Tea and Cardiovascular Disease

Introduction

Cardiovascular Disease (CVD) is the main cause of death in the UK, accounting for over 250,000 deaths a year, more than one in three people. The main forms of CVD are Coronary Heart Disease (CHD) and stroke. About half of all deaths from CVD are from CHD and about a quarter are from stroke.[1] More than 110,000 people die of heart problems, 300,000 have heart attacks and 1.4 million suffer from angina every year. In addition, CHD accounts for about 3% of all hospital admissions in England. [2]

Risk Factors associated with CHD

There is no one single cause for CHD, instead the risk of developing it is determined by a combination of factors, some of which are unalterable, others that are potentially modifiable. These risk factors are outlined in Table 1.

Table 1

Modifiable Risk Factors	Non-modifiable risk factors
Hyperlipidaemia (raised cholesterol and triglycerides) Hypertension (high blood pressure) Reduced physical activity Smoking Stress Obesity	Family history Sex Age

Other physiological factors and conditions that may increase the risk of developing CHD, include:-

     Insulin resistance syndrome
     Oxidation of lipoproteins
     Inflammation and endothelial damage
     Hyperhomocysteinaemia (high blood homocysteine)
     Platelet aggregation
     Clotting factors

     Diabetes Mellitus
     Renal Disease

Prevention

Primary prevention of CVD involves adopting a 'healthy lifestyle' to control the 'modifiable' risk factors. The important aspects of this type of lifestyle include:-
  – Quitting smoking
  – Taking regular exercise
  – Adopting a healthy diet
  – Reducing stress and anxiety levels

Dietary Recommendations

A healthy diet[3] that includes the following;-
- Increasing the consumption of oily fish
- Increasing fruit, vegetable and pulses
- Replacing some of the dietary energy coming from total fat with complex starchy foods
- Moderating fat reduction with the use of monounsaturated fats
- Limiting salt intake
- Consuming modest amounts of alcohol

can help to reduce the risk of CVD by altering a range of risk factors in a number of ways. Some of these effects are outlined in Table 2.

Table 2[4]

Dietary Intervention	Physiological Effect
Omega 3 fatty acids (oily fish, rapeseed oil)	– Anti-inflammatory, protecting against endothelial damage – Anti-thrombotic – Reduces triglycerides – Improves insulin sensitivity – Anti-arrhythmic effects
Other fatty acids	– Action of omega–3 fatty acids is improved by lower intakes of saturated fat – Lower saturated fats reduces the risk of thrombosis and reduces serum lipids
Fruit, vegetables, pulses, nuts	– Antioxidants protect against Low Density Lipoprotein (LDL) oxidation – Rich in potassium, may help to control blood pressure – Rich in folic acid, may prevent homocysteine formation – Contain soluble fibre, helping to improve lipid profiles
Alcohol	– Improved HDL levels – Possible antioxidant effects

The benefits of tea

There is growing evidence suggesting that other dietary components may enhance the general healthy eating recommendations. For example, research is highlighting that there maybe a beneficial relationship between tea drinking and reduced risk of cardiovascular disease.

The evidence for tea and CVD

A number of epidemiological studies[5-12] have demonstrated that total flavonol/ flavonoid or tea consumption is linked to protection from heart disease and stroke. However, not all studies have shown similar protective effects.[13-16]. Inconsistencies from these studies maybe as a result of their design e.g. lack of detail about exposure to tea – quantity, strength and variety, insufficient information about the flavonoid contents of foods and other risk factors for CVD not being considered. These details may influence the end results and consideration of these factors is required for any future research.

However, the conclusions from a recent meta-analysis of all studies investigating the relationship between tea drinking and CHD suggested that drinking 3 cups of tea a day reduces the risk of myocardial infarction by 11%.[17]

Protective mechanisms of tea

The outcomes from these studies have created great interest in understanding the mechanisms by which tea may confer its cardiovascular protective properties. Mechanisms such as the prevention of LDL oxidation[18-23], reduction in blood lipids[24-26], anti-inflammatory actions[27,28], improvements in blood vessel function[29] and inhibition of platelet aggregation[30-34] have been established mainly in animal and in vitro studies. These mechanisms are discussed in greater detail in the fact sheet 'Tea and Antioxidants'.

Results in human studies are not as clear, and although some epidemiological studies seem to indicate that tea can reduce serum cholesterol[8,35-37], most studies show no effect in reducing serum cholesterol or blood pressure. As antioxidant activity from tea has been demonstrated in vivo[38-39], it may be that tea exerts its cardioprotective properties in other ways such as improvements in endothelial dysfunction[29], platelet aggregation[34] or ways that have yet to be investigated.

In summary

From a number of epidemiological studies investigating the relationship between tea drinking and cardiovascular disease, it is reasonable to conclude that drinking both green and black tea is compatible with dietary advice to help protect against CVD. However, although the scientific evidence for the mechanisms by which tea exerts its positive health effects is growing, it is not yet conclusive and represents promising areas for future research in human trials.

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