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Fitoterapia 79 (2008) 433 – 438

FITOTERAPIA

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Cardioprotective effect of 'Marutham' a polyherbal formulation on isoproterenol induced myocardial infarction in Wistar rats

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Received 17 January 2007; accepted 18 January 2008
Available online 6 June 2008

Abstract

Myocardial infarction is the number one killer disease in many parts of the world. The cardioprotective effect of Marutham, a polyherbal formulation on serum and heart tissue lipids, serum lipoproteins and heart membrane bound enzymes in isoproterenol induced myocardial infarction was studied in Wistar rats. Pretreatment with Marutham at different doses of 30, 60 and 90 mg kg^{-1} to isoproterenol treated rats significantly prevented the altered lipid profile and membrane bound enzymes to near normal status. The results of our study showed the cardioprotective potential of Marutham on isoproterenol induced myocardial infarction in rats.

Keywords: ATPases; Isoproterenol; Lipids; Myocardial infarction; Marutham

1. Introduction

Myocardial infarction (MI) is one of the main causes of death from cardiovascular disease. An increased risk of coronary heart disease (CHD) is associated with high levels of serum total cholesterol [1] and low density lipoprotein (LDL) [2] and decreased levels of high density lipoprotein (HDL) [3]. Isoproterenol (ISO) is a synthetic β-adrenergic agonist that causes severe stress in the myocardium, resulting in infarct like necrosis of the heart muscle [4]. Moreover, ISO promotes lipolysis in the myocardium [5] and thus an increase in the concentration of myocardial lipids [6]. In traditional practice, medicinal plants are widely used in many countries for the treatment of various diseases. Combined extracts of herbs are used as the drug of choice rather than individual plant extracts.

Marutham is a polyherbal formulation containing eight plant constituents. The Marutham constituents are known to possess cardioprotective, anti-hyperlipidaemic and antioxidant properties. According to Ayurvedic text, a combination of substances is used to enhance the desired action and eliminate unwanted side effects. Phytomedicine if combined with the preventive model of medical practice, could be among the most cost effective practical ways to shift the focus of modern cardiovascular disease treatment to prevention or cardioprotection. In the present communication, we

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doi:10.1016/j.fitote.2008.01.009

Table 1
Composition of Marutham

Plants and their parts used	Concentration (mg per capsule)
Allium sativum (bulb)	20 mg
Withania somnifera (tuber)	50 mg
Glycyrrhiza glabra (roots)	20 mg
Wedelia calendulaceae (stems and leaves)	20 mg
Nelumbium speciosum (petals)	100 mg
Tinospora cordifolia (stems)	20 mg
Emblica officinalis (fruits without seeds)	20 mg
Terminalia arjuna (bark)	100 mg
Silasathu parpam	20 mg
Sangu parpam	20 mg
Pavazha parpam	30 mg
Sirungi parpam	20 mg
Ayachendooram	20 mg

examined the preventive effect of Marutham on lipids, lipoproteins and membrane bound enzymes (ATPases) on ISO-induced myocardial stress in rats.

2. Experimental

2.1. Preparation of Marutham

Marutham is a polyherbal formulation containing eight plant constituents. All the different plant parts (Bulb of *Allium sativum*, tuber of *Withania somnifera*, roots of *Glycyrrhiza glabra*, stems and leaves of *Wedelia calendulaceae*, petals of *Nelumbium speciosum*, stems of *Tinospora cordifolia*, fruits without seeds of *Emblica officinalis* and bark of *Terminalia arjuna*) were collected fresh from Erode district, Tamilnadu, India and shade dried. All the plants were identified by a Botanist. All the plant parts were ground and powdered. All the other ingredients (Silasathu parpam, Sangu parpam, Pavazha parpam, Sirungi parpam and Ayachendooram) were also ground and powdered. Finally, the powdered plant parts and parpam were mixed in the concentration for one capsule as given in Table 1.

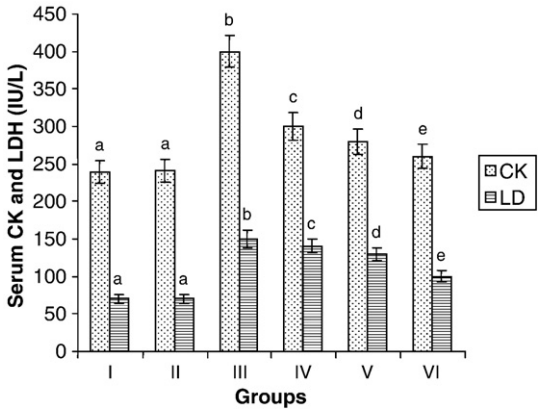

Fig. 1. Effect of Marutham on the activities of serum creatine kinase (CK) and lactate dehydrogenase (LDH) in normal and isoproterenol (ISO) treated rats. Each value is mean ± S.D for six samples in each group. Values not sharing a common letter (a, b, c, d, e) differ significantly at $P<0.05$ (DMRT). Group I, normal untreated rats. Group II, normal rats + Marutham (90 mg/kg). Group III, ISO-treated rats. Group IV, Marutham pretreated rats (30 mg/kg) + ISO. Group V, Marutham pretreated rats (60 mg/kg) + ISO. Group VI, Marutham pretreated rats (90 mg/kg) + ISO.