Abstract

Introduction. Vibroacoustic disease (VAD) is the whole-body pathology caused by excessive exposure to LFN. For the past 25 years, it has been known that low frequency noise (LFN, <500 Hz, including infrasound) targets the respiratory system. In LFN-exposed rodents, the morphological changes of respiratory tract tissue partially explained some respiratory symptoms reported by VAD patients. However, many questions remain unanswered. Recently, some volunteer VAD patients underwent bronchoscopy in order to ascertain possible damage that could be associated with their respiratory complaints.

Methods. Fourteen fully-informed and volunteer VAD patients were submitted to bronchoscopy, and biopsies were removed for analysis.

Results. All patients exhibited small submucosal vascular-like lesions near the spurs, consisting of increased collagen and elastin fibres. Histology disclosed ciliary abnormalities, basal membrane hyperplasia, and thickening of vessel walls. In five patients, collagen bundles appeared degenerative and disrupted. No inflammatory process was ever identified, and no differences were seen between smokers and non-smokers.

Discussion. Data is in accordance with what was observed in LFN-exposed animal models and also in 8 VAD patients who developed lung tumours. Collagen disruption and degeneration was also observed in electron microscopy images of the respiratory tract of LFN-exposed rodents. Thickened blood and lymphatic vessel walls have been consistently seen in images of VAD patients and of LFN-exposed rodents. During bronchoscopy performed by other reasons, this sort of structural aspects is not frequently seen. Taken together, it is strongly suggested that these findings could be VAD-specific.

Keywords
Low frequency noise, vibroacoustic disease, vascular lesions, displasia, auto-immune disorders, collagen disease, ciliar structure, apoptosis, mecano-transduction.