

# CHAPTER I

## INTRODUCTION

### 1. Rationale and background

At present, coronary artery disease (CAD) is a major killer and is the most common cause of mortality and morbidity in the entire world (Reddy, 1993). CAD is a disease characterized by narrowing or blockage of the arteries and vessels that provide oxygen and nutrients to the heart caused by atherosclerosis. High blood pressure (Weber, 1996), tobacco smoking (Doll and Hill., 1966; Panagiotakos et al., 2007) and high blood cholesterol concentration are major risk factors of CAD (Lilly, 2003). Moreover, the minor risks of CAD are diabetes mellitus (Lilly, 2003), heredity (Caillier, 2006; Manresa et al., 2006), gender (Kuller et al., 2000; Reis et al., 1994), obesity (Barrett-Connor et al,1984, Dyer et al., 2004; Garfinkel and Stellman,1998), and physical inactivity (Ignarro et al., 2007). People with high risk factors are more likely to develop CAD. Furthermore, vasculitis, vasoconstriction, medicine or abnormal infant arteries are causes of blockage arteries.

The most common symptom of CAD is angina pectoris due to an inadequate blood supply to the heart muscle. However, many people have no symptoms of CAD before having a heart attack. Thus, early diagnosis is very important. In diagnosis a physician will take general examination and chest examination. Diagnostic tests include electrocardiography (ECG), exercise stress test (EST), echocardiography, and coronary angiography.

EST is a screening test for diagnosis of CAD (Davis et al., 1990; Detrano et al., 1988). It predicts severity and prognostic value of CAD. During the test, cardiac muscle consumed large amount of energy leading to increased oxygen consumption. If there is blockage of cardiac vessel, the cardiac muscle will have inadequate blood supply. This contributes to abnormal contraction of the cardiac muscle and results in chest pain or abnormal ST segment. Accordingly, previous studies have shown that the maximum oxygen consumption ( $\dot{V}O_{2,max}$ ) during the test is a predictor of cardiovascular disease and total mortality (Laukkanen et al., 2002).

Arya and coworkers reported an index of myocardial oxygen consumption as a result of heart rate and blood pressure that is clinical benefit (Arya et al., 2005). In addition, recent studies reported that aerobic capacity was associated with fasting plasma glucose levels, plasma cholesterol, ECG, echocardiography and coronary angiography (Gotto and Pownall, 1999; Park et al., 2007; Van de Veire, 2006; Wichitsranoj et al, 2007).

However, no study investigated aerobic capacity and correlation between aerobic capacity and lipid profiles (high density lipoprotein, low density lipoprotein, triglycerides and total cholesterol), heart rate, blood pressure, other cardiovascular risk factors and CAD confirmation from tests including echocardiography, and coronary angiography, in Thai patients with CAD. The information of the present study is important for prevention, evaluation, treatment and rehabilitation in Thai patients with suspected CAD.

## **2. Objectives of this thesis**

2.1 To investigate aerobic capacity in patient with suspected CAD.

2.2 To investigate correlation between aerobic capacity and lipid profiles (high density lipoprotein, low density lipoprotein, triglycerides and total cholesterol), heart rate and blood pressure and CAD confirmation from other tests including echocardiography, and coronary angiography in Thai patients with suspected CAD.

2.3 To investigate the correlation between aerobic capacity and cardiovascular risk factors in Thai patients with suspected CAD.

## **3. Scope and limitation**

3.1 This study was conducted after the permission of Khon Kaen University Ethical Committee.

3.2 The subjects of this study were men and women, aged between 30 and 75 years in Khon Kaen province and around one.

#### **4. Hypothesis**

I hypothesize that Thai patients suspected CAD who are diagnosed as CAD had poor aerobic capacity. Moreover, aerobic capacity is correlated with lipid profiles, heart rate, blood pressure, other cardiovascular risk factors and CAD confirmation from other tests including echocardiography, and coronary angiography in Thai patients with suspected CAD.

#### **5. Anticipated outcomes**

5.1 To provide the information about the aerobic capacity in Thai patients with suspected CAD

5.2 To provide the information about the correlation between aerobic capacity, lipid profiles (high density lipoprotein, low density lipoprotein, triglycerides and total cholesterol), heart rate, blood pressure, other cardiovascular risk factors and CAD confirmation from other tests including echocardiography, and coronary angiography in Thai patients with suspected CAD