

Are intestinal worms nature's anti-atherosclerosis vaccine?

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This commentary refers to 'Infections, atherosclerosis, and coronary heart disease', by NVK Pothineni et al., doi: 10.1093/eurheartj/ehx362.

Pothineni et al.¹ provide an excellent up-to-date review of how bacterial and viral infections might promote atherosclerosis. Additionally, we must consider that some pathogens such as helminths might protect against atherosclerosis. Helminths, such as hookworm, roundworm, and some water-borne helminths, have co-existed with humans for millennia and represent a major feature of human disease ecology. The long-evolved strategies of intestinal helminths include drawing metabolic resources from their host, including blood lipids and glucose, as well as modulating immune function towards greater T_H2 (anti-inflammatory) polarization. These helminth-induced alterations may be factors in slowing atheroma progression, and diminishing atherosclerotic plaque rupture.²

Ongoing studies with Tsimane forager-farmers of the Bolivian Amazon suggest possible cardioprotective effects of helminths. Tsimane have the lowest levels of coronary arterial calcification (CAC) ever reported. By age 80, Tsimane have 80% less CAC than 'healthy' US adults from Multi-Ethnic Study of Atherosclerosis.³ However, Tsimane suffer chronic systemic inflammation from multiple infections, which are their main cause of morbidity and mortality. Serial measurements show elevated C-reactive protein (CRP), interleukin-6 (IL-6), and other inflammatory markers.⁴

Most (70%) of Tsimane carry at least one helminth. Biomarkers of helminthic infection (IgE, eosinophils) vary inversely with total cholesterol, low-density lipoprotein (LDL), and high-density lipoprotein.⁵ Total cholesterol is almost 10 mg/dL (0.26 mmol/L) lower among those with elevated CRP and IL-6 and 19 mg/dL (0.49 mmol/L) lower with elevated IgE.⁵

Other findings are consistent with potential athero-protective effects of helminths (see Table 1, Ref. 2). For example, patients with schistosomal infections had lower glycated haemoglobin, triglycerides and LDL. In Siberia, patients with *Opisthochis felineus* had smaller atherosclerotic lesions in the thoracic and aortic arteries that varied inversely with worm density.

Throughout human history, helminth burdens have fluctuated, but their current absence is specific to industrialized, urban environs. Under novel conditions of obesogenic diets and physical inactivity introduced in recent history, the absence of helminths may produce maladaptive outcomes. Exploring the role of helminths in the progression of atherosclerosis merits further attention.

Conflict of interest: none declared.

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