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Impact of Intermittent Fasting on Lipid Profiles in Obese Individuals with Metabolic Complications: A Mini-Review

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ABSTRACT

Intermittent fasting (IF) has emerged as a popular dietary approach with potential health benefits, particularly in managing obesity and its associated metabolic complications. This review explores the impact of IF on lipid profiles in obese individuals with metabolic disorders such as type 2 diabetes, dyslipidemia, and insulin resistance. IF regimens, including alternate-day fasting, the 5:2 diet, and time-restricted feeding, have shown promising results in modulating lipid metabolism, reducing total cholesterol, triglycerides, and low-density lipoprotein (LDL) levels while increasing high-density lipoprotein (HDL) levels. The mechanisms underlying these changes involve shifts in energy metabolism, increased fatty acid oxidation, improved insulin sensitivity, and reduced inflammation. Additionally, the review highlights the role of IF in weight loss, body composition improvement, and reduction of cardiovascular risk factors. However, there is variability in the magnitude of lipid profile improvements depending on factors such as the specific IF regimen, duration, and individual metabolic status. Further long-term studies are required to elucidate the sustainability and clinical relevance of these changes in lipid profiles. This review provides insights into the potential of IF as a therapeutic strategy for lipid management in obese individuals with metabolic complications.

Keywords: Intermittent fasting, lipid profiles, obesity, metabolic complications, dyslipidemia, insulin resistance,

INTRODUCTION

Obesity is a major global health concern linked to numerous metabolic complications, including type 2 diabetes, dyslipidemia, and cardiovascular disease[1–3]. Lipid metabolism dysregulation, characterized by elevated levels of low-density lipoprotein cholesterol (LDL-C) and triglycerides (TG) alongside reduced levels of high-density lipoprotein cholesterol (HDL-C), is commonly observed in obese individuals[4, 5]. As traditional dietary interventions have shown limited long-term efficacy in improving lipid profiles, intermittent fasting (IF) has gained traction as a promising alternative for managing obesity and its metabolic consequences[6, 7].

Types of Intermittent Fasting

Several IF regimens have been studied for their effects on lipid profiles, including[7–9]:

Alternate-Day Fasting (ADF): Involves alternating between fasting days and eating days, typically with 25% caloric intake on fasting days.

5:2 Diet: Involves two non-consecutive fasting days per week with normal caloric intake on the other five days.

Time-Restricted Feeding (TRF): Limits the daily eating window to a specific number of hours, commonly 8 hours, with fasting for the remaining 16 hours.

Each of these regimens has distinct impacts on metabolism and lipid regulation, making it crucial to assess their effects on obese individuals with pre-existing metabolic conditions.

Effects of IF on Lipid Profiles: Studies have demonstrated that IF can lead to significant improvements in lipid profiles, which is particularly important for reducing cardiovascular risk in obese individuals. Key changes include[10–13]:

Reduction in Total Cholesterol: IF regimens have consistently been shown to lower total cholesterol levels in obese individuals, particularly those with metabolic syndrome. This reduction is primarily attributed to enhanced fat metabolism during fasting periods.

Decrease in LDL Cholesterol and Triglycerides: LDL-C and TG levels tend to decrease with IF, which can help reduce the risk of atherosclerosis. This effect is likely due to the

mobilization of fat stores and increased fatty acid oxidation.

Increase in HDL Cholesterol: Some studies have reported modest increases in HDL-C levels following IF. Higher HDL-C is associated with improved cholesterol efflux and reduced risk of cardiovascular disease.

Mechanisms Underlying IF-Induced Lipid Profile Change

The improvements in lipid profiles during IF are driven by several metabolic mechanisms:[8, 14, 15]

Increased Fatty Acid Oxidation: Prolonged fasting depletes glycogen stores, prompting the body to shift to fatty acid oxidation as a primary energy source. This process helps reduce TG and LDL-C levels.

Improved Insulin Sensitivity: IF has been shown to enhance insulin sensitivity, leading to better glucose regulation and a subsequent decrease in circulating lipid levels.

Hormonal Regulation: IF influences hormones such as adiponectin, which enhances lipid breakdown, and reduces inflammation, both of which contribute to lipid metabolism improvement.

CLINICAL IMPLICATIONS FOR OBESE INDIVIDUALS WITH METABOLIC COMPLICATIONS

The lipid-modulating effects of IF are particularly relevant for obese individuals suffering from metabolic complications. Improving lipid profiles can significantly lower the risk of cardiovascular events, which are highly prevalent in this population. Additionally, IF can aid in weight loss, which further improves lipid metabolism and overall metabolic health[16, 17].

Variability in Responses

Despite promising findings, the response to IF in terms of lipid profile improvement can vary among individuals. Factors such as the type of IF regimen, duration of fasting, baseline metabolic status, and adherence levels play a critical role in determining the efficacy of IF.

Challenges and Future Directions

While short-term studies have provided valuable insights into the benefits of IF on lipid profiles, long-term data are scarce. Future research should focus on the sustainability of IF-induced lipid improvements, its long-term safety, and its comparative effectiveness against other dietary interventions.

CONCLUSION

Intermittent fasting holds great potential as a therapeutic approach for improving lipid profiles in obese individuals with metabolic complications. By targeting dyslipidemia through mechanisms such as increased fatty acid oxidation and improved insulin sensitivity, IF may reduce cardiovascular risks and enhance metabolic health. However, individualized approaches and further long-term studies are necessary to fully establish the clinical utility of IF for lipid management in this population.

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