Date :

Title : T LYMPHOCYTE FUNCTION AND PMN CHEMOTAXIS IN ANESTHESIOLOGISTS AND OTHER OR PERSONNEL

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INTRODUCTION

The noxious effects of long-term exposure to anesthetic concentrations of nitrous oxide on the bone marrow of animals and man are well known. There are conflicting data in the literature whether T lymphocyte function is altered in anesthesiologists and OR personnel.[1] We have investigated T cell function in 15 individuals working in unscavenged operating rooms, by determining total T and "active" T lymphocytes in peripheral blood, assessing as well spontaneous blastogenesis, killer (K) cell function, and mixed lymphocyte culture (MLC) of these lymphocytes. Chemotaxis of polymorphonuclear leukocytes (PMN) was also evaluated in 80 operating room personnel, as well as 30 age and sex-matched controls.

METHODS

The following tests were performed on blood samples from 15 OR personnel and 15 control individuals not exposed to anesthetics: total T cell, active T cell, K cell, spontaneous blastogenesis and panel MLC. The T cell population was quantitated after standard lymphocyte separation from blood by a density gradient centrifugation and incubation of the lymphocytes and sheep red blood cells (SRBC) under varying conditions. Active rosette forming cells (A-RFC) formed after a five minute incubation at 37°C. Total T lymphocytes (T-RFC) were detected after a 60 minute incubation at 4°C.[2] Killer cell activity, spontaneous blastogenesis and mixed lymphocyte cultures (MLC) were determined using standard assays.[3] Chemotaxis of PMN was evaluated in 80 OR personnel and 30 controls, i.e. non-exposed individuals by a modification of the technique of migration under agarose.[4] 10% horse serum was used as the chemoattractant. The duration of chronic exposure to trace anesthetics was from three months to more than 30 years, and the age varied from 20 to 55 years.

RESULTS

There were no significant differences in total T cell, spontaneous blastogenesis and K cell cytotoxicity in the OR personnel compared to normal controls. A threefold increase of "active" T lymphocytes over the control was observed in 92% of the test group. A significant decrease in total PMN count was recorded for 60% of the OR personnel. However, we found that PMN chemotaxis was within normal limits. Our findings are summarized as follows:

T CELL FUNCTION AND PMN CHEMOTAXIS IN OR PERSONNEL

	T-RFC	A-RFC	K Activity	MLC	Spont. Blasto-genesis
n=15	normal	3 fold increase	normal	normal	normal

	PMN chemotaxis	PMN count
n=80	normal	decrease in 60%

DISCUSSION

Previous work has indicated that the "active" rosette forming cells are an index, correlating well with cell-mediated immune function. In contrast, the total number of rosette forming cells or total T reflect the presence and distribution of T cells, without necessarily indicating their function. Normal numbers of total T cells can be associated with severe disease, as well as abnormal in vitro testing. Previous studies on T lymphocyte function in anesthesiologists and other OR personnel refer only to total T cells.[1] Our finding of an increase in "active" T cell in OR personnel working in unscavenged operating rooms indicates a stimulation of the cell-mediated immune system, suggesting increased T cell activity. The anesthetic agents or factors which may be responsible for the stimulation have not been determined. The decrease in total PMN count is usually attributed to nitrous oxide. The effect of other volatile anesthetics should be ruled out by further studies, which will help to elucidate the mechanisms and agents responsible for the altered T cell function.

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