Discussion

The present study shows that treatment with aspirin alone or in combination with *Garcinia cambogia* have favorable effects on blood viscosity. Moreover treatment with aspirin plus *Garcinia cambogia* produced significant and better effects than treatment with aspirin alone on blood viscosity. Previous study revealed clearly that aspirin have antioxidant and anti-inflammatory activities and this may explain the effects of aspirin on fibrinogen level in this study. It is well-known that Increase fibrinogen levels are a consequence of inflammatory process⁹. Interestingly in this study fibrinogen level was significantly reduced after 2 weeks treatment with aspirin and this may be related to the anti-inflammatory effects of aspirin¹⁰. this study showed that aspirin plus *Garcinia cambogia* significantly reduce blood viscosity after 1 week of treatment and this statistically significant decrease in blood viscosity may pointed out a potential role of *Garcinia cambogia* as antioxidant in addition to aspirin in the reduction of blood viscosity. Many previous studies showed that antioxidant improve blood viscosity by improve RBC rigidity and decrease fibrinogen level and inflammatory mediators¹¹⁻¹³. Moreover the present study revealed

clearly that treatment with *Garcinia cambogia* cause significant reduction in two parameters of blood viscosity, fibrinogen and plasma cholesterol, and so this leads to further reduction in blood viscosity. Interestingly in this study fibrinogen was significantly further reduced when *Garcinia Cambogia* was added to the treatment regimens and this may be related in part to the anti-inflammatory effects of hydroxycitric acid which is the main components of *Garcinia cambogia*¹⁴. In the present study adding of *Garcinia Cambogia* produce pronounced effect regarding the reduction in serum cholesterol after 2 weeks of treatment. This finding agree with previous studies which state that *Garcinia cambogia* limits the synthesis of fatty acids in the liver and muscles and thus arrest lipogenesis by inhibiting the enzyme ATP- citrate lyase^{15,16}. So with no further synthesis, the existing fatty acids are gradually metabolized, resulting in reduction of serum cholesterol. We conclude that the dual effects of aspirin and *Garcinia Cambogia* produced significant and better effects than aspirin alone on blood viscosity, so we recommend using it in treatment and/or prevention of complications of diseases that related to high blood viscosity.

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