The Development of the Angle of the Anterior Chamber

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Summary

A new theory about the developmental mechanism of the chamber angle, which explains the origin and disappearance of the mesodermal tissue in the normal angle and its persistence in congenital glaucoma.

Reference

Worst, J. G. F.: The pathogenesis of congenital glaucoma. Thesis Assen (1966).

Discussion

Hagedoorn: The theory of the splitting of the anterior chamber was put forward by Koelliker and for a long time was cited in all text-books. In 1930 a large comparative study which I undertook revealed the probability that this splitting in man is the result of extensive ingrowth of mesodermal cells, after the endothelium has grown in as a first layer. The whole picture in man, however, is not very clear.

The nature of the tissue in the chamber angle could, however, be beautifully seen in well-preserved specimens from the half-ape Tarsius.

I believe that the chamber angle is freed by atrophy (resorption) of tissue, and that persistence and increase or outgrowth of this tissue (persistent mesoderm, mesostroma) play their part in malformation in the chamber angle and thus probably also in the malformation which is found in buphthalmos.

Worst replies: It is true that I did not mention in my bibliography on this subject Prof. Hage < Iooris work on the development in Tarsius. The reason for this was that the stages of development with which my new theory is concerned are much later than the stages which were studied in Tarsius. My theory is

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only concerned with the chamber angle, the development of the anterior chamber itself has already taken place by this time and is not covered by the new theory.

Manschot asks if the speaker will elaborate on his statement that there is no evidence that splitting occurs in the chamber angle.

Worst replies: I can easily explain my last statement that I have found no evidence in my material that splitting of pre-formed layers is a mechanism involved in the formation of the chamber angle. In most of the good specimens, in which no shrinkage has occurred, no line of cleavage can be found between the corneo-scleral system on the one hand and the uveal system on the other. These specimens are the basis of the new theory. In a number of preparations a line of cleavage can be clearly seen, as demonstrated by Manschot in a former meeting. These cleavage planes are artefacts, by which I mean that these splits have no mechanical significance for the development. Extension of these cleavage planes leads to the separation of a portion of

the ciliary body from its insertion into the scleral spur in a completely un-physiological manner. This separation can only be produced mechanically as an artefact. Another argument against these splits being of importance in the developmental mechanism is that they are present at a much later stage of development than that at which the cleavage mechanism is thought to be active, according to Burian's original theory.

De Haas asks whether the speaker has found a continuous layer of endo-thelium in the chamber angle in cases of hydrophthalmos. Is cleavage of this layer therapeutically sufficient?

Worst replies: An extremely thin, continuous layer has only been seen in an occasional, very favourable case, passing from the base of the iris, over the persistent tissue in the chamber angle, to the cornea. It is probable that this is endothelium, but it is difficult to prove it, especially by means of histology. This difficulty is indicated by the rarity of preparations in which a continuous layer of endothelium covering the chamber angle is found.

Kok-van Alphen: The chamber angle in a child with buphthalmos reminds one of that of a cat, dog or pig; only the scleral vascular plexus is absent. Is it possible that the malformation in buphthalmos is of the atavistic type?

Worst replies: It is an attractive theory that we are dealing with an atavistic phenomenon and that the normal ligamentum pectinatum of pigs

dogs

cats

etc.

is phylogenetically related to the persistent ligamentum pectinatum of buphthalmos; I believe in it myself. When practising goniotomy on pigs' eyes

for example

one is struck by the similarity between the two structures.