Melanoma associated spongiform scleropathy

Characterization, biochemical and immunohistochemical studies

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ABSTRACT

This PhD dissertation work was carried out at the Eye Pathology Section, Institute of Neuroscience and Pharmacology, University of Copenhagen.

Melanoma associated spongiform scleropathy (MASS) is a non-inflammatory scleral change with a spongiotic morphology seen in association with uveal melanoma.

MASS is seen as whitish spindle shaped areas within the sclera that is adjacent to and in contact with a choroidal or ciliary body melanoma. MASS changes of different grades of severity were seen in 38% of 363 melanoma eyes investigated.

A significant high incidence of MASS was found in old age groups. The development of MASS and its severity are influenced by the extent of contact between the tumour and the sclera.

Statistical correlation was found between MASS and scleral and extrascleral tumour extension. More than 90% of 82 specimens that showed tumour extension were associated with MASS.

A biochemical analysis of scleral samples taken from areas with severe MASS showed a significant reduction of the main amino acids of collagen type I. This was associated with an increase in glycosaminoglycans. These findings indicate a collagen degradation process.

In situ hybridization showed a significantly more frequent and more intense expression of MMP-2 by scleral fibroblasts in areas with MASS compared with areas without MASS. This was also seen by immunohistochemical staining. Similar high frequency and intense expression of MMP-2 were seen in tumour infiltrating macrophages.

The results of biochemical and immunohistochemical studies indicate a collagen degradation process, which may be the result of the proteolytic enzyme MMP-2 expressed by scleral fibroblasts under the effect of tumour humeral factors and/or tumour infiltrating macrophages. This degradation results in fragmentation of the scleral collagen fibrils. This along with the accumulation of water in the sclera due to increased production of glycosaminoglycans leads to the histopathological picture of MASS.

The scleral degradation may facilitate tumour invasion and may explain the statistical relation between MASS and scleral tumour invasion.

MASS was found in a few of the eyes that had received pre-enucleation radiation. Possibly due to destruction of scleral fibroblasts.

No relation between MASS and survival was found.