Cerebrospinal Fluid Research

BioMed Central

Oral presentation

Open Access

Selective ependymal denudation and expansion of lateral ventricles of H-Tx rats appear as interrelated phenomena

Alexander R Ortloff* and Esteban M Rodríguez

Address: Instituto de Histología y Patología, Universidad Austral de Chile, Valdivia, Chile

Email: Alexander R Ortloff* - alexanderortloff@uach.cl

* Corresponding author

from 50th Annual Meeting of the Society for Research into Hydrocephalus and Spina Bifida
Cambridge, UK. 30 August – 2 September 2006

Published: 21 December 2006

Cerebrospinal Fluid Research 2006, **3**(Suppl 1):S18 doi:10.1186/1743-8454-3-S1-S18

Background

The mutant H-Tx rat starts to develop hydrocephalus around E18. In these rats, lateral ventricles are the only brain cavities becoming expanded. Although this dilatation has been ascribed to the stenosis of Sylvius aqueduct, the actual mechanism of such a selective ventricular dilatation remains to be elucidated. In other mutant rodents denudation of the ependyma has been shown to play a role in the development of hydrocephalus. With this in mind, the possibility that ependymal denudation also occurs in H-Tx rats has been investigated.

Materials and methods

The brains of normal and hydrocephalic E20, PN1, PN3, PN5, PN7 and PN10 H-Tx rats were processed for (i) scanning electron microscopy, (ii) immunocytochemistry, using a set of antibodies for the analysis of secretory (subcommissural organ) and ciliated ependyma.

Results

Lateral ventricles were the only brain cavities undergoing ependymal denudation. Such a process was already detected at E20, indicating that it may start at earlier stages of development. Studies are in progress to establish time of onset of ependymal denudation. In the lateral ventricles, only the dorsal ependyma detached. The denudation process started with the detachment of a few ependymal cells forming a small denuded area that could be regarded as a denudation centre. From this point, denudation expanded radially to form large circular denuded areas. At PN1, the dorsal wall of lateral ventricles displayed several denuded circles of different diameters. Surprisingly, the number, size and location of the circular denuded areas were similar in both lateral ventricles, suggesting that the ependymal denudation follows a pattern. Macrophages were abundant on either side of the denudation front. The total denuded surface increased with age by the confluence of the circles of denudation, so that at PN10 most of the dorsal ependyma was missing. In recently denuded areas all elements of nervous tissue became exposed and readily visualized under the scanning electron microscope. After a few days, the denuded areas appeared covered by astrocytes.

Conclusion

(i) In the H-TX rat, ependymal denudation of lateral ventricles follows a temporal-spatial pattern; (ii) denudation starts during foetal life, when hydrocephalus is not severe; (iii) ependymal denudation and hydrocephalus may be related at the etiopathological level, rather than the former being consequence of the latter; (iv) the early and selective denudation of lateral ventricles may explain the selective expansion of these ventricles.

Acknowledgements

Supported by Grants Fondecyt 1030265, Chile to EMR & Programa Doctorado Ciencias Veterinarias, Universidad Austral de Chile, to ARO.