



Change in Mitochondrial Membrane Potential in Peripheral Blood Lymphocytes, Especially in Natural Killer Cells, Is a Possible Marker for Surgical Stress on the Immune System.

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There is accumulating evidence that surgical stresses cause impairment of systemic immune responses, which may promote susceptibility to infection as well as growth of remnant cancer cells in cancer patients. Although alterations in numbers, populations, and functions of lymphocytes have been extensively studied to assess modulation of the immune system, the precise mechanisms of immunosuppression caused by surgical stresses have not been identified, nor have methods been developed to estimate the magnitude of surgical stresses on the immune system. In the present study, to evaluate the effects of surgical procedures on the immune system, the mitochondrial membrane potential ($\Delta\Psi(m)$) of peripheral blood lymphocytes (PBL) from 25 patients who underwent various types of operation was measured by flow cytometry using 3,3'-dihexyloxycarbocyanine iodide (DiOC(6)(3)) on the day before operation and on postoperative day (POD) 1, POD 3, and POD 7. The $\Delta\Psi(m)$ in PBL, especially in natural killer (NK) cell population, was reduced after major surgery. In particular, the reduction of $\Delta\Psi(m)$ in NK cells appeared to be proportional to the severity of the surgical procedures and reflected the impairment of cellular function. Interestingly, the $\Delta\Psi(m)$ in NK cells was also negatively correlated with the level of plasma noradrenaline after major surgery, suggesting that the reduction of $\Delta\Psi(m)$ in NK cells induced by surgical stresses may be mediated, at least in part, by the accompanying increase in plasma noradrenaline. Monitoring of $\Delta\Psi(m)$ in PBL after operation may be one of the useful markers for estimating the magnitude of surgical stresses on the immune system.

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