Effect of oral n-acetylcysteine supplementation on the immunity system in patients with acute myocardinal infarction

Trisulo Wasyanto, author

Abstrak

inflammation, oxidative stress, and fibrosis play important roles after an acute myocardial infarction (AMI) event. The most studied inflammatory biomarker in cardiovascular disease is C-reactive protein (CRP). It has been demonstrated that myeloperoxidase (MPO) and Galectin-3 (Gal-3) have some essential roles on immune system when an AMI event occurs. We aimed to determine the effect of oral N-acetylcysteine (NAC) supplementation at the dose of 600 mg 3 times daily for 3 consecutive days on the immune system of AMI patients.
Methods: our randomized single-blinded experimental study using pre- and post-treatment evaluations was performed at Dr. Moewardi Hospital, Indonesia, from May to August 2018. Thirty-two patients with AMI and ST segment elevation (STEMI) who received fibrinolytic therapy were included. There were 17 patients received standard therapy plus 600 mg oral NAC supplementation every 8 h for 3 days and 15 patients received standard therapy, which served as the control group. High-sensitivity C-reactive protein (HsCRP), MPO, and Gal-3 levels of both groups were evaluated at admission and after 72 h receiving treatment.
Results: HsCRP, MPO, and Gal-3 levels between NAC and control groups at admission were not significantly different; while intergroup differences after 72 h of NAC supplementation were significant (p values of HsCRP, MPO, and Gal-3 levels were 0.0001, 0.001, and 0.017, respectively). Furthermore, in the NAC group, HsCRP, MPO, and Gal-3 levels at 72 h after treatment were significantly different from the corresponding levels at admission (p values: 0.0001, 0.0001, and 0.0001, respectively); the control group did not show these differences. There were also significant intergroup differences between the NAC and control groups regarding HsCRP, MPO, and Gal-3 levels (p values: 0.011, 0.022, and 0.014, respectively).
Conclusion: oral supplementation of 600 mg NAC every 8 h for 72 h can reduce HsCRP, MPO, and Gal-3 levels in AMI patients receiving fibrinolytic therapy. Results of our study will provide more options for supplementation therapy to improve management of IMA patients.
.....Latar belakang: inflamasi, stres oksidatif dan fibrosis memegang peran penting setelah terjadinya infark miokard akut (IMA). Biomarker inflamasi yang banyak dipelajari pada penyakit kardiovaskular adalah C-reactive protein. Ada bukti bahwa myeloperoksidase (MPO) dan galectin-3 (Gal-3) memegang peran penting pada sistem imun tubuh saat terjadi IMA. Penelitian ini bertujuan untuk melihat efek pemberian terapi tambahan N-acetylcystein (NAC) secara oral 600 mg 3 kali sehari selama 3 hari terhadap sistem imun pasien IMA. Metode: penelitian eksperimental acak, tersamar tunggal dengan metoda pre- dan post-test. Dilakukan di Rumah Sakit Dr. Moewardi Surakarta, dari bulan Mei hingga Agustus 2018. Tiga puluh dua pasien IMA dengan elevasi segmen ST (STEMI) yang mendapat terapi fibrinolitik masuk penelitian: 17 pasien mendapat terapi standar ditambah NAC 600 mg per oral setiap 8 jam selama 3 hari dan 15 pasien mendapat terapi standar sebagai kontrol. Kadar high sensitivity C-reaktif protein (HsCRP), MPO, dan Galectin-3 dari kedua kelompok diperiksa saat masuk dan setelah 72 jam perawatan.
Hasil: kadar HsCRP, MPO, dan Gal-3 pada kelompok NAC dan kontrol pada saat admisi tidak berbeda

bermakna, sedangkan kadar antar kelompok pasca 72 jam pemberian NAC didapatkan perbedaan yang bermakna dengan nilai p untuk kadar HsCRP, MPO, dan Gal-3 sebesar 0,0001, 0,001, dan 0,017. Pada kelompok NAC saat admisi dan pasca 72 jam, didapatkan perbedaan kadar HsCRP, MPO, dan Gal-3 yang bermakna dengan nilai p secara berurutan 0,0001, 0,0001 dan 0,0001; sedangkan pada kelompok kontrol tidak didapatkan perbedaan ini. Terdapat perbedaan kadar HsCRP, MPO, dan Gal-3 yang bermakna antara kelompok NAC dan kelompok kontrol (nilai p secara berurutan adalah 0,011, 0,022 dan 0,014). Kesimpulan: pemberian terapi tambahan NAC 600 mg oral tiap 8 jam selama 72 jam dapat menurunkan kadar HsCRP, MPO, dan Gal-3 pada pasien IMA yang mendapatkan terapi fibrinolitik. Hasil penelitian ini akan memberikan pilihan terapi tambahan untuk pengelolaan pasien IMA yang lebih baik