

A confocal, structural and ultrastructural investigation on Salzmann's nodular corneal degeneration

Antonio Micali¹, Anna Roszkowska², Rosaria Spinella², Pasquale Aragona², Antonina Pisani¹, Domenico Puzzolo¹

¹ Department of Biomorphology and Biotechnologies, University of Messina, Italy

² Department of Surgical Specialties, Section of Ophthalmology, University of Messina, Italy

Salzmann's Nodular Degeneration (SND) of the cornea is a non-inflammatory, slowly progressive, generally bilateral disease, whose pathogenesis is still unknown. It is characterized by single or multiple whitish-gray nodules raised above the corneal surface. Aim of the present work was to investigate the structure and the ultrastructure of an advanced SND and to correlate it to confocal *in vivo* findings. A forty-three years old man complained a progressive bilateral visual impairment during the past eight years. At the slit lamp examination he showed in both eyes partially confluent whitish, sub-epithelial nodules localized in the mid periphery of the cornea: the clinical diagnosis of SND was made. Confocal examination with Confoscan 4 (Nidek Technologies, Italy) was performed before the treatment and after 1, 6 and 12 months. Thick membranes containing nodules were then removed manually from both eyes and they were processed for the structural and ultrastructural analysis on semithin and ultrathin sections. With the confocal microscope, in both examined eyes the basal epithelial cells showed elongated shape, especially in close proximity to the nodules. After SND removal, the resurfaced new epithelium exhibited at confocal regular pattern even after 12 months while activated keratocytes were present in the superficial stroma. At 6 months after the treatment, it was possible to demonstrate sub-basal nerves bundles, which appeared extremely thick with a well-evident tortuous course. The light and electron microscopic investigations demonstrated that the corneal epithelium, even if dramatically reduced in thickness over the nodules, showed a well-preserved morphology in all its layers, as it was also confirmed by the normal growth after the surgical treatment. No superficial nerve bundles were detected in the stroma under the nodules. It is hypothesized that SND might be the final result of trophic disturbances secondary to altered corneal nerves distribution as a consequence of different, and yet unknown, chronic local or general disorders. After nodules removal, sporadic and irregular sub-basal nerves could be observed, as an attempt to increase the trophism of the entire cornea.

Key word

Cornea, ultrastructure, SND