RELATIONSHIP BETWEEN INTRAABDOMINAL FAT DISTRIBUTION, PLASMA BIOMARKER LEVELS AND ENDOTHELIAL FUNCTION IN HYPERCHOLESTEROLEMIC SUBJECTS

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INTRODUCTION

It has been demonstrated that development of hypercholesterolemia is associated with endothelial cell dysfunction and the creation of a pro-inflammatory condition. Dysfunction of endothelium-dependent vasodilation is perceived as an early marker for developing atherosclerosis. Impaired endothelial function is evident in obese individuals. The distribution of body fat depots, in particular intraabdominal type obesity, is strongly associated with the decrease in endothelial dependent vasodilation.

AIM

The aim of the study was to investigate association between intraabdominal fat distribution, plasma biomarker levels and endothelial function in hypercholesterolemic subjects.

MATERIALS AND METHODS

1. Subjects were classified into three groups according to the total cholesterol (TC) level:

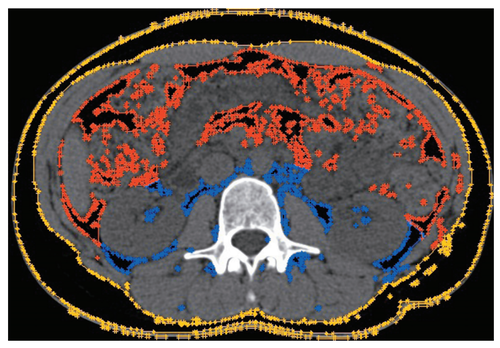
90 subjects
age of 37,8 ± 3,11
→ **30 C**
→ **30 BC**
→ **30 HC**

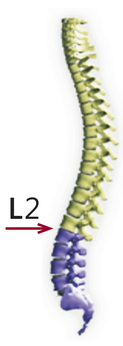
45/45 F/M

C – control (**TC < 200 mg/dl**)
BC – borderline hypercholesterolemia (**TC 200–239 mg/dl**)
HC – high hypercholesterolemia (**TC ≥ 240 mg/dl**)

2. Computed tomography (CT) measurements of total abdominal fat

Total abdominal fat were accomplished in a single axial section (5 mm) positioned at the level of L-2 vertebra

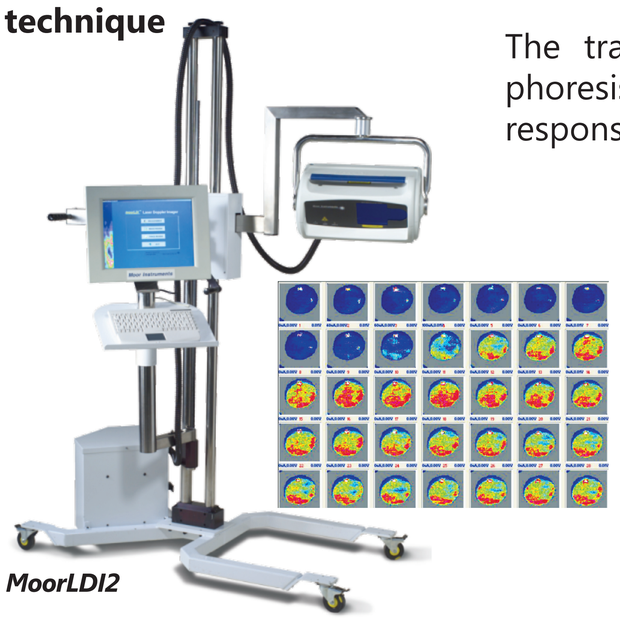




Siemens Somatom Definition AS

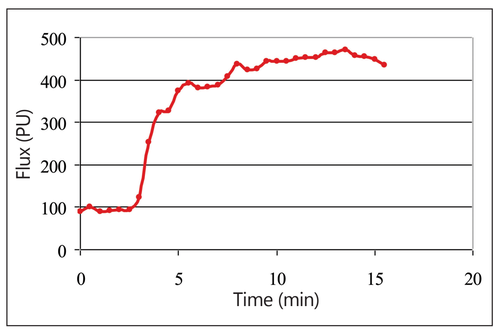
SC Subcutaneous fat **RP** Retroperitoneal fat **IP** Intraperitoneal fat

3. Endothelial function was measured by Laser Doppler imagining technique



MoorLDI2

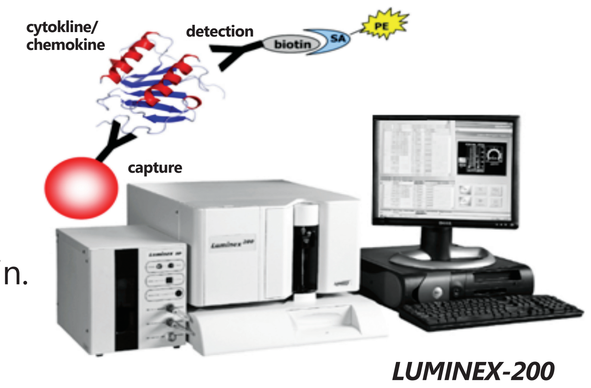
The transdermal acetylcholine iontophoresis applications for vasodilatatory response was used.



Cutaneous perfusion (Δ ***LDI from basal)*** was measured

4. Detection of plasma biomarker levels

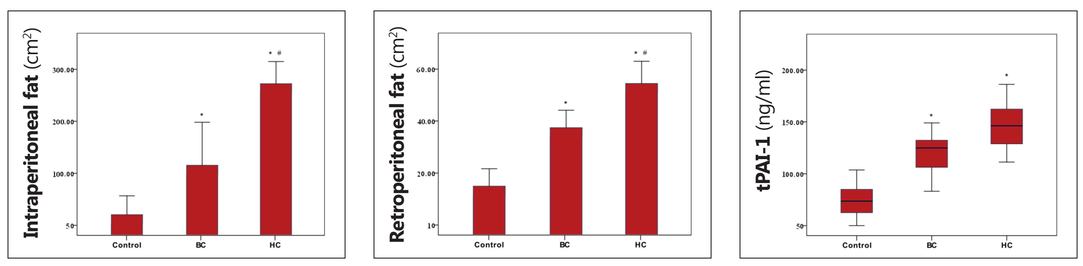
tPAI-1 – plasminogen activator inhibitor;
sICAM – soluble intercellular adhesion molecule;
MCP-1 – monocyte achemoattractant protein.



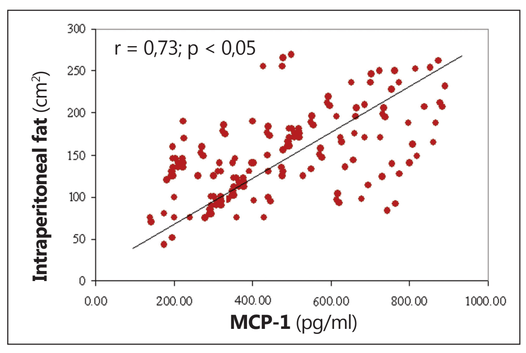
LUMINEX-200

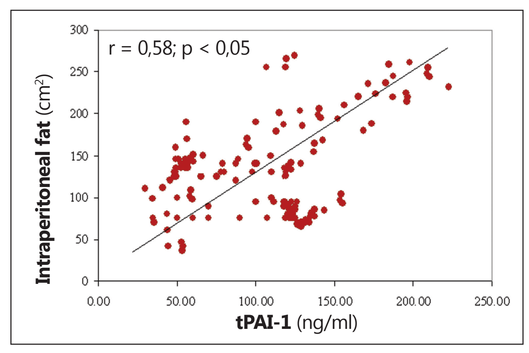
RESULTS

Both IP and RP fat area, as well as circulating level of MCP-1, tPAI-1 and sICAM-1 were significantly increased in BC and HC compared with control subjects ($p<0.01$). Cutaneous vasodilatatory response to Ach delivery was significantly decreased in BC and HC compared with control subjects ($p<0.05$).

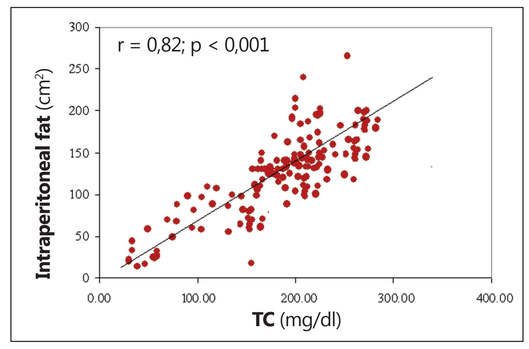


* HC and BC vs. Control | # HC vs. BC





Only IP fat area positively correlated with TC ($p = 0.001$), MCP-1 and PAI-1 ($p <0.05$) in the whole study group.



We found that with TC ($p=0.008$; $r= –0.69$) and IP fat area ($p<0.005$; $r= –0.57$). Only tPAI-1 and sICAM-1 negatively correlated with –0.70 and $r= –0.59$, respectively).

CONCLUSIONS

Increased level of MCP-1, tPAI-1 and IP fat area are associated with hypercholesterolemia and endothelium dysfunction.

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