Macrophage migration inhibitory factor

Wang et al., evaluate whether the macrophage migration inhibitory factor (MIF) level in serum of ischemic stroke patients was associated with their clinical severity and early outcome.

METHODS: During February 2017-March 2018, consecutive patients admitted to our hospital because of first-ever ischemic stroke were identified. The prognostic value of MIF was set for predicting the outcome of these patients at discharge. The results were compared with existing methods, including National Institutes of Health Stroke Scale (NIHSS) score and validated indicators.

RESULTS: 289 patients were enrolled. The serum level of all patients was determined (median: 20.6 ng/ml). At admission, 131 patients (45.3%) were evaluated as minor stroke (NIHSS < 5). When serum level of MIF was increased by each 1 ng/ml, the unadjusted and adjusted risk of moderate-to-high clinical severity was elevated by 5% (OR = 1.05 [95% CI: 1.01-1.09], P = 0.006) and 3% (1.03 [1.00-1.08], P = 0.02), respectively. At discharge, 82 patients (28.4%) had poor functional outcomes. The median serum level of MIF was lower in group with good outcomes than that observed in poor outcomes (19.4[15.8-24.2] vs. 24.0[19.9-29.4] ng/ml; P < 0.001). When serum level of MIF was increased by each 1 ng/ml, the unadjusted and adjusted risk of poor outcomes was elevated by 9% (1.09 [1.05-1.13], P < 0.001) and 6% (1.06 [1.02-1.10], P < 0.01), respectively.

CONCLUSIONS: High MIF levels are independently related to the moderate to high clinical severity in ischemic stroke patients, as well as the poor outcome at discharge [1)].

Radiotherapy significantly increases survival innumerous cancer patients, although it may have delayed adverse effects, including significant short- and long-term effects on cardiovascular function, leading to significant morbidity and mortality. However, the mechanisms underlying these effects remain unclear. Cardiomyocyte senescence contributes to cardiovascular disease via impaired cardiac function. MicroRNA-34a (miR-34a) is a senescence-associated miR involved in the pathology of cardiovascular diseases, while macrophage migration inhibitory factor (MIF) is a cardioprotective cytokine with an important role in cardiovascular diseases. The present study aimed to determine whether MIF has a cytoprotective effect in cardiomyocytes exposed to radiation through modulating miR-34a. Human cardiomyocytes (HCMs) were incubated with MIF and then exposed to radiation. Cellular proliferation was measured using a Cell Counting Kit-8, while cellular senescence was evaluated based on the senescence-associated β-galactosidase activity and the gene expression levels of cyclin-dependent kinase inhibitor 1a (Cdkn1a) and Cdkn2c. Oxidative stress was evaluated by measuring the generation of reactive oxygen species and malondialdehyde, as well as the expression of antioxidant genes. In addition, HCMs were treated with small interfering RNA against sirtuin 1 (SIRT1) to examine the role of this gene in MIF-associated rejuvenation following radiation-associated senescence. miR-34a was significantly increased in HCMs exposed to radiation, while MIF inhibited senescence by suppressing miR-34a. SIRT1 was identified as a target gene of miR-34a, mediating the anti-senescence effect induced by MIF. Furthermore, MIF rejuvenation involved rebalancing the oxidation process disturbed by radiation. These results provided direct evidence that inhibition of miR-34a by MIF protected against radiation-induced cardiomyocyte senescence via targeting SIRT1. Inhibition of miR-34a by MIF may thus be a novel strategy for combating cardiac radiation-associated damage [2)].

1)

Wang CW, Ma PJ, Wang YY, Yang M, Su LL, Wang S, Liu YX, Yuan B, Zhao JH. Serum level of

macrophage migration inhibitory factor predicts severity and prognosis in patients with ischemic stroke. Cytokine. 2019 Jan 4;115:8-12. doi: 10.1016/j.cyto.2018.11.029. [Epub ahead of print] PubMed PMID: 30616035.

2)

Hu Y, Xia W, Hou M. Macrophage migration inhibitory factor serves a pivotal role in the regulation of radiation-induced cardiac senescencethrough rebalancing the microRNA-34a/sirtuin 1 signaling pathway. Int J Mol Med. 2018 Nov;42(5):2849-2858. doi: 10.3892/ijmm.2018.3838. Epub 2018 Aug 23. PubMed PMID: 30226567.