THE DETERIORATION OF THE VISUAL FIELD IN GLAUCOMA AND THE BLOOD PRESSURE

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INTRODUCTION AND HISTORICAL REVIEW

In cases of raised intraocular pressure, the morphological findings at the site of the lamina cribrosa are a decrease in the capillary circulation with a loss of nervous tissue called cavernous atrophy, ultimately followed by compression of the remaining mesodermal supportive tissue and the development of excavation.

At present it is generally assumed that a decrease of the capillary circulation at the level of the lamina cribrosa constitutes the first objective sign of an increase of the intraocular pressure.

The question that arises is whether there exists a functional correlation between absolute or relative increase of the intraocular pressure and pressure in the vascular system that supplies the lamina cribrosa.

CLINICAL TESTS

As is generally known numerous experiments have proved that an artificial increase of the intraocular pressure to values approaching that of the systolic ophthalmic pressure results in a sudden narrowing of the visual field, and that a further increase of the pressure may result in the complete disappearance of vision and even of light perception, probably as a consequence of an interruption of the blood circulation of the neuro-retinal elements. The pressure required to provoke this phenomenon is proportional to the patient's systolic ophthalmic pressure.

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Functional disorders resulting from an impaired circulation at the level of the disc and lamina cribrosa are seen to occur if the intraocular pressure is increased to a value between the diastolic and the mean ophthalmic pressure. Such disorders can be demonstrated by the skiascotometric method (Goldmann, 1947, 1960). There is also a decrease of the sensitivity in that area of the visual field that is situated between 10° and 30° around the fixation point (Gafner & Goldmann, 1955; Goldmann, 1956).

Recently, Jaeger, Weeks & Duane (1964) referred to similar tests (skiascotometry), which showed that an increased intraocular pressure produced with Bailliart's ophthalmodynamometer resulted in disorders of the visual field typical of glaucoma. Drance (1962, 1966) also assumes a correlation between blood pressure and ocular lesions in case of increased ocular pressure.

It can further be concluded from the literature that a number of authors have noticed functional signs in cases where a disturbance of the equilibrium between the vascular pressure and the intraocular pressure can be regarded as the causal factor. These cases can be classified under three headings: abnormalities of the arterial pressure, treated cases of hypertension and cerebro-vascular resistance.

_Arterial hypertension and hypotension_

A general increase of the arterial blood pressure exerts a protective action against the harmful effects of an increase in the intraocular pressure (Bailliart, 1929; Dobree, 1956).

Sachsenweger (1963) concluded from a study of 240 patients that a low systemic blood pressure favours the occurrence of visual field defects and excavation of the disc, whereas an increased blood pressure counteracts these phenomena. The presence of vascular sclerosis favours the occurrence of lesions in glaucoma, even in the presence of arterial hypertension.

The proportion of patients who become blind as the consequence of glaucoma is larger among those with hypotension than among those with a normal blood pressure, and larger among those with normal than among those with increased blood pressure. In this connection it may be noted that the ophthalmic pressure is more interesting than the systemic blood pressure.

Sobanski (1935, 1936) was of the opinion that a too low blood pressure in relation to the increased intraocular pressure is the cause of the degeneration of the optic nerve and the narrowing of the visual field in tabes. In his opinion, this explained the functional disorders even in cases of glaucoma without pres-