THE RETINAL VESSELS

R. SEITZ

Translated by

Blodi

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Comparative ophthalmoscopic and histologic studies on healthy and diseased eyes

by

R. SEITZ, M.D.

First Assistant of the University Eye Clinic, Tuebingen

Translated by

Frederick C. Blodi, M.D.

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With 363 illustrations, including 32 in color

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Foreword to English edition

The study of pathologic anatomy has experienced a renaissance during the last decade which is due to a number of factors. One factor is the availability of sophisticated, special staining techniques which allow a histochemical determination of a variety of compounds in and around the eye. These methods have greatly enriched our knowledge of mucopolysaccharides, neural structures, and respiratory and other enzymes in the eye. The electron-microscopic examination of the ocular structures represents another boost to the interest in the morphology and pathology of the eye.

Finally, we have recently come to appreciate that a close and detailed correlation between the clinical, or gross, findings and the microscopic picture of lesions of the fundus may greatly enhance our understanding of the basic pathology of many diseases. This is especially true for degenerative diseases of the retina, for retinal detachment, and for pathologic alterations of the vitreous.

A beautiful example for such a comparative study is this monograph by Dr. Seitz. It should clarify many misconceptions regarding pathologic processes of the retinal vessels, and it should remain the basic foundation on which further observation on the retinal vasculature are made.

Frederick C. Blodi, M.D.
Iowa City, Iowa

Foreword to English edition

Preface to German edition

In 1892 Gunn described the "crossing phenomenon" of the retinal vessels. From the ophthalmoscopic picture he thought that this was a venous compression by a hardened artery. This opinion is still popular even today, though in 1937 Sallmann showed that this is a misconception: in two cases which ophthalmoscopically appeared as venous compressions, he found, histologically, only a densification of the adventitial tissues which simulated a narrowing of the venous caliber. The ophthalmoscopic picture was, therefore, misleading. Sallmann's conclusions could be corroborated by R. Seitz (1958) on a large material.

This example shows that, contrary to common opinion, it is not always possible to deduce the histologic substrate from an apparently unequivocal ophthalmoscopic picture.

The reasons for this are manifold:

The magnification with which we observe the fundus is actually quite small.

Our ophthalmoscopy is primarily an observation of tissues in direct illumination. The optical properties of the overlying tissue layers influence the evaluation of the deeper retina and of the choroid. Therefore, we cannot expect the same results as when we examine tissue sections under the microscope.

Another reason is that for some fundus changes the pathologic anatomic alterations are not sufficiently known. This is due to the fact that these changes may come to an enucleation only rarely, and if we have a chance to examine them histologically, a detailed ophthalmoscopic picture is frequently lacking.

These considerations show us the way by which we can avoid such ophthalmoscopic errors as they have been perpetrated in the "crossing phenomena." The solution is a comparative ophthalmoscopic and histologic examination performed by the same investigator.

R. Seitz has pursued his studies on the normal and diseased retinal vessels in a systematic way and, in my opinion, with great success. The careful comparison of numerous individual ophthalmoscopic changes with the corresponding histologic pictures has led to an extensive and informative treatise on the diseases of the retinal vessels. These studies enhance our knowledge of the pathologic anatomic changes, which are the basis of the ophthalmoscopically observed fundus diseases. In addition we receive many detailed instructions on the observation and evaluation of ophthalmoscopic findings. I believe, therefore, that not only the academically interested but also the practicing ophthalmologist will receive stimulation and enrichment from the study of this book.

H. Harms

Foreword to German edition

A few years ago I noticed in the fundus of a healthy young man marked "crossing phenomena." This patient had neither hypertension nor sclerosis, nor any other disturbance of his circulation. This and similar observations gave the stimulus to the present examinations. Such observations have probably been made by every ophthalmologist, though they cannot be reconciled with the generally accepted ideas on the etiology and pathogenesis of these "crossing phenomena."

We were at first only interested in the vessel crossings and the so-called "crossing phenomena." Again and again we encountered, on ophthalmoscopic examinations, some problems which concerned vascular changes in the neighborhood of these crossings. These were then included in our examinations. In this way we obtained observation after observation and our material, in the beginning only selected, became finally if not complete, nevertheless a rich collection of various diseases of the retinal vessels.

Our results are based on a comparison of the ophthalmoscopic and histologic findings of identical vessels. We have, therefore, studied not only the very marked vascular changes which may be characteristic for a certain vascular disease but also very early and noncharacteristic alterations. This was an advantage when we tried to use our results for the ophthalmoscopic evaluations of vascular changes in general. The execution of our examinations was made possible only by the good cooperation of the various clinics and institutes of the University of Tuebingen. I would like, therefore, to thank first of all the Director of the Medical Polyclinic of the University, Professor Dr. S. Heni, and the other physicians of the Medical Department for their cooperation and support. I would also like to thank Dozent Dr. E. Kallee, who counseled me in many physiologic chemical questions.

The pathologist of our University, Professor Dr. E. Letterer, was always willing to help me in the numerous pathologic anatomic problems. His enormous experience was of great assistance. Thanks to his stimulation

and guidance, this monograph covers not only the pathomorphology of the retina but could be put on a much broader basis. For this reason, and also for his kind permission to let me use this material, I shall always be in his debt. His co-worker, Dr. W. Heinzel, helped me in numerous conversations with his advice and guidance. These concerned especially the problems of kidney pathology.

I am also indebted to the neuropathologist, Professor Dr. G. Peters, in whose Institute in Bonn I worked for some time. It is there that I learned to correlate the pathologic findings in the retina with the corresponding neuropathologic changes.

Professor Dr. M. Schneider, Director of the Physiologic Institute of the University of Cologne, and Dozent Dr. K. Barbey, of the Physiologic Institute of the University of Tuebingen, gave me ample opportunity to discuss with them problems of the functional importance of the retinal vessel crossings. This part of the monograph developed under their influence and their critique.

I wish to thank my long-time assistant, Miss M. Eyssel, for the technical help in the preparation of the material. I also wish to thank our artist, Mr. W. Zeltmann, and our photographer, Mr. B. Schneider, who completed their tasks in such exemplary fashion.

The method of examination and observation which is the basis of this book has been instilled into me by my teacher, Professor Dr. H. Harms. This corresponds to his idea and his execution of an ophthalmoscopic examination. May this monograph, more than any words, express my gratitude to him for transmitting his scientific attitude.

I owe a special debt to the German Research Society which has subsidized my work for many years.

Some of the plates were provided without cost by Hoffmann-LaRoche. This has reduced the price of the book considerably.

Finally I would like to thank the publishing house, Ferdinand Enke, its Director Dr. A. Enke, and his associates, especially Mr. W. Th. Schmidt-Gabian. They fulfilled my wishes with consideration and in a magnanimous way. Many thanks, therefore, for this beautiful and much appreciated editorial labor.

R. Seitz, M.D.