TRACHEAL EPITHELIAL ATYPIA IN GUINEA PIGS EXPOSED TO KEROSENE

Miriam Noa, Odelsa Ancheta, Ma.Cristina de la Rosa, Amelia Capote
National Center for Scientific Research. Post Box 6990. Havana City, Cuba

e-mail: miriam.noa@cenic.edu.cu

Kerosene is a petroleum by-product very much used for cooking, illumination and heating in underdeveloped countries. A high correlation has been demonstrated between the use of kerosene and the frequency of asthmatic crises in housewives and others workers who use it. An attempt has been made by our group using guinea pigs to demonstrate tracheal histopathological alterations with some epithelial damages being shown. Nevertheless, the ultrastructure of the upper respiratory tract using two different ways to induce kerosene damage has not been previously reported, this being the aim of this paper.

In group 1, guinea pigs were exposed to kerosene aerosols for 15 min daily, placed in a plastic box in which they inhaled droplets of kerosene (no more than 9 microns in diameter) at a mean concentration of 32.5 mg/L. The aerosol was made using a Wright nebuliser. In group 2, animals were exposed to kerosene smoke produced by a kerosene stove for two hours, in both groups, animals were exposed during 21 days. Two others groups were studied as controls, in one of them, animals were kept in atmospheric air and in the other, guinea pigs were exposed to a saline aerosol for 15 min daily under conditions similar to group 1. Light and electron microscopic studies (TEM and SEM) were carried out on tracheas of these animals. For paraffin sections, tracheas were fixed in 10% buffered formalin, sections were stained with haematoxylin and eosin. In groups 1 and 2, at light microscopy, tracheas showed epithelial atypia (basal cell hyperplasia, lost of intercellular adherence, irregular epithelial stratification) and inflammatory infiltrate in the lamina propria. The ultrastructural studies showed the same alterations, as well as changes of the ciliation of the tracheas ciliated cells.

In the control group none of the above changes were observed. Our results indicate that kerosene engender changes in tracheas of guinea pigs. It should be convenient to do other experiments to see whether the alterations are reversible if the irritating agent is removed, or whether the atypias develop into a cancer if exposure is longer.

Figs 1 and 2.-Tracheas of kerosene treated guinea pig showing basal cell hyperplasia, inflammatory infiltrate within the epithelium and in the lamina propria and loss of intercellular adherence. 179X.

Fig. 3. Electron micrograph of tracheae of a guinea pig treated with kerosene showing the cilium with swelling and distortion of the ciliary membrane. X 3,000