

Abstract

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C-reactive protein concentration and risk of coronary heart disease, stroke, and mortality: an individual participant meta-analysis.

The Emerging Risk Factors Collaboration.

BACKGROUND: Associations of C-reactive protein (CRP) concentration with risk of major diseases can best be assessed by long-term prospective follow-up of large numbers of people. We assessed the associations of CRP concentration with risk of vascular and non-vascular outcomes under different circumstances.

METHODS: We meta-analysed individual records of 160 309 people without a history of vascular disease (ie, 1.31 million person-years at risk, 27 769 fatal or non-fatal disease outcomes) from 54 long-term prospective studies. Within-study regression analyses were adjusted for within-person variation in risk factor levels.

RESULTS: Log(e) CRP concentration was linearly associated with several conventional risk factors and inflammatory markers, and nearly log-linearly with the risk of ischaemic vascular disease and non-vascular mortality. Risk ratios (RRs) for coronary heart disease per 1-SD higher log(e) CRP concentration (three-fold higher) were 1.63 (95% CI 1.51-1.76) when initially adjusted for age and sex only, and 1.37 (1.27-1.48) when adjusted further for conventional risk factors; 1.44 (1.32-1.57) and 1.27 (1.15-1.40) for ischaemic stroke; 1.71 (1.53-1.91) and 1.55 (1.37-1.76) for vascular mortality; and 1.55 (1.41-1.69) and 1.54 (1.40-1.68) for non-vascular mortality. RRs were largely unchanged after exclusion of smokers or initial follow-up. After further adjustment for fibrinogen, the corresponding RRs were 1.23 (1.07-1.42) for coronary heart disease; 1.32 (1.18-1.49) for ischaemic stroke; 1.34 (1.18-1.52) for vascular mortality; and 1.34 (1.20-1.50) for non-vascular mortality.

INTERPRETATION: CRP concentration has continuous associations with the risk of coronary heart disease, ischaemic stroke, vascular mortality, and death from several cancers and lung disease that are each of broadly similar size. The relevance of CRP to such a range of disorders is unclear. Associations with ischaemic vascular disease depend considerably on conventional risk factors and other markers of inflammation.

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