



# The association between blood lipid and phlegm turbidity syndrome of angina pectoris: A systematic review and meta-analysis



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## KEYWORDS

Angina pectoris;  
Phlegm turbidity  
syndrome;  
Blood lipid;  
Meta-analysis

## Summary

**Background:** A series of case–control studies have been conducted to investigate the association between blood lipid and phlegm turbidity syndrome of angina pectoris, but produced inconsistent results.

**Objective:** We performed a meta-analysis to determine the association between blood lipid and phlegm turbidity syndrome of angina pectoris more precisely.

**Methods:** Manual screening as well as screening of the China National Knowledge Infrastructure (CNKI), Chinese Journal full-text database (VIP), Wanfang database (WF), ScienceDirect, Pubmed, the Cochrane Library, and Embase were carried out for relevant literature. The formula was translated to calculate the pooled mean value and standard deviation value. The ‘‘Newcastle–Ottawa Quality Assessment Scale: Case–Control Studies’’ (NOS) was taken to assess the quality of the included studies. The Revman 5.2.6 software provided by ‘‘The Cochrane Collaboration’’ was used to analyze the collected data. The subgroup analysis was established according to the sample size proportion between the test group and the control group. Sensitivity analysis was constructed by using two different effect models. Besides, a funnel plot was created to analyze potential publication bias.

**Abbreviations:** CNKI, China National Knowledge Infrastructure; VIP, Chinese Journal full-text database; WF, Wanfang database; TC, total cholesterol; TG, triglyceride; LDL-C, low-density lipoprotein-cholesterol; HDL-C, high-density lipoprotein-cholesterol; QYDS, Qi and yin deficiency syndrome; YDS, Yang deficiency syndrome; CCS, Cold coagulating syndrome; HQDS, heart qi deficiency syndrome; QSS, Qi stagnation syndrome; HBSS, heart blood stasis syndrome; AMI, acute myocardial infarction; CHD, coronary heart disease; TCM, Traditional Chinese Medicine.

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**Results:** No statistically meaningful difference existed between the test group and control group of total cholesterol (TC) and low-density lipoprotein-cholesterol (LDL-C) in non-Qi and yin deficiency syndrome (QYDS) and non-Yang deficiency syndrome (YDS) subgroup, whereas the two biotic indicators in the test group were higher than the non-phlegm syndrome group in other subgroups. Triglyceride (TG) in phlegm syndrome group showed superior to non-phlegm syndrome group in the rest subgroups except for the non-CCS (Cold coagulating syndrome)-non-YDS subgroup. High-density lipoprotein-cholesterol (HDL-C) levels of the phlegm group were lower than that of the non-phlegm group in all subgroups.

**Conclusion:** When comparing with Traditional Chinese Medicine (TCM) syndromes of asthenia nature, such as YDS, QYDS, and heart qi deficiency syndrome), the levels of TG, TC, and LDL-C were higher in phlegm turbidity syndrome. However, for sthenia syndromes such as Qi stagnation syndrome (QSS), heart blood stasis syndrome (HBSS), and CCS, there was no obvious difference. Furthermore, HDL-C levels in the phlegm turbidity group were lower than those of the non-phlegm group. Nevertheless, these results should be confirmed with further studies.

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## Introduction

Angina pectoris is caused by rapid, transient myocardial ischemia and hypoxia.<sup>1</sup> It is generally acknowledged that patients with angina pectoris have the risk of acute myocardial infarction (AMI) and sudden death, and the prognosis depends on the extent of coronary artery disease and heart function.<sup>1</sup> The incidence of angina in China has increased year by year.<sup>2,3</sup> Moreover, the onset age has become much younger.<sup>4</sup>

Although the etiology of coronary heart disease (CHD) remains indistinct, the cause of CHD is believed to be multifactorial. The recommended risk factors include: systematic conditions, such as diabetes mellitus, hyperlipidemia,<sup>5–7</sup> hypertension<sup>8,9</sup>; the inflammatory biomarkers: hs-CRP<sup>10,11</sup>; habits and customs: cigarette<sup>12,13</sup> and alcohol.<sup>14</sup> TCM also has records on this subject. Angina pectoris belongs to the category of chest obstruction in TCM. It is believed that the occurrence of the disease has been associated with the invasion of pathogenic cold, eating disorder, emotional illness, etc.<sup>15</sup> Eating lot of greasy and sweet food or being addicted to cigarette and alcohol may lead to dysfunction of the spleen.<sup>15</sup> So that phlegm retention is gathered by the water and dampness. In TCM, the concept of phlegm is referred to as the resultant of metabolic disorders of the body's water. This pathological product may block blood circulation, influence the function of organs, and cause a variety of complex pathological changes in the body, thus leading to the emergence of phlegm syndrome. Phlegm syndrome refers to the symptoms caused by the stopping of phlegm. Phlegm blocks the arteries and veins of heart, which ultimately leads to phlegm syndrome causing chest obstruction.<sup>15</sup> Hyperlipidemia has been investigated to be associated with phlegm syndrome of angina pectoris, but the consequences are contradictory. Despite the fact that these biomarkers were found to significantly increase the risk of phlegm syndrome of angina pectoris in some studies,<sup>16–24</sup> others found only borderline relationship or even no association.<sup>25,26</sup> Therefore, we established this systematic review to further examine the relationship between blood lipid with phlegm syndrome of angina pectoris.

## Methods

### Protocol and registration

Our protocol can be accessed on University of York Centre for Reviews and Dissemination (<http://www.crd.york.ac.uk/prospero/>), the registration number is: CRD42013006687.

### Search methods

#### Data sources

According to the "Cochrane Handbook for Systematic Reviews of Interventions" published by The Cochrane Collaboration, we screened the following online databases along with manual screening: China National Knowledge Infrastructure (CNKI; 1979 – January 2014), Chinese Journal full-text database (1989 – January 2013), Wanfang database (1977 – January 2013), ScienceDirect (1823–2014), Pubmed (1950–2014), the Cochrane Library (1948–2014), and Embase (2009–2014). The latest search was performed on 20 January 2014.

#### Search strategies

The following terms: "Coronary heart disease," "angina," "phlegm," "phlegm syndrome" were used to identify all relevant studies. When screening ScienceDirect and other English databases, we built a search strategy as follows: (a) angina; (b) phlegm syndrome; (c) phlegm Zheng; (d) phlegm pattern; (e) tan zhuo; (f) a in all fields; (g) b in all fields; (h) c in all fields; (i) d in all fields (j) e in all fields; (k) g 'OR' h 'OR' i 'OR' j 'AND' f. For CNKI and other Chinese databases the following strategy was used: (a) CHD; (b) angina; (c) phlegm; (d) a in abstract; (e) b in abstract; (f) c in abstract; (e) d 'OR' e 'AND' f.

#### Selection criteria

Eligible research should meet the following criteria: (a) case–control studies; (b) participants should be diagnosed with angina pectoris (stable and unstable) in Western medicine and chest obstruction in TCM; (c) phlegm syndrome should be contained; (d) diagnosis standard must be

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