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Effective evaluation of small dense LDL

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Small dense LDL (sdLDL) is a subtype of LDL that expresses greater atherogenicity than large buoyant LDL and is characteristic of the dyslipidaemia seen in metabolic syndrome, obesity and type 2 diabetes[1]. With a dramatic increase in these conditions in both adults and children worldwide, a rapid and reliable method of estimating sdLDL is of potential value in the identification and subsequent management of 'at-risk' individuals.

Separation of LDL subclasses has been achieved by methods including preparative ultracentrifugation or polyacrylamide gradient gel electrophoresis (PGGE); the former has been developed to allow quantification using iodixanol density-gradient media and pre-staining[2,3]. While this method is suitable for high-through-put analysis, the procedure is only semi-quantitative. Fully-quantitative ultracentrifugation is more time-consuming, and not therefore suitable for large-scale screening. A simple and rapid method for sdLDL quantification based on Mg–heparin precipitation has been described by Hirano *et al*[4]. The present report describes a comparison of the latter method for sdLDL quantification with the iodixanol gradient ultracentrifugation method[3].

Blood sampled into a tripotassium citrate anticoagulant was obtained from nine adults. Plasma removed by centrifugation was separated into two portions that were used for sdLDL analysis by one of the two methods; the procedures were carried out blind by different operators. Ultracentrifugation of one portion in an iodixanol gradient was followed by fractionation and measurement of the cholesterol in twenty fractions, providing a complete lipoprotein profile for each individual from which the sdLDL could be estimated. The Mg–heparin method was performed as described[4]. Briefly, heparin–$MgCl_2$ was added to plasma to separate VLDL, IDL and large buoyant LDL. sdLDL and HDL remained in the infranatant fraction and LDL-C was determined by the direct LDL-C method on an ILAB 650 autoanalyser (Randox Laboratories Ltd, UK).

On the small sample studied these two methods gave a reasonable correlation (Figure), as indicated by the similarity in fractionated cholesterol profiles and significant correlation between the cholesterol content of sdLDL. The Mg–heparin precipitation method may provide a suitable method for estimation of sdLDL in 'at-risk' individuals. This method may allow for quantitative high-through-put analysis for use in large-scale dietary interventions in populations who are dyslipidaemic.

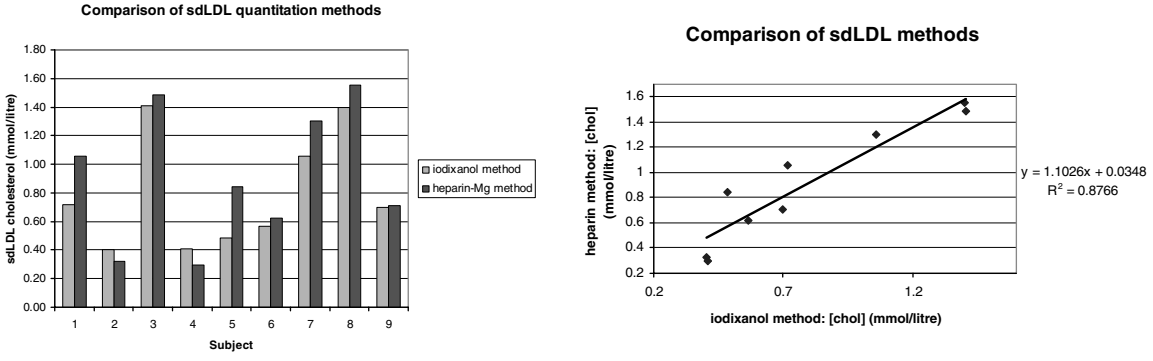

Figure Comparison of sdLDL measurements by alternative methods.

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