MEDICINAL PLANTS USAGE IN CARDIO VASCULAR DISEASES: A REVIEW

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ABSTRACT

Medicinal plants have been used as medicine since the beginning of civilization have become mainstays of human pharmacotherapy. Cardiovascular disease is the major cause of death in advanced countries. The history of herbology is inextricably intertwined with that of modern medicine. Many drugs were originally derived from plants. The plant derivatives remain the basis for a major proportion of the commercial medications used today for the treatment of heart disease, high blood pressure, pain, asthma, and other diseases. Herbal medicine is oldest form of health care known to mankind. Herbs have been used by all cultures throughout history. The knowledge of herbal medicine dates back from prehistoric times and has been transferred from generation to generation. For cardiac diseases, herbal treatments have been used in patients with congestive heart failure. Several plants, including Terminalia arjuna, Inula racemosa, and Astragalus membranaceus, have been found to have therapeutic usage for the treatment of cardiovascular disease. The bark of the Terminalia arjuna tree has a long history of used as a cardiac tonic as well, and has been indicated in the treatment of coronary artery disease, heart failure, hypercholesterolemia, and for relief of anginal pain. Additionally, it has been found to have antibacterial and antimitagenic properties. Inula racemosa, is another traditional Ayurvedic botanical that has potential cardioprotective benefit. In human trials, a combination of Inula racemosa and Commiphora mukul was shown to be superior to nitroglycerin in reducing the chest pain and dyspnea associated with angina. Clinical studies have indicated that its in vitro antioxidant activity is the mechanism by which it affords its cardioprotective benefit.
Continuing research is necessary to elucidate the pharmacological activities of the many herbal remedies now being used to treat cardiac diseases. This review highlighted herbal medicines that affect the cardiac system both in terms of efficacy and safety as reported from the scientific literature and issues concerning use of herbal medicines that is available. These herbs are categorized under the primary diseases they treat. However, most herbal medicines have multiple cardiovascular effects that frequently overlap. This study presents a investigation of the importance of natural products from plants and also includes a brief discussion on platelet aggregation and myocardial infarction, phytochemicals from plants & usage in cardiac diseases, pharmacology and cardio-vascular application, cardiovascular natural products and their effects, congenital heart disease & cardiovascular diseases.

**KEY WORDS:** Cardio vascular diseases, medicinal plants, pharmacology, phytochemicals, platelet aggregation.

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**INTRODUCTION**

Cardiovascular disease is a term used to describe a large range of diseases that affect the heart or blood vessels. There are various diseases considered as cardiovascular disease includes coronary artery disease, heart attack, heart failure, high blood pressure and stroke. The term cardiovascular disease" is often used interchangeably with “heart disease” because both terms refer to diseases of the heart or arteries. Whatever name is used —cardiovascular disease or heart disease – it is clear that diseases of the heart and blood vessels are serious problems. Cardiovascular disease is the number one worldwide killer of men and women (John Vorstermans, 2007).

Cardiovascular disease is an established chronic disease for the population of developed and developing countries. Chronic diseases are illnesses that are prolonged, do not resolve spontaneously, and are rarely cured completely. Cardiovascular disease refers to variety of diseases and conditions affecting the heart and blood vessels. The major cardiovascular diseases are coronary Cardiovascular Disease (CHD), myocardial infarction (MI), stroke and congestive heart failure (CHF). Cardiovascular diseases are preventable. This disease causes a significant burden in mortality, morbidity, and health care cost. Despite the gradual decline in
cardiovascular death rates over the last few decades, these diseases are and will remain the number one cause of death in industrialized countries. In this region, 48.6 percent of deaths were caused by cardiovascular disease in the year 2000 (WHO, 2002). By 2020, 46.4 percent deaths are expected to be attributable to CVD in this region. Moreover, CVD will soon become the main cause of death and disability in the developing world as well; by 2020, a third (33.8 percent) of all deaths are expected to be due to CVD (WHO, 2002). In the year 2000, 16.7 million people died from CVD, accounting for 30.3 percent of all deaths worldwide; more than half of these deaths were in developing countries (WHO, 2001). Not only is cardiovascular disease a considerable health burden (e.g. high morbidity and high mortality), it causes also a significant health care cost (i.e. economic burden), which will continue to grow as the population ages.

The ongoing economic and technological developments taking place in the developing countries will in all likelihood cause the pattern seen in developed world to be repeated. The epidemic of cardiovascular disease is expected initially to emerge in those who are wealthy and subsequently to spread to those who are less wealthy. Likewise, when the epidemic starts to slow, this will first become apparent among the affluent, with the disease continuing to have a high prevalence in those who live in poverty. The burden of CVD, although already high in developed world, is therefore expected to increase on a global scale as the developing countries start to contribute significantly to this (WHO, 2002). The presence of rising CVD underscores the imperative need to develop effective and appropriate prevention policies.

Spices were the most valuable items of trade in the ancient and medieval world. Herbalist and folk practitioners have used plant remedies for centuries, but only recently have scientist begun to study the powers of common herbs and spices. In the current set-up, the anti-proliferative, anti-hyper cholesterolemic, anti-diabetic, anti-inflammatory effects of spices have overriding importance, as the key health concern of mankind nowadays is diabetes, cardiovascular diseases, arthritis and cancer. Spices or their active compounds could be used as possible ameliorative or preventive agents for these health disorders. Spices are rich in antioxidants, and scientific studies suggest that they are also potent inhibitors of tissue damage and inflammation caused by high levels of blood sugar and circulating lipids. Because spices have very low calorie content and are relatively inexpensive, they are reliable sources of antioxidants and other potential bioactive compounds in diet. Some spices used in the Indian
kitchen for its flavour and taste which are potential to maintain a healthy heart (Hannah R. Vasanthi and Parameswari, 2010).

**Effects on platelet aggregation and myocardial infarction**

Ten small, randomized trials, all but one in adults and of short duration, showed promising effects of various garlic preparations on platelet aggregation and mixed effects on plasma viscosity and fibrinolytic activity. Because the trials had only 409 participants, short follow-up periods, unclear randomization processes, no intention-to treat analyses, missing data, and variability in techniques used to assess outcomes, no firm conclusions can be drawn. There were insufficient data to confirm or refute effects of garlic on clinical outcomes such as myocardial infarction. One 3-year randomized trial with 492 participants found no statistically significant decreases in numbers of myocardial infarctions and deaths when placebo was compared with 6 to 10 grams of garlic ether extract. Overall, the data suggests that the reductions, averaging between 12-25 mg/dl were the greatest in patients treated with the garlic products for 3 months. Decreases in Low density lipoprotein level have been reported. However, for some placebo-controlled trials, no significant garlic-associated reductions in total cholesterol were observed even after 6 months of treatment. The conflicting data regarding garlic’s hypocholesterolemic actions may be due to flawed trial design, differences in types of garlic preparations used, doses administered, duration of use and heterogeneity in subject profiles. Of interest is a recent report examining whether improved delivery of bioactive garlic constituents could explain discordant findings. When men and women were collectively evaluated following ingestion of a garlic oil preparation, only total antioxidant indices were significantly improved after 6 weeks treatment. Yet when evaluated by gender high density lipoprotein level-C and total cholesterol were significantly improved for women only. Thus gender and bioavailability of preformed bioactives may also explain disparate results. In addition to lipid-lowering actions, garlic preparations have been studied in humans for other potential cardiovascular disease (CVD) benefits. Blood pressure reduction normalization of glucose and insulin response, and frequency of myocardial infarctions have been evaluated to a very limited degree with no consistent conclusions (Gail B. Mahady, 2000).
Phytochemicals from plants & Usage in cardiac diseases

Neferine also resembles tetrandrine in structure but has been isolated from seeds of *Nelumbo nucifera* (Li et al., 1990). Its mechanism of action is unclear and it seems to have both calcium antagonist and quinidine-like activity on the heart. The stem bark of *Terminalia arjuna* (Roxb.) is used by the Ayurvedic physicians in India for the treatment of various cardiovascular diseases, collectively referred to as hritroga. It has been extensively studied in animal models to demonstrate cardioprotective properties, ranging from positive inotropic-, hypolipidemic-, coronary vasodilatory- and antioxidant effects to induction of stress protein in heart. Various bioactive compounds, like triterpinoids, tannins, flavonoids and minerals have been isolated from the stem bark. A number of clinical studies have also reported its beneficial effects in patients of chronic stable angina, endothelial dysfunction, heart failure and even ischemic mitral regurgitation. However, there are some identified lacunae, like standardisation of the 'drug', toxicity studies along with pharmacological interactions with other drugs and large multicentre randomized clinical trials, before its use by modern medicine is acceptable (Maulik and Katiyar, 2010).

Miller AI (1998) reported that plants including *Crataegus oxyacantha, Terminalia arjuna, Inula racemosa*, and *Astragalus membranaceus*, have been found to have therapeutic benefit for the treatment of cardiovascular disease. *Crataegus oxyacantha* has been used traditionally as a cardiac tonic and current uses include treatment for angina, hypertension, arrhythmias, and congestive heart failure. Animal studies have also indicated that Crataegus extracts may also have potential use as anti-ischemic and lipid-lowering agents. The bark of the *Terminalia arjuna* has a long history of use as a cardiac tonic as well, and has been indicated in the treatment of coronary artery disease, heart failure, hypercholesterolemia and for relief of anginal pain. Additionally, it has been found to have antibacterial and antimutagenic properties. *Inula racemosa*, also known as Pushkarmool, is another traditional Ayurvedic botanical that has potential cardioprotective benefit. In human trials, a combination of *Inula racemosa* and *Commiphora mukul* was shown to be superior to nitroglycerin in reducing the chest pain and dyspnea associated with angina..

Lokhande et al.(2006) used the roots of the plant *Inula racemosa* as folk medicine in east Asia and Europe. Inula racemosa in combination with Commiphora mukul was reported to cure myocardial ischemia. However, systematic investigation of the plant for its specific role in
heart diseases has not been conducted so far. In the present study, we have reported the isolation of four major constituents A, B, C and D along with some minor constituents from the plant *Inula racemosa*. Among the major constituent, constituent D has been selected first from spectral data and studied for its cardiac activity on isolated frog heart. The experimental data show that constituent D decreases heart rate and force of contraction at 40 mcg/ml. Actions of Adrenaline are blocked by constituent D and it also acts as an agonist for Propranolol. The studies indicate that constituent D produces a negative ionotropic and negative chronotropic effect on frog's heart. These studies can be utilized as a cardiac marker for exploring the cardiac activity of the plant *Inula racemosa*.

Cardiac glycosides were found to be present in *C. asiatica*, a compound that has been shown to aid in treatment for congestive heart failure and cardiac arrhythmia. This is another reason why this plant is widely used in traditional medicine. Cardiac glycosides work by inhibiting the Na$^+$/K$^+$ pump. This causes an increase in the level of sodium ions in the myocytes, which then leads to a rise in the level of calcium ions. This inhibition increases the amount of Ca$^{2+}$ ions available for contraction of the heart muscle, improves cardiac output and reduces distention of the heart (Krishnaiah et al., 2009).

Vasanthi et al. (2012) opined that many traditional plant based medicines are playing an important role in health care. Phytochemicals are natural bioactive compounds found in vegetables, fruits, medicinal plants, aromatic plants, leaves, flowers and roots which act as a defense system to combat against diseases. The phytochemicals from natural products cover a diverse range of chemical entities such as polyphenols, flavonoids, steroidal saponins, organosulphur compounds and vitamins. A number of bioactive compounds generally obtained from terrestrial plants such as isoflavones, diosgenin, resveratrol, quercetin, catechin, sulforaphane, tocotrienols and carotenoids are proven to reduce the risk of cardiovascular diseases and aid in cardioprotection which is the leading cause of death globally. The cardioprotective effects of the various phytochemicals are perhaps due to their antioxidative, antihypercholesteremic, antiangiogenic, anti-ischemic, inhibition of platelet aggregation and anti inflammatory activities that reduce the risk of cardiovascular disorders. The multi-faceted role of the phytochemicals is mediated by its structure-function relationship and can be considered as leads for cardiovascular drug design in future.
Pharmacology and cardio-vascular application

The areas of pharmacological and cardiovascular applications have been investigated and reported by many workers (Petkov, 1979; Patel et al., 1982; Satyavati, 1988; Weiss, 1988; Ceriana, 1992; Singh et al., 1993; Leuchtgens, 1993; Schussler et al., 1995; Chatterjee et al., 1997; Zafar Alam Mahmood et al., 2010). These include: hypolipidemic action (which has been recognized since the vedic ages) and its antiinflammatory effect. The hypolipidemic action was pioneered by the laboratory investigations carried out by the research workers based on the postulation of Sushruta that guggul is very useful in the treatment of obesity. It is reported that the uptake of LDL-cholesterol from the blood by the liver increases due to Guggulsterones consequently the concentration of LDL also decreases (Satyavati, 1988). The stereo isomers E- and Zguggulsterone have been reported as main component in Guggul lipid (an antagonist ligands for the bile acid receptor farnesoid X receptor (FXR)) are responsible for hypolipidemic activity (Urizar and Moore, 2003; Zafar Alam Mahmood et al., 2010).

Cardio protective and anti-hyperlipidemic activity of ethyl acetate extract of Commiphora mukul has been reported to possess preventive activity against deteriorating changes in serum cholesterol, triglycerides, and plasma fibrinogen level in lab animals. Further, increase in plasma fibrinolytic activity has also been noted (Srivastava, 1991). The oleoresin part of guggul, at a dose of 12.5 mg/100g has been noted to produce pronounced anti-arhritic and anti-inflammatory activities (Sharma and Sharma, 1977). Few side effects such as weight loss, peptic ulcer have been noted in lab animals fed on extract against those, given betamethasone (Satyavati, 1991). Clinical study was carried out on patients (35 in number) with rheumatoid arthritis using guggulipid and based on this study results, dose requirement side effects along with change in hematology were recorded. Results of the study were very encouraging and showed the digestive and analgesic activity of guggulipid with no toxic or side effects (Antonio et al., 1999). In another study 20 patients with hyperlipidemia were given guggulipid in two different dose level and noted to decreased total cholesterol and triglyceride concentration. In addition, a gradual increase in HDL level and significant decrease in LDL and VLDL have been recorded at the end of study (Verma and Bordia, 1988). Few minor side effects, such as mild diarrhea and nausea were among patients kept on guggulipid. Other side effects, such as raise in bilirubin levels, hemolysis of blood, hepatitis, and obstruction of the biliary tract need to be confirmed (Murray, 1995; Zafar Alam Mahmood et al., 2010).
Cardiovascular natural products and their effects

A number of plants are reported to contain cardiac glycosides. Cardiac glycosides or cardenolides are steroidal in nature with an attached lactone group. They inhibit the membrane bound sodium-potassium ATPase pump resulting in depletion of intracellular potassium and an increase in serum potassium. This results in a decrease in the electrical conductivity through the heart tissue causing a decrease in the heart rate, and increasing cardiac output (Kamlesh K. Bhutani & Vikrantsinh M.Gohil, 2010).

*Thevetia nerifolia* is reported to contain thevitin A, B and peruvoside which are potent cardiac glycosides found in all parts of the plant and with high concentration in the fruits (Bose et al., 1999). *Rauwolfia serpentina* was first tested in India for antihypertensive activity (Vakil, 1949) However, the active principle Reserpine was isolated and studied abroad (Bein, 1953; Muller et al., 1952). It exhibits its action by inhibiting monoamine oxidase (MAO). *Terminalia arjuna* bark has been used for the treatment of symptoms similar to angina in the traditional Indian system of medicine Arjunolic acid isolated from this plant has been shown to provide significant cardiac protection in isoproterenol induced myocardial necrosis in rats (Sumitra et al., 2001). The *Coleus spp.* have been reported in the *Ayurvedic materia medica* for the treatment of heart diseases. Coleonol (or Forskolin as it is known now) isolated from this plant at CDRI, Lucknow (Tandon et al., 1977), has been shown to possess hypotensive action and positive inotropic effect on the heart (Dubey et al., 1981; Kamlesh K. Bhutani & Vikrantsinh M.Gohil, 2010).

Cardiovascular effects

Berberine has been reported to have protective effects against cardiac arrhythmias and severe congestive heart failure (Pan et al., 2002; Pan GY et al., 2002; Zhou et al., 2001). This physiological effect is due to the ability of berberine to prolong action potential duration and inhibit the inward rectifier potassium current and outward delayed rectifier potassium current (50–100 μM). Berberine has also been shown to inhibit the human ether-a-go-go-related channel expression in Xenopus oocytes (median effective dose was 95 μM). In rats, Langendorff perfusion of an isolated heart was performed using verapamil to bring about acute heart failure. Treatment of the heart with berberine (10 μmol/l) before the use of verapamil significantly reduced the degree of heart failure as compared with the control group (p < 0.001) (Zhou et al.,
2001;WHO,2009).

**Congenital heart disease & cardiovascular diseases**

According to Lokhande et al. (2006) and *Caraka Samhita* of Agnivesa, plants are termed as cardiac tonic as follows:

<table>
<thead>
<tr>
<th>Botanical Name/Family</th>
<th>Useful parts</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Magnifera indica</em> Linn. (Anacardiaceae)</td>
<td>Fruit</td>
</tr>
<tr>
<td><em>Gmelina asiatica</em> Linn. Verbenaceae</td>
<td>Fruit</td>
</tr>
<tr>
<td><em>Carissa carandas</em> Linn. Apocynaceae</td>
<td>Fruit, Bark, Leaves</td>
</tr>
<tr>
<td><em>Garcina indica</em> Choisy Guttifereae</td>
<td>Fruit</td>
</tr>
<tr>
<td><em>Garcinia pedunculata</em> Roxb. (Guttifereae)</td>
<td>Fruit</td>
</tr>
<tr>
<td><em>Punica granatum</em> Linn. Lythraceae</td>
<td>Flowers, Fruits</td>
</tr>
<tr>
<td><em>Citrus medica</em> Linn. Rutaceae</td>
<td>Fruit</td>
</tr>
</tbody>
</table>

(Source: Lokhande et al., 2006)

*Emblica officinalis* Gaertn. is used to rebuild and maintain new tissues and increases red blood cell count. It is the highest natural source of vitamin C and reduces mucous in the throat and maintaining health. In Ayurveda *Emblica officinalis* fruits are reputed Rasayanas and rejuvenators. They are extensively used in Ayurvedic preparations for the treatment of a number of diseases and debility states and are one of the three constituents of triphala (equal parts of three myrobalans, taken without seed: *Phyllanthus emblica*, *Terminalia bellirica*, and *Terminalia chebula*) which is a remedy for constipation, indigestion and hyperacidity. It contains gallic and ellagic acids, hydrolysable tannins, ascorbic acid (Vitamin C), phyllembic acid emblicol, and alkaloids. This Plant has shown its mettle in the areas of digestive, heart health, and
diabetics (Bhattacharya et al., 2002; Manjunatha et al., 2001) Plant even help to reduce the toxic side effects of chemotherapy, restores antioxidant status to the kidneys, and reduces blood sugar levels in diabetics (Haque et al., 2001; Sabu & Kuttan, 2002). They have potent immunomodulatory, immunostimulant, antipyretic, spasmo-lytic, antifungal, antibacterial and antiviral activities.

*Terminalia arjuna* (Roxb.) bark is used as medicine (Ayurvedic Encyclopaedia, 2004). Six teaspoonfuls of *Arjunarishta* are given to the patient twice daily after food with an equal quantity of water (Bharani et al., 2002) Arjuna is a cardiac tonic used in Ayurveda for a variety of heart conditions (Amritpal Singh, 2005). *Arjuna* is a coronary vasodilator, protects the heart, strengthens circulation, and helps to maintain the tone and health of the heart muscle. 1/2 teaspoon (500 milligrams to one gram) 3 times a day is given with honey and warm water. Administered at a dose of 15 mg/kg, arjunolic acid could protect against damage wreaked by myocardial necrosis, which translates into irreparable damage to heart cells (Sumitra et al., 2001).

*Ocimum sanctum* (Linn) is used against a wide variety of diseases (Treas and Evans Pharmacognosy, 1997). The leaves are household remedy for common cold and cough. Ayurvedic text describes the herb to be aromatic and a pacifier/normaliser of vitiated and is useful in blood disorders. Phytochemical investigations of leaves have shown the presence of flavones, glycosides, gallic acid and its ester, cafffeic acid and volatile oil having eugenol (70.5%) as the main component *Tulsi* leaf extract has shown adaptogenic, anti-inflammatory and anti-asthmatic activities. *Picrorhiza kurroa* rhizome is used for the treatment of fever, jaundice, liver afflictions, bile disorders, against infections, inflammatory and drainage morbid conditions (Scartezzini & Speroni, 2000) It is astringent, bitter and a valuable tonic, extensively employed for rejuvenation therapy. It contains phenolic glycosides (androsin- aglycone, apocynine), Iridoid glycosides (Kutkoside, picrosides I, II, III), Cucurbitaceous glycosides, vinallic acid, cinnamic acid. Active constituents of the herb have been found to be responsible for the inhibition of free oxygen radicals. Picroliv, a standardised fraction from root shows hepatoprotective activity against liver cirrhosis and liver toxicity, promoting the repair of injured tissues. The standard fraction, Picroliv also has exhibited hypolipidaemic action, altering lipolytic activities in plasma, liver, heart and adipose stimulating catabolism of risky low-density lipoprotein (LDL) while increasing the beneficial high-density lipoprotein (HDL) fraction. Roots also show antiasthmatic
activity.

*Allium sativum* (Liliaceae), also known as “the spice of life”, was one of the earliest documented examples of a food plant also used for the prevention and treatment of disease. The plant is a perennial, erect bulbous herb, with the bulb, giving rise to a number of narrow, keeled, grass-like leaves above ground. The medical history of garlic dates back at least 4000 years, where its medical uses were described in the ancient Chinese, Indian and Sumerian literature. Discorides, a Roman physician, recommended garlic to clean the arteries, and Hippocrates (460-370 BC), the father of modern medicine, was known to prescribe garlic for a wide variety of ailments. Garlic has been used as a food and medicine for thousands of years, and more recently has been the focus of numerous clinical studies, primarily for its cardiovascular benefits (Gail B. Mahady, 2000). *Cinnamomum zeylanicum* Linn. (Hawthorn berry tincture strengthens heartbeat and improves circulation in the blood vessels of the heart. Hawthorn extract gently dilates the coronary vessels increasing the supply of arterial blood to the heart. This action enhances oxygen utilization, resulting in a stronger and more powerful heart muscle. Crataegus differs from digitalis, which is also an effective heart stimulant, in that it does not produce side effects. Crataegus strengthens the overall effect of digitalis

*Centella asiatica* has shown promise in cognitive, circulatory, digestive health and venous hypertensive microangiopathy (Incandela et al., 2001; De Sanctis et al., 2001). In microangiopathy in diabetics, the triterpenic fraction (60 mg twice daily for 12 months) decreased capillary filtration and edema, which in turn improved the condition (Incandela et al., 2001). *Mucuna prurita* Hook exhibited efficacy in heart disease and diabetes. The extract had an anti lipid peroxidation property, due to its effect in removing hydroxyl radicals and super oxides 200 mg/kg/d exerted maximum anti-hyperglycemic effects after six weeks (Rathi et al., 2002). *Withania somnifera* has immunostimulatory properties, exerts a positive influence on the endocrine, cardiopulmonary and central nervous systems and improves memory (Dhuley et al., 2001) *Azadirachta indica* A. Juss. *Neem* is helpful in coronary artery disease and heart arrhythmias( Khosla et al., 2002) in addition to protecting against ulcers and strep infections (Vanka et al.,2001) . *Gymnema sylvestre* R. Br. (Meshasringa shows hypoglycemic and anti-hyperglycemic activity, useful for diabetics (Grover et al., 2002 ) An extract of leaves given to rats for three weeks influenced lipid metabolism, improving serum cholesterol and triglyceride levels (Shigematsu et al., 2001).
CONGESTIVE HEART FAILURE

A number of herbs contain potent cardioactive glycosides, which have positive inotropic actions on the heart. The drugs digitoxin, derived from either *D purpurea* (foxglove) or *Digitalis lanata*, and digoxin, derived from *D lanata* alone, have been used in the treatment of congestive heart failure for many decades. Cardiac glycosides have a low therapeutic index, and the dose must be adjusted to the needs of each patient. The only way to control dosage is to use standardized powdered digitalis, digitoxin, or digoxin. When 12 different strains of *D lanata* plants were cultured and examined, their total cardenolide yield ranged from 30 to almost 1000 nmol/1 g. (Stuhlemmer et al., 1993). As is evident, treating congestive heart failure with non-standardized herbal drugs would be dangerous and foolhardy (Nick et al., 1998).


The diagnosis can be further supported by the detection of the substance digoxin in a radioimmunoassay for digoxin. However, the extent of cross-reactivity between the cardiac glycosides from herbal sources and antibodies used in the radioimmunoassays has not been clearly defined (Osterloh and Herold, 1982). For this reason, digoxin assays may serve to confirm the suspected diagnosis but not to quantify the severity. Once the diagnosis has been established, the use of digoxin-specific Fab antibody fragments may be helpful in the treatment of severe intoxication. Other modalities, such as dialysis, cannot be easily facilitated because, like digoxin, natural glycosides are distributed extensively into peripheral tissues.
CONCLUSION

While herbal medicines is popular in India and Ayurveda is still in its early days of establishment. With the growth of alternative and complementary medicines it would seem there is good scope to see Ayurveda move to a front line of support for people with early and non-acute health problems. The main benefit of herbal drugs as a complementary practice is in the early stages of chronic manifestation of cardiovascular disease. The Ayurveda approach may make a significant difference to any developmental cardiovascular disease. Ayurveda's view of the human body give it the skills to help people bring themselves back into balance, before the pathology goes to the third level of manifestation. Once it goes to the third stage then the best help is by a modern medical practitioner. There is scope for working alongside modern medical practitioners and patients especially with those patients who have an adverse reaction to medical drugs, have liver problems or are generally adverse to taking drugs. Ayurveda can act as a good complementary approach. Health practitioners, in taking clinical histories, should remember to ask patients about their alternative health practices and stay informed regarding the beneficial or harmful effects of these treatments. Legal surveillance of alternative medicine practices with low safety margins should be instituted for the sake of public health. As more information becomes available regarding the safety and efficacy of alternative medicines, research-supported claims may one day appear on the labels of alternative medicines. The integration of proven complementary therapies with conventional treatments in heart disease will allow cardiologists to offer many additional options to their patients, possibly improving quality of life and reducing human suffering. Choosing from among the best conventional and complementary options is the only logical and ethical thing to do (William Frishman et al., 2004).

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