

Total Antioxidant Capacity Of HDL In Patients Before And After Coronary Surgery

A Palasuwan, W Dahlan, Y Carpentier

Citation

A Palasuwan, W Dahlan, Y Carpentier. *Total Antioxidant Capacity Of HDL In Patients Before And After Coronary Surgery*. The Internet Journal of Laboratory Medicine. 2004 Volume 1 Number 1.

Abstract

During the postoperative period following cardiopulmonary bypass (CPB), oxygen free radicals are generated by the whole body inflammatory response. Intracellular and extracellular compartments possess defense mechanisms against oxygen free radical damage referred namely "antioxidant status". The purpose of this study was to investigate the early postoperative changes of total antioxidant capacity of HDL in patients before and after coronary surgery. Eleven patients undergoing coronary artery bypass surgery participated in this study and their HDL was obtained from both preoperative and 2-day postoperative plasma by sequential ultracentrifugation. Total antioxidant capacity of HDL was measured by using radical cation decolorization (TEAC) assay. Using student's t-test, total antioxidant status of HDL from most patients remained unchanged for at 2 days after operation ($p > 0.05$). Further studies are required in more patients and at prolonged interval times.

INTRODUCTION

Total plasma antioxidant status reflects the capacity of extracellular compartment to scavenge oxygen free radicals. The antioxidant capacity in the aqueous phase of extracellular fluids has been developed.⁽¹⁾ Total human plasma antioxidant status during CPB was first described by Toivonen and coworkers⁽²⁾. They found to increase, however, a similar study by Pyles and colleagues⁽³⁾ showed a significant decrease in total plasma antioxidant status. They measured in a group of patients who underwent surgery for congenital heart defects, ages 3 days – 16 years.

HDL play an important role against the LDL oxidation, namely via their content of paraoxonase(PON). 80% of this enzyme is carried by HDL. Van Laten et al. (1995) reported a decrease of PON 2 days after cardiac surgery and together with a loss of HDL protective effect against LDL oxidation. To date, there are rarely data specifically reporting the total antioxidant capacity of HDL from patient before and after bypass. The purpose of this study was to describe the early postoperative changes of total antioxidant capacity (TAC) of HDL in patients before and after coronary surgery.

MATERIALS AND METHODS

We studied 11 patients undergoing coronary artery bypass surgery. HDL were obtained from EDTA plasma, before (HDL-Be) and 2 days after bypass surgery (HDL-Af), by

sequential ultracentrifugation. The density range was set at 1.063-1.18 g/ml. Plasma was separated by centrifugation at 4°C within 30 min of venepuncture. Then HDL was isolated by sequential ultracentrifugation.

TOTAL ANTIOXIDANT CAPACITY ASSAY

Total antioxidant capacity of HDL was measured by using radical cation decolorization assay⁽⁴⁾. This assay is based on the inhibition by antioxidants of the absorbance of the free radical cation from ABTS (2,2'-azinobis-[3-ethylbenzothiazoline-6-sulphonic acid]).

RESULTS AND DISCUSSION

Total antioxidant capacity of HDL in before and after surgery patients is shown that there were not difference between TAC of HDL-Be and HDL-Af. Using student's t-test, there were no significant changes in most of the data here.

Total plasma antioxidant status reflects the capacity of extracellular fluid compartment to scavenge oxygen free radicals. In our study, total antioxidant status of HDL from most patients remained unchanged for at 2 days after operation. In previously report, Miller NJ and colleagues⁽⁵⁾ showed no significant changes in serum total antioxidant activity from myocardial infarction patients between admission and on day 1 and day 2. However, Hadjinikolaou L and coworkers⁽⁶⁾ studied early changes in total plasma

antioxidant capacity (TPAC) from patients coronary artery bypass surgery. They shown TPAC was suppressed for 72 hours after the operation. TPAC changed seemed to had to distinct pathophysiological phases, an early around 1-6 hours and a late around 24-72 hours. In the early phase plasma antioxidant depression was inversely related to lipid peroxidation. In the late phase a slow and progressive recovery of TPAC was observed.

Further studies are required in more patients and at prolonged interval times.

References

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Author Information

Attakorn Palasuwan

The Lipid and Fat Sciences Research Center, Faculty of Allied Health Sciences, Chulalongkorn University

Winai Dahlan

The Lipid and Fat Sciences Research Center, Faculty of Allied Health Sciences, Chulalongkorn University

Yvon A. Carpentier

L.Deloyers Laboratory for Experimental Surgery, Faculty of Medicine, Erasmus hospital, Université Libre de Bruxelles (ULB)