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Serum zinc and copper status in dyslipidaemic patients with and without established coronary artery disease

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Abstract

Introduction: Aspects of trace element status have previously been investigated as possible contributory factors to atherosclerosis. In this present study a more comprehensive approach has been taken, looking at the relationship between dietary macro- and micronutrient intake, serum concentrations of zinc and copper, and markers of inflammation in dyslipidaemic patients with or without established coronary artery disease (CAD) and healthy controls, so that a clearer understanding of the potential relationship between copper and zinc status and coronary disease may be ascertained. Methods and Materials: Dyslipidaemic patients (n=٢٣٨) were recruited from the local General Hospital in Guildford, UK. Fifty-rive of these patients had established CAD. Control subjects (n=١٣٥) were recruited from among employees at the local University and Hospital. A validated food frequency questionnaire was used for estimating the dietary intake of zinc and copper. Results: Serum copper, copper/caeruloplasmin ratio, zinc/copper ratio, and C-reactive protein (CRP) were significantly different in the patient groups compared to controls [serum copper: ١٧,٢٠±٠,٢ v ١٥,٩١±٠,٢٩ μmol/L, p<٠,٠٠١; copper/ caeruloplasmin ratio: ١١١,٣٧ ± ٢,١٨ v ١٠٠,٦٣±٢,٩٣ μmol/g, p<٠,٠١; zinc/ copper ratio: ٠,٨٥ ± ٠,٠١ v ٠,٩٠±٠,٠١, p<٠,٠٥; and CRP: ١,٢٥ (٠,٤٢-٣,٢٦) v ٠,٥٨ (٠,١٧-١,٤٢) mg/L, p<٠,٠٠١]. Dietary protein, total fat, starch, fibre, monounsaturated fat, zinc, and zinc/copper ratio were also significantly higher in the patients compared to controls. Patients with established CAD had significantly higher serum CRP (p< ٠,٠٥) and lower serum zinc (p< ٠,٠١) and zinc/copper ratio (p<٠,٠١) compared to both patients without CAD and healthy controls. Conclusion: Significant differences in copper and zinc status, dietary intake and markers of inflammation were observed in patients with dyslipidaemia, with or without established CAD, compared with control subjects. Differences in serum CRP, copper and caeruloplasmin may be related to a heightened state of inflammation. The imbalance in zinc/ copper metabolism may either contribute to the CAD risk or be a consequence of an acute phase response.

Reaxys Database Information

Author keywords

Dyslipidemic; Heart disease; hs-CRP; Trace elements

Indexed Keywords

EMTREE drug terms: C reactive protein; ceruloplasmin; copper; monounsaturated fatty acid; zinc

EMTREE medical terms: article; cardiovascular disease; cardiovascular risk; controlled study; copper blood level; coronary artery disease; dietary intake; disease association; dyslipidemia; human; major clinical study; metabolic disorder; protein blood level; questionnaire; risk factor; validation process; zinc blood level