Cardioprotective Effect of Parawata Shakrit (Fecal matter of Pigeon) in Isoprenaline induced Myocardial Ischaemia in Rabbits

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INTRODUCTION

Medicine is an ever changing science. Research focusing on the causes diagnosis, treatment and prevention of heart diseases is moving ahead rapidly. IHD occurs due to disparity between supply and demand. It leads to decreased oxygen supply or ischaemia and is followed by necrosis if further supply decreases. Coronary artery atherosclerosis is common among all causes of decreased blood supply.

EPIDEMIOLOGY:

Heart disease has been labelled as single largest killer of the world. Cardiovascular diseases constitute the leading cause of death in men in economically developed countries. In women, it is the second or third leading cause. CVS death rate per lakh population in India in 2000 for Males and Females was 146& 126 respectively. This figures are projected to be 295 & 239 in 2015.

According to Acharya Charak, the thing and disease are derived from ahara. The ahara is passing through different complex metabolic pathway and is processed to end metabolites at cellular levels. In this processing of absorbed nutrients, dhatushama, srotas and vyana vata participate in action. Vyana vata is responsible to circulate rasa dhatu throughout body at desired rate of metabolic demand. Acharya Chakrapani states that the diffusion of rasa means, not only rasa, but all dhatu which have fluidity, i.e. rasaraktdi ambu like dhatu. The continuous diffusion between extra cellular and intra cellular fluid maintain the normal physiological state i.e. homeostasis in body. Demand is determined by the
action of dhatusma and supply is concerned with vyanvata and srotas. Hence, if abnormality develops in anyone among them, it leads to impaired circulation, abnormal dhatu production and subsequently by pathological state i.e. disease.

PATHOGENESIS

Ayurveda the science of life, is full of uncountable secret, out of those one is Parawata Shakrit (Fecal matter of Pigeon), mentioned in Charak Samhita Chikitsasthan 4/72. This drug is indicated for grathita rakta (thrombosis), common cause of IHD because the drug is fecal matter, hence it was essential to prove the drug in experimental animal model.

As the rabbits have a coronary arterial pattern akin to human, it was felt worthwhile to test the feasibility of producing myocardial ischaemia in them by slow iv administration of isoprenaline and simultaneously recording ECG events. Objective being to evaluate the curative effect of Parawata-Shakrit in induced myocardial ischaemia in rabbits before the use of drug in man.

MATERIAL & METHODS

<table>
<thead>
<tr>
<th>Test article</th>
<th>– Fecal matter of Pigeon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic</td>
<td>– Yellowish brown powder</td>
</tr>
<tr>
<td>Test system</td>
<td>– Rabbit</td>
</tr>
<tr>
<td>Strain</td>
<td>– Albino</td>
</tr>
<tr>
<td>Body weight range</td>
<td>– 1 to 1.5 kg.</td>
</tr>
<tr>
<td>Number of animals</td>
<td>– Per group – 6</td>
</tr>
<tr>
<td>Total number of group</td>
<td>– 3</td>
</tr>
</tbody>
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All eighteen rabbits were sedated by diazepam, iv 2mg/kg. Isoprenaline 2mg/kg dissolved in 25 ml of normal saline was infused through marginal ear vein at the rate of 4 drops per minute for a period of 2 hours for two consecutive days to induce MI.

**Group I** :- This group was treated as Control group

**Group II** :- Treatment group

Animals of this group were treated with Parawata – Shakrit powder suspension (1gm/kg P.O.) at 3 hrs. and 12 hrs. after the completion of second dose of isoprenaline infusion on second day.

**Group III** :- Treatment group

Animals were treated with Parawata-Shakrit powder suspension (1gm/kg P.O.) at 24 hrs. and 36 hrs. after the completion of second dose of isoprenaline infusion on second day.

**Parameter**

► The blood was collected from each animal for testing of AST, Sugar, Cholesterol and Clotting time.

► The twelve leads ECG was recorded in each animals on day-0, day-1, day-2, day-3, day-4 and day-5, ECG of day-0 was taken as normal ECG, on day-1 & day-2 ECG was taken immediate after completion of isoprenaline infusion.

► Animals were observed for clinical features related to overstimulation of sympathetic nervous system, viz heart rate, breathlessness, discomfort, foaming, lacrimation urination and defecation.

► On fifth day of isoprenaline infusion the animals belonging to each group were sacrificed. Heart was dissected and preserved in 10% formaldehyde solution. The biopsy of heart was carried out to study gross and microscopic pathological changes.

**DISCUSSION AND CONCLUSION**

The characteristic features of distress and shock following the isoprenaline infusion was observed in rabbits in this study, were similar to clinical features seen in AMI in human.

The presence of deep and widened Q-wave, ST segment elevation or depression & T-wave inversion were present in ECG of rabbits following the isoprenaline
infusion. Tachycardia was also noted in all ECG. These were accompanied by increase in SGOT level which reflects the severity of myocardial damage.

Animals of control group exhibited diffuse microscopic myocardial lesions suggesting ischaemia. Infiltration of mononuclear cells, acute congestion or oedema, reflects inflammatory changes in myocardium of control group rabbits.

In group II significant beneficial effects were observed on ECG findings. The ECG of day 3, 4, & 5 revealed small Q wave, normal ST segment and T wave, in one animal T-wave inversion was persisting upto day-5, but ST segment was normal. Microscopic study also revealed the less severity of myocardial ischaemia in comparison with control group. SGOT level shifted to normal on day-3. In this study parawata shakrit, given at 3 hours and 12 hours following isoprenaline induced ischaemia in rabbits showed significant reduction in myocardial ischaemic events.

Group III showed good response in reduction of induced MI. ECG findings of day 4 and day 5 revealed almost normal findings. There was normal ST segment and microscopic study indicates the reduction in MI as compared to control group.

The effects of drug in reducing the Myocardial ischaemia is less in group III than group II, but reduction was significant. As per comparative study with other available thrombolytic drugs, as mentioned in text, this drug was observed effective even after 24 hrs. of onset of myocardial ischaemia.

The reduction in extent of ischaemia in group III indicates that the drug may develop reperfusion in area even after 24 hours of onset of ischaemia, which is not possible by available modern drug like streptokinase etc. Parawata Shakrit by inducing fibrinolytic or thrombolytic mechanism may reperfuse the area. Vasodilatation may be another mechanism through which drug may exert its action.

Action of drug is either on clotting mechanism, or on platelet aggregation and or on prostaglandins which develop vasodilatation and help in reperfusing the affected area.

It may concluded that Parawata Shakrit is devoid of acute and subacute toxicity and is effective to reperfuse the area of myocardial ischaemia. The drug has both cardioprotective as well as curative effect in Ischaemic heart disease.