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Research Article

EFFECT OF CARICA PAPAYA LEAF EXTRACT ON PLATELET COUNT IN DENGUE PATIENT

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ABSTRACT

India is one of the countries where the highest cases of dengue fever are reported. The number of patient and distribution area increases with increasing mobility and population density. *Carica papaya* L. belongs to Caricaceae family is a widely cultivated plant in India. The leaves of papaya are believed to boost platelet count and dengue fever patient benefit, but there are few limited work has been done by scientists on this. The objective of this study was to determine the effects of *C. papaya* leaves extract (CPE) on dengue fever patient. The study was designed with 120 subjects, which includes 80 dengue patients and 40 healthy subjects. Subjects are divided into three groups control, dengue patient and CPC treatment group. Treatment group was given 50g/day CPE up to 3 days. The results indicated that CPC group had maintained stability of hematocrit in the normal level, shorten hospitalization period and increased the platelet count significantly in dengue fever patients as compare to the control group.

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INTRODUCTION

Dengue infection is a viral infection spread by mosquitoes with the fastest spreading in the world. It occurs especially in tropical and subtropical countries. Epidemic dengue is a major public health problem in India. The incidence rate has risen thirty times according to the raising of geographical expansion towards new countries and urban to rural change, high mobilization of the citizens, climate changes, and other epidemiologic factors (WHO 2008). Till now there is no approved vaccine or drug against this dengue virus, therefore there is an urgent need of development of alternative solutions for dengue. Several plants species have been reported with anti-dengue activity. Recently, the use of alternative medicine and the consumption of plant materials have increased in many countries in the world, mostly because plant-derived drugs and herbal formulation are commonly considered to be less toxic and side effects than synthetic ones. *Carica papaya* L. (CP) is found in most tropical and subtropical countries of the world. It is a small tree, the single stem growing from 5 to 10 m tall. The leaves are large, 50 - 70 cm diameter, deeply palmate lobed with 7 lobes. The papaya plants is now cultivated commercially as a fruit in many countries of the world. In many parts of Indonesia, the fruits of papaya are much sought after by human as valuable foodstuff and have anti-hypertension activity (Eno *et al*. 2000).

Many scientific investigations have been conducted to evaluate the biological activities of various parts of CP, including fruits, shoots, leaves, rind, seeds, roots or latex. The leaves of papaya have been shown to contain many active components that can increase the total antioxidant activity in blood and reduce lipid peroxidation level, such as papain, chymopapain, cystatin, tocopherol, ascorbic acid, flavonoids, cyanogenic-glucosides and glucosinolates (Otsuki *et al*. 2010). The alkaloids, flavonoids, saponins, tannin, and glycosides are related with anti-inflammatory activity. CP leaves extract also found to have anti-bacterial effect (Romasi *et al*. 2011), anti tumor, and immunomodulator activities (Otsuki *et al*. 2010). The leaf of CP is considered as non toxic because its LD50 is more than 15 g per kg body weight (Kardono *et al*. 2003). The leaves also contain cardiac glycosides, anthraquinones, carpaine, pseudocarpaine, phenolic compounds (Owoyele *et al*. 2008), (Zunjar *et al*. 2011). In this study we observed the efficacy of CP leaves extract in treatment of dengue fever by measuring platelets and other serum parameters.

MATERIALS AND METHODS

Whole study included 120 subjects out of which 80 dengue patients and 40 control subjects, 80 patients were further sub divided into 40 dengue and 40 papaya leaf treatment group. The eligible dengue subjects were patients, male or female, ages 15 - 55 years old, with clinical criteria as high continuous

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fever with acute onset (2 - 7 days). Treatment group was treated with papaya leaf extract powder (50g/day, in two times at 5 hour interval) up to 3 days. The subject enrolment was done between July 2016 to May 2017 from Lucknow city. Blood samples were collected at baseline and after three days and the platelet count, hematocrit, TLC, Hb, SGPT and SGOT level were determined in the clinical hospital laboratory, during in the hospitalization period.

Papaya leaves extract granules preparation

We collected green papaya leaves from papaya plant and dehydrated it by using dehydrator machine. After drying make the powder by grinding in mixer. Granules were made by warm dil. Water, powder and binding agent (starch paste).

Statistical analysis

The data were presented in terms of Mean ±SD, two Groups are compared by using t test and three groups by ANOVA and "Tukey's Multiple Comparison Test" and all analysis was made using the SPSS and prism statistical software package and P value of less than 0.05 was considered, statistically significant.

RESULTS

Hematocrit and Platelet Counts in Blood (HCT and PLT)

Normal range of HCT for men is 38.8 to 50 percent and for women, 34.9 to 44.5 percent. The reference range of platelet count in human is 150000 - 400000 /µL. At the base line HCT percentage change in patient group was significantly higher as compare to the control. After treatment of papaya leaves extract, HCT percentage change significant reverses back in treatment group as compare to patient group but change is not significant when compared with the control group. It means papaya leaves extract treatment completely normalised the HCT change.

At the base line platelet count was significantly lower in the patient group as compare to control group indicating the presence of Dengue. After treatment of papaya leaves extract Papaya leaves extract treatment significantly increased the platelet count in treatment group but there were significant differences among treatment, patient and control groups. So our data indicated that papaya leaves extract treatment had positive effect for treating dengue but it could not normalise platelet count completely.

Haemoglobin and Total Leukocytes Count (TLC) in Blood

The normal range for haemoglobin is: for men, 13.5 to 17.5grams per decilitre and for women, 12.0 to 15.5 grams per decilitre and the normal range of TLC is 4000-10000/µl.

Haemoglobin level was significantly lesser as compare to control at base line. After the treatment of papaya leaves extract, there were no effect on treatment group as compare to patient group and control group. So, we can conclude that papaya leaves extract does not have any effect on haemoglobin level.

Total Leukocytes Count (TLC) was significantly increased at base line but there are no differences after treatment when compare with patient group and control group.

Serum glutamic-oxaloacetic transaminase (SGOT) and Serum glutamic pyruvic transaminase (SGPT)

There is no significant difference SGPT level in dengue subject and control subject at baseline and also at 3 days in Normal (Control), Dengue patient (Patient) and papaya leaves Extract treatment (treatment) groups. However, SGOT was increased significantly in dengue patient which did not revert at normal level with 3 days treatment of papaya leaves Extract.

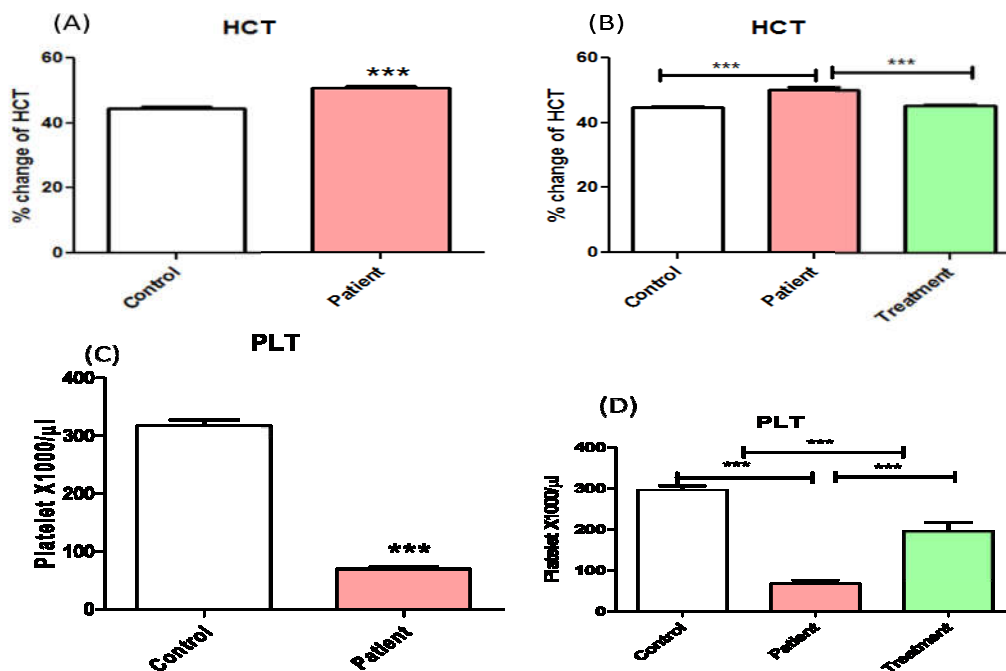


Fig1 (A)-Hematocrit percentage in Normal(control) and Dengue patient (patient) at baseline (0 day), (B) Hematocrit percentage in Normal (Control), Dengue patient (Patient) and papaya leaves Extract treatment (treatment) groups after 3 days , (C)- Platelet count in Normal(control) and Dengue patient (patient) at baseline (0 day), (D) Platelet count in Normal (Control), Dengue patient (Patient) and papaya leaves Extract treatment (treatment) groups after 3 days (***) P value, P ≤ 0.0001).

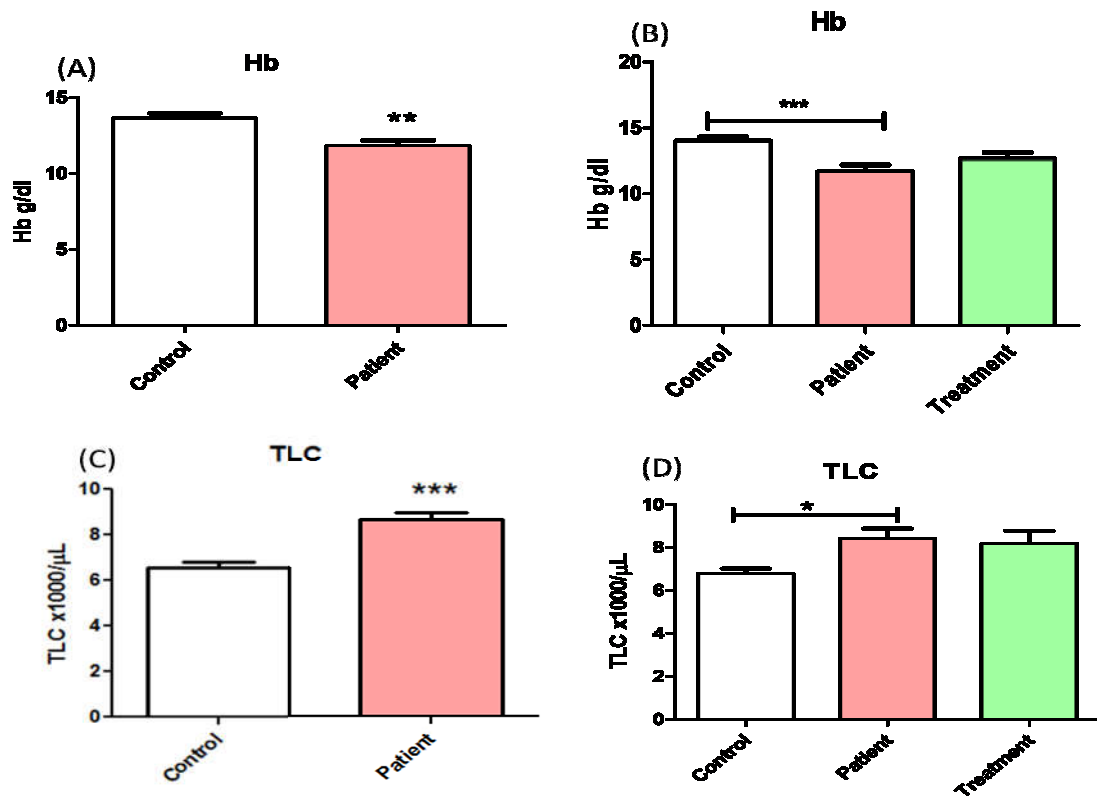


Fig 2 (A)-Haemoglobin Level in Normal (control) and Dengue patient (patient) at baseline (0 day), (B) Haemoglobin Level in Normal (Control), Dengue patient (Patient) and papaya leaves Extract treatment (treatment) groups after 3 days, (C)- TLC count in Normal(control) and Dengue patient (patient) at baseline (0 day), (D) TLC count in Normal (Control), Dengue patient (Patient) and papaya leaves Extract treatment (treatment) groups after 3 days. (**P value, $P \leq 0.0001$, (**P value, $P \leq 0.001$, (*P value, $P \leq 0.01$)

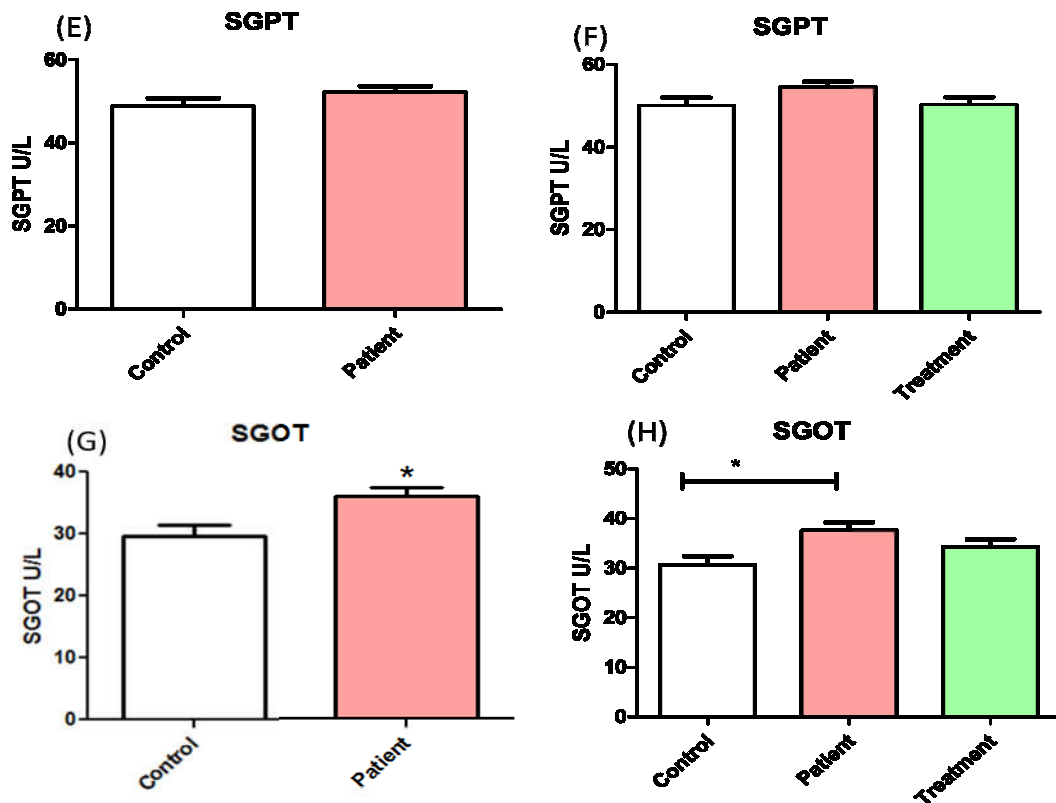


Fig 3 (E) SGPT Level in Normal(control) and Dengue patient (patient) at baseline (0 day), (F) SGPT Level in Normal (Control), Dengue patient (Patient) and papaya leaves Extract treatment (treatment) groups after 3 days (G) SGOT Level in Normal(control) and Dengue patient (patient) at baseline (0 day),(H) SGOT Level in Normal (Control), Dengue patient (Patient) and papaya leaves Extract treatment (treatment) groups after 3 days (*P value, $P \leq 0.01$)

CONCLUSION

The main objective of the study is to investigate the importance of *C. papaya* leaves extracts in Dengue fever. As *C. papaya* contains two important biologically active compounds viz: chymopapain and papain which are widely used for digestive disorders. Other active compounds of *C. papaya* are lipase, a hydrolase. Further Seeds and fruits are excellent antihelminthic and antiamebic (Okeniyi JA *et al.*). in addition to dried leaves, latex, ripe fruits, unripe fruits, seeds, seeds juice, root, flower and stem bark of *C. papaya* are used as antimicrobial, anthelmintic, antimalarial, antifungal, antiamebic, hepatoprotective, male and female antifertility, immunomodulatory and against histaminergic (Karishna KL *et al.*). The dengue attacks start in late summer and end in early winter in India. Most patients infected are in the age of 20-45 years old. The Dengue fever repeats every year and causes several deaths. The rise of PLT count in the present study indicates that *C. papaya* leaves extract have strong activity against dengue. So, *C. papaya* leaves extract could be used as an additional or as a complementary drug in dengue fever patients, which accelerates the increased in platelet count, and shorten the hospitalization period. However, this is a preliminary work and more works, *C. papaya* leaves are still required which may help in control of such dangerous diseases.

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