Studio prospettico randomizzato in doppio cieco sul rapporto ossigeno/cellule staminali in volontari sani

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Summary

Studies have identified a cell population called endothelial progenitor cells, which can be isolated from circulating mononuclear cells, bone marrow, and cord blood. EPCs express a number of endothelial-specific cell-surface markers and exhibit numerous endothelial properties. They have been extensively studied as biomarkers of cardiovascular disease and as a cell-based therapy for repair of damaged blood vessels in diabetes and other inflammatory disease. The exposure to hyperbaric oxygen (HBO_2) has been proved to mobilize stem/progenitor cells from the bone marrow. Based on these data, we focused our attention to endothelial progenitor cells (EPCs) characterised by great proliferative potential and vessel-forming activity in vivo. We employed a specifical culture method for EPCs, obtaining, between 5 and 22 days of culture, colonies of fVIII and CD31 positive endothelial cells. Moreover, we found that chronic administration of hyperbaric oxygen, daily for 90 min at 2.5 ATA, for 20 treatments, increases the percentage of EPCs, identified and enumerated via flow-cytometry as CD34, CD133 and VEGF receptor 2 expressing cells. Our results show that CD34+ cells percentage remain constant at the basal level throught the treatment cycle; CD34/CD133 percentage increases in oxygen treated volunteers already after the first treatment (214% compared to 91%). Triple-positive cells percentage increases from treatment 10 (210% vs 82%) and remains significantly elevated after 20 treatments (300% vs 137%). A month after stopping hyperbaric exposures all cell values return to baseline.

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Riassunto

Sono stati trattati in camera iperbarica per 20 sedute a (2.5 ATA con FiO_2= 1), 8 volontari sani, consenzienti e informati, altri 7 sono stati trattati in aria contemporaneamente, mediante maschera facciale. Al 1° (sia prima che immediatamente dopo il trattamento), 10°, 20° trattamento e dopo 30 giorni dalla sospensione, sono state indagate, da campioni di sangue periferico, cellule mononucleate circolanti identificate come CD 34, CD133, CD VEGFR-2, la triplice positività identifica cellule proendoteliali circolanti (EPCs). Il gruppo in ossigeno presentava un significativo incremento di CD34/CD133 già dopo il primo trattamento e comparsa della triplice positività (CD34/CD133/CDVEGFr-2) al decimo e al ventesimo trattamento, rispetto al controllo in aria, con il ritorno al valore normale a 30 giorni dalla sospensione del trattamento.

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