MEDICAL NEWS TODAY

Niacin Flush In Heart Patients - Beware Of Using Drugs To Treat

By Grace Rattue | Published Thursday 12 April 2012

Niacin, also known as vitamin B3, has drawn considerable attention from physicians and patients for its ability to increase "good" cholesterol (high density lipoprotein, HDL), while also reducing "bad" cholesterol. Niacin prevents the break down of fat, thus blocking the availability of LDL building blocks.

Often patients refrain from taking niacin due to uncomfortable facial flushing. This effect is caused as a result of prostaglandin fat or (PG) releasing. PGD2 is responsible for unwanted vasodilation, the "niacin flush." Niacin flush occurs when blood vessels expand from relaxed smooth muscle cells within vessel walls.

PGD2 is created by COX-2 (enzyme) and released by immune and skin cells. PGD2 acts on a muscle cell-surface receptor called DP1 to activate the flushing. In order to determine whether a combination of niacin and a DP1-blocking drug is effective in reducing heart attacks, as opposed to other medications that lower LDL cholesterol, a large clinical trial is being conducted.

However, whether its wise to block DP1 in individuals prone to heart disease, especially patients taking niacin, is being questioned in a study conducted by Wenliang Song, M.D., research assistant professor, and Jane Stubbe, Ph.D, postdoctoral fellow, in the Perelman School of Medicine, University of Pennsylvania, and their colleagues. The study is published in this months Journal of Clinical Investigation.

Evidential animal and human studies demonstrate that platelets produce PGD2, which acts as a brake via DP1 on their own activation. Platelets, are complex cells within the bloodstream, which bind stick together in the first phase of blood clotting. Interestingly, COX-1, the target inhibited by low-dose aspirin produces PGD2 in platelets. In addition, thromboxane (Tx)A2, another fat that stimulates platelets is also made from COX-1 in platelets.

Similar to aspirin in low-doses being cardioprotective by thinning the blood, the benefit from preventing platelet TxA2 is better compared with the potential risk of suppressing platelet PGD2 production.

In order to get a better understanding of the potential risks from blocking DP1, the researchers used mice lacking the DP1 receptor, although, unlike humans, mice do not express DP1 in their platelets.

Garret FitzGerald, M.D., director of the Institute for Translational Medicine and Therapeutics, said:

"Frankly, because of this, we did not expect to detect any signal of cardiovascular hazard in the the mice."

According to the researchers, removal of DP1 made mice slightly more susceptible to hardening of the arteries, thrombosis, the formation of aneurysm, and high blood pressure. The team suggest that these results mirror DP1 expression in vascular and immune cells in mice the same as in humans, although its absence on mouse platelet cells.

In humans, the researchers found that niacin stimulated COX-1- dependent formation of PGD2 and also TxA2 in platelets. In addition, they found that by blocking DP1, the effect of TxA2 on platelet activation improved.

Results from the study indicate that in individuals with cardiovascular disease, and especially those taking niacin, blocking the effects of DP1 and PGD2 is likely to be undesirable. According to the researchers, that possibility is not addressed in the large ongoing clinical trial of the DP1 antagonist/niacin combination.

FitzGerald anticipates that if such a hazard were to exist it would be confined to individuals not taking low-dose aspirin, along with niacin. FitzGerald explains:

"This potential hazard of blocking one aspect of PGD2 action, the one dependent on DP1, contrasts nicely with our recent report that blocking its other receptor, DP2, may be beneficial in limiting male-pattern baldness."

Written By Grace Rattue

References

Perelman School Of Medicine at the University of Pennsylvania

Additional information

Citations