

PubMed ▼

Format: Abstract**Full text links**[LinkOut to related resource](#)[Acta Cardiol.](#) 2007 Aug;62(4):381-9.

Low carbohydrate ketogenic diet enhances cardiac tolerance to global ischaemia.

[Al-Zaid NS¹](#), [Dashti HM](#), [Mathew TC](#), [Juggi JS](#).

Author information

Abstract

The cardio-protective effects of a low carbohydrate ketogenic diet following global ischaemic injury as compared to rats fed a normal and high carbohydrate diet for a period of 19 weeks, were investigated. The reperfusion recovery of coronary flow was highly significant in the low carbohydrate ketogenic diet group. Although the initial reperfusion recovery of the pressure developed in the left ventricle, Pmax was similar in all groups, after 15 minutes, the momentum for faster recovery was maintained in the low carbohydrate ketogenic diet group. Ultrastructural observations of the cardiac muscles have shown that there was a decrease in the number of mitochondria in rats fed a high carbohydrate diet and an increase in the number of mitochondria in those fed a low carbohydrate ketogenic diet as compared to the normal diet group. This study demonstrates that a low carbohydrate ketogenic diet is cardio-protective functionally.

INTRODUCTION: Ischaemia and reperfusion lead to cell death. These pathways are regulated and hence are subjected to therapeutic intervention. Previously, we have shown that a low carbohydrate ketogenic diet (LCKD) reduces the risk factors for heart disease in obese patients. This study is aimed at understanding the cardio-protective effects of LCKD following global ischaemic injury in rats.

MATERIALS AND METHODS: Rats weighing 190-250 g were divided into normal diet (ND), LCKD and high carbohydrate diet (HCD) groups consisting of six animals in each group. Specific diets were given to each group for a period of 19 weeks. Changes in body weight, ultrastructure of the cardiac muscles and the cardio-protective effects of the LCKD group as compared to the ND and HCD groups were investigated in rats following global ischaemic injury.

RESULTS: Electron microscopic studies have shown that there was a decrease in the number of mitochondria in rats fed a high carbohydrate diet and an increase in the number of mitochondria in those fed a low carbohydrate ketogenic diet as compared to the normal diet group. Rats on LCKD had a remarkable tolerance to ischaemia and a faster recovery of cardiac function following reperfusion. The initial reperfusion recovery of the pressure developed in the left ventricle, Pmax was similar in all groups. However, after 15 minutes, the momentum for faster recovery was significantly maintained in the LCKD group ($P < 0.05$). The reperfusion recovery of coronary flow was highly significant ($P < 0.05$) in the LCKD regime. The increase in left ventricle end diastolic pressure,

coronary vascular resistance and the changes in body weight were not significant between the experimental groups.

DISCUSSION AND CONCLUSION: This is a unique study showing ultrastructural variation in cardiac muscle in relation to cardio-protective function in rats fed a low carbohydrate ketogenic diet. This study suggests that the LCKD is cardio-protective functionally. The underlying mechanism of the cardio-protective effect of an LCKD needs to be elucidated.

PMID: 17824299 DOI: [10.2143/AC.62.4.2022282](https://doi.org/10.2143/AC.62.4.2022282)

[Indexed for MEDLINE]

Publication type, MeSH terms, Substances



LinkOut - more resources

