

Human Pericoronary Adipose Tissue as Storage and Possible Supply Site for Lipoproteins in Atherosclerotic Coronary Plaques

Yasumi Uchida*

Abstract

Aim of Review: It is generally believed that low-density lipoprotein (LDL) and monocytes enter the vascular wall from the lumen, and the former becomes oxidized LDL (oxLDL) and the latter macrophages and they participate in atherosclerosis. However, definite *in vivo* clinical evidence is lacking. This review article summarizes our findings on the possible roles of oxLDL and other lipoproteins stored in pericoronary adipose tissue (PCAT), which, when thickened, becomes a risk factor for coronary artery disease.

Findings: Immunohistochemical staining of PCAT and its adjacent coronary arteries obtained from autopsy subjects revealed that oxLDL, high-density lipoprotein (HDL) and apolipoprotein A1 (ApoA1) co-deposited in adipocytes in the majority of PCAT samples. LDL did not deposit in PCAT. The incidence of oxLDL was low in the intima of normal coronary segments, but increased during the growth stage and decreased during the mature stage of plaques, whereas that of HDL and ApoA1 was increased in the growth stage and increased further in the mature stage. The incidence of LDL in plaques was low and showed no obvious relation to plaque morphology. OxLDL and ApoA1 deposited in either a dotted or diffuse pattern whereas HDL showed a diffuse pattern in both the PCAT and intima. The dotted pattern occurred when oxLDL or ApoA1 was contained in CD68(+) -macrophages that were observed in the PCAT, adventitia, media and intima. A certain group of CD68(+) -macrophages contained both oxLDL and ApoA1. The CD68(+) -macrophages across the border of the PCAT, external and internal elastic laminae were frequently observed, suggesting their traverse from the PCAT toward the intima. The localization of diffusely deposited oxLDL, HDL and ApoA1 coincided with that of intimal vasa vasorum. LDL was deposited diffusely in the intima but its localization did not necessarily coincide with that of vasa vasorum.

Summary: Contrary to the generally believed mechanism, immunohistochemical findings suggested that native oxLDL, HDL and ApoA1 are stored in PCAT and conveyed either by CD68(+) - macrophages or vasa vasorum to coronary plaques. Therefore, therapies targeting the PCAT could be effective in preventing human coronary atherosclerosis.

Keywords: Apolipoprotein A1; High-density lipoprotein; Human coronary