Expression of CD11b and CD62L on circulating monocytes: Relationship with repetitive ischemia.


Background:

Ischemia has been shown to induce influx of monocytes in ischemic tissue\(^1\). This influx of monocytes is important for angiogenesis and arteriogenesis and is also involved in healing and remodelling of infarcted tissue.

CD11b and L-selectin (CD162L) are involved in adhesion of monocytes (and neutrophiles) to endothelial cells and subsequent invasion in inflamed tissue. CD11b-expression on peripheral monocytes has been shown to be increased in patients with acute coronary syndromes\(^2\). In patients with stable angina results of CD11b on peripheral leukocytes have been ambiguous.

CD162L is involved in the initial adhesion of leukocytes on endothelium is widely shed upon activation.

The most important prognostic factor in stable coronary disease is the presence and extent of inducible ischemia. Whether a coronary stenosis causes ischemia can reliably be assessed using Fractional Flow Reserve (Figure 1)

\[ \text{FFR} \]

Aim:

To compare the expression of CD11b and CD162L on peripheral monocytes in patients with stable angina with at least one coronary stenosis with a positive FFR, meaning inducible ischemia (FFR<0.80), negative FFR and patients with acute coronary syndrome/NSTEMI (ACS).

Methods:

Before angiography blood was collected. Patients with an active inflammatory state were excluded. FFR was performed in all lesions in the stable angina group. As part of a in vitro stimulation-experiment we analyzed expression of CD11b and CD 162L on peripheral monocytes incubated 30 minutes with PBS, which served as a control sample. CD11b and CD162L expression was assessed using Flowcmetry. Results are expressed as median and interquartile range, p-value of <0.05 is considered statistically significant.

Results:

Blood was collected from 55 patients of which 34 had at least one positive FFR, 21 had all negative FFR’s and 15 had ACS.

We found significantly higher expression of CD11b on peripheral monocytes of patients with stable angina and a positive FFR [21.4(18.2) (median[IQR]) compared to patients with a negative FFR [12.45 (9.4)], p=0.014

Interestingly, CD11b expression on monocytes of patients with ACS was also significantly lower [13.4 (10.2)], p=0.028 than that of the FFR-positive stable angina group (Figure 2).

CD162L expression did not differ between groups

Discussion:

In this preliminary analysis we found increased expression of CD11b in patients with stable coronary artery and inducible ischemia as assessed by FFR.

One explanation for this could be that repetitive ischemia (as occurs in stable angina for example during exercise) recruits monocytes to the site of ischemia to promote angiogenesis and arteriogenesis\(^3\). Increased expression of CD11b facilitates influx of monocytes with the possible downside of increased atherogenesis or even plaque destabilization.

Our finding that CD11b expression was lower in the ACS group is contradictory to previous research, we have no explanation for this finding, although it must be realised that the sample size is small.

Future directions:

We aim to extend our inclusion and also include healthy adults as a definitive control group. Analysis of expression of CD11b and CD162L after in vitro stimulation of peripheral monocytes and granulocytes will be performed.