Effect of anaesthesia with propofol and remifentanil on whole-blood chemiluminescence: discriminant analysis of the results.

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Propofol (2,6-diisopropylphenol) is an intravenous anaesthetic agent increasingly used for induction and maintenance of general anaesthesia. The action mechanism of propofol is multifaceted involving, among others, a positive modulation of gamma-aminobutyrate, a reduced excitability of sensory-motor neurons, a decrease of the open time of the acetyl-choline receptor channel. Furthermore propofol decreases cardiac beta-adrenoceptor responsiveness and suppresses the activity of L-type calcium channels in heart. However, in addition to these mechanisms, propofol exerts its effects also by a less specific interaction with membrane lipids due to its high hydrophobic structure.

Although the anaesthetic effect of propofol rapidly fades, both in-vitro and in-vivo results indicate that propofol can exert also some effects on the immune system. In particular, platelets-erythrocytes and platelets-leukocytes interaction is modified and platelets aggregation is reduced through inhibition of TxB2 synthesis and increase of NO production. Furthermore, neutrophil respiratory burst and protein phosphorilation by specific kinases are inhibited.

In the present work, the effect of propofol anaesthesia on neutrophil function was studied in a group of young patients undergoing surgery for strabismus correction. Anaesthesia was obtained by intravenous administration of propofol and remifentanil (a specific µ-receptor opioid agonist). Neutrophil function was measured by whole blood luminol- and lucigenin-dependent chemiluminescence (CL) in presence or absence of zymosan or PMA. Peripheral blood was obtained before and after 45 minutes of general anaesthesia, and after 2 and 24 hours after the end of surgery.

Despite the small number of patients (9 patients), discriminant analysis of the results clearly indicates that, while no variation of CL response was present after 45 minutes of anaesthesia, CL specific activity was significantly modified after 2 and 24 hours. In particular, modifications of either CL intensity and kinetics were obtained.

The results of this study clearly indicate that propofol (and remifentanil) anaesthesia induces a modification of neutrophil function that is long-lasting if compared to the short-lasting anaesthetic effect.