

## Original Contribution

# Assessment of postprandial triglycerides in clinical practice: Validation in a general population and coronary heart disease patients

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Oral-fat tolerance test;  
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GOLDN study

**BACKGROUND:** Previous studies have suggested that for clinical purposes, subjects with fasting triglycerides (TGs) between 89–180 mg/dl (1–2 mmol/l) would benefit from postprandial TGs testing.

**OBJECTIVE:** To determine the postprandial TG response in 2 independent studies and validate who should benefit diagnostically from an oral-fat tolerance test (OFTT) in clinical practice.

**METHODS:** A population of 1002 patients with coronary heart disease (CHD) from the CORDIOPREV clinical trial and 1115 white US subjects from the GOLDN study underwent OFTTs. Subjects were classified into 3 groups according to fasting cut points of TGs to predict the usefulness of OFTT: (1) TG < 89 mg/dl (<1 mmol/l); (2) TG, 89–180 mg/dl (1–2 mmol/l); and (3) TG > 180 mg/dl (>2 mmol/l). Postprandial TG concentration at any point > 220 mg/dl (>2.5 mmol/l) has been pre-established as an undesirable postprandial response.

**RESULTS:** Of the total, 49% patients with CHD and 42% from the general population showed an undesirable response after the OFTT. The prevalence of undesirable postprandial TG in the CORDIOPREV clinical trial was 12.8, 50.3, and 89.7%, in group 1, 2, and 3, respectively ( $P < .001$ ) and 11.2, 58.1, and 97.5% in group 1, 2, and 3, respectively ( $P < .001$ ) in the GOLDN study.

**CONCLUSIONS:** These two studies validate the predictive values reported in a previous consensus. Moreover, the findings of the CORDIOPREV and GOLDN studies show that an OFTT is useful to identify postprandial hyperlipidemia in subjects with fasting TG between 1–2 mmol/l (89–180 mg/dL), because approximately half of them have hidden postprandial hyperlipidemia, which may influence treatment. An OFTT does not provide additional information regarding postprandial hyperlipidemia in subjects with low TG (<1 mmol/l, <89 mg/dL) or increased TG (>2 mmol/l, >180 mg/dl).

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Current recommendations propose that therapeutic targeting of elevated fasting plasma triglycerides (TGs)  $\geq 1.7$  mmol/L or 150 mg/dL, a marker of TG-rich lipoprotein (TRL) and their remnants, may provide further cardiovascular benefit.<sup>1</sup> However, we spend most of the time in the postprandial state because of several meals and occasional “snacking”. Postprandial lipemia is a physiological response occurring 2 to 12 hours after consuming a fat-enriched meal, and it is defined by the extent and duration of the increase in plasma TGs.<sup>2,3</sup> Thus, the evaluation of postprandial lipemia becomes more physiologically relevant, particularly since nonfasting TGs are independent predictors of the risk of atherosclerosis and cardiovascular disease (CVD).<sup>4</sup> Furthermore, postprandial hypertriglyceridemia is associated with increased inflammation and oxidation that influences vascular function.<sup>5–7</sup>

Currently, there is no definitive consensus or enough evidence to sustain the further development of routine nonfasting/postprandial TGs measurements for clinical and research purposes. In this context, an Expert Panel of scientists and clinicians together with a meta-analysis of 113 studies conducted in healthy white subjects (without clinical or physician-diagnosed CVD or metabolic disease, with baseline TGs <2.0 mmol/l [ $<177$  mg/dL], with body mass index <30 kg/m<sup>2</sup> and not on chronic medication) has suggested that subjects with fasting TGs between 1–2 mmol/L (89–180 mg/dL) would benefit from the additional clinical information provided by an oral-fat tolerance test (OFTT).<sup>8,9</sup> In contrast, individuals with fasting

TGs <1 mmol/L (89 mg/dL) rarely have an exaggerated or delayed TG response after an OFTT, even in the presence of dyslipidemia or obesity. Conversely, individuals with fasting TGs >2 mmol/L (180 mg/dL) usually have an exaggerated and delayed TG response, and an OFTT will not add clinically relevant information. Based on this evidence, the Expert Panel<sup>8</sup> suggested that an OFTT should not be performed in the latter 2 subgroups. However, other studies have demonstrated the heterogeneity of the response of TGs after fat load.<sup>10,11</sup> In this context, Wojczynski et al. observed that the pattern of postprandial change in TGs was qualitatively similar for normotriglyceridemic and hypertriglyceridemic individuals; however, the magnitude of the response was exaggerated among hypertriglyceridemic when compared with normotriglyceridemic individuals.<sup>12</sup>

To confirm the postprandial TGs limits set by the Expert Panel,<sup>8</sup> we evaluated the results of 2 studies. The CORonary Diet Intervention with Olive Oil and Cardiovascular PREvention (CORDIOPREV) study (NCT00924937) is an ongoing prospective, controlled trial with a mean follow-up of 5 years, including 1002 patients with coronary heart disease (CHD). In this cohort of high-risk patients, our primary aim was to explore the degree of undesirable postprandial TG response in patients with CHD based on an OFTT. We also assessed the postprandial TG response in a second population drawn from a multicenter, population-based study comprising a large group of US white subjects from the Genetics of Lipid Lowering Drugs and Diet Network (GOLDN) study (NCT00083369).

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