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Advancements in Treating Vascular Dysfunction in Pro-Inflammatory States: The Promising Efficacy of PCSK9 Inhibitors

Background:
Vascular dysfunction is exacerbated in pro-inflammatory states, causing CVD. This study explores the efficacy of proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors vs. traditional lipid-lowering agents in improving vascular function in these conditions.
Methods:
A systematic review and meta-analysis were conducted using a comprehensive search in PubMed, ScienceDirect, and Cochrane from the last five years. Randomized controlled trials and cohort studies were included, with the primary outcome being improvement in vascular dysfunction assessed by endothelial tests and markers.
Results:
Across 24 studies involving ~61,000 participants, PCSK9 inhibitors alirocumab and evolocumab showed efficacy. The EVOLVE and EVACS trials showed evolocumab's endothelial benefits in dyslipidemia and HIV, with treatment reducing LDL-C by 60%.
Alirocumab/evolocumab cut CVD risk by 2% and mortality by 1% vs. placebo, while evolocumab also cut down MI (myocardial infarction) risk by 1%.
Against ezetimibe and statins, PCSK9 inhibitors lowered LDL-C more; over 95% of evolocumab recipients met LDL-C targets at 8 weeks, starkly outperforming the 38% in the placebo group.
Conclusion:
PCSK9 inhibitors, particularly alirocumab and evolocumab, have exhibited significant potential in improving vascular function, especially in pro-inflammatory states such as HIV and dyslipidemia. Their potency in reducing LDL-C levels by 60% and achieving LDL-C targets in over 95% of evolocumab recipients at 8 weeks underscores their therapeutic value. Despite high evidence grading versus placebo, comparisons with ezetimibe and statins require further long-term studies.
Future Work:
Further studies on PCSK9 inhibitors are essential to evaluate long-term outcomes, comparative effectiveness with existing lipid-lowering therapies, and their economic viability. Expanding research to diverse patient groups and exploring novel administration methods could broaden their clinical utility.