DOMENICO COTUGNO
1736-1822

Da un ritratto in miniatura fatto dal vivo

CEREBROSPINAL FLUID

IN HEALTH AND IN DISEASE

BY

ABRAHAM LEVINSON, B.S., M.D.

ASSOCIATE IN PEDIATRICS, NORTHWESTERN UNIVERSITY MEDICAL SCHOOL; ATTENDING PEDIATRICIAN CHILDREN'S HOSPITAL OF THE COOK COUNTY HOSPITAL, CHICAGO; ATTENDING PEDIATRICIAN, SARAH MORRIS HOSPITAL FOR CHILDREN OF THE MICHAEL REESE HOSPITAL, CHICAGO; ATTENDING PEDIATRICIAN, MOUNT SINAI HOSPITAL, CHICAGO

WITH FOREWORD BY

LUDVIG HEKTOEN, M.D.

WITH EIGHTY-EIGHT ILLUSTRATIONS, INCLUDING FIVE COLOR PLATES

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To Him to Whom the Practice of Medicine Constitutes an Ideal Rather Than a Profession,

To Him Who Combines Clinical Insight and Scientific Research,

To Him Who Sees in Medicine Both a Science and a Philosophy,

This Little Volume is Respectfully Dedicated.

FOREWORD

By Ludvig Hektoen, M.D.

The author was kind enough to ask me if I would look over his manuscript and then tell him whether it seemed to me worthy of publication. Later, when I told him that in my opinion he had produced a valuable little book, he requested me to state the reasons for this favorable opinion in the form of a foreword. This I can do in a few brief statements.

In the first place, on reading the manuscript, I soon became aware that the author had come to his task with not only a large experience behind him in the examination by various methods of the cerebrospinal fluid as an aid in diagnosis, but with a highly creditable record in the scientific study of this fluid as well. Evidently he had been drawn to his work on the cerebrospinal fluid because of its attractiveness as a field of research, as well as on account of its importance in diagnosis.

It is to this happy combination of true philosophic interest and first-hand practical knowledge on the part of the author that the book owes its chief merit, namely, thoroughness and freshness in the parts dealing with fundamental problems, as well as in those dealing with practical matters. In the second place there could be no doubt in regard to the timeliness of a work of this kind. Indeed it seemed to me that a definite want would be supplied; for, in spite of an increasing importance in medicine, there was as yet no comprehensive book on all phases of the cerebrospinal fluid.

John McCormick Institute
For Infectious Diseases, Chicago, 1919.

PREFACE TO THIRD EDITION

The constantly increasing interest of clinicians and research workers in the study of cerebrospinal fluid has been a source of gratification to me. It has made the preparation of a third edition of this book a "labor of love" in spite of the enormous amount of work entailed.

In this edition I have tried to keep pace with the development of the subject and have endeavored to incorporate both the results of other workers in the field and my own recent investigations. I have attempted to do this in as compact a form as possible to obviate the necessity of adding unduly to the length of the book.

In order to simplify the reading of this volume, I have rearranged the chapters, separating the clinical from the theoretical sections of the book. With the same thought in mind, I have tried to present the simplest methods to be employed by the practicing physician.

I wish to acknowledge my indebtedness to Dr. R. L. Kahn, the author of the Kahn test, for his brief description of his test.

I also wish to express my thanks to Dr. M. A. Perlstein for the valuable assistance he has rendered in the preparation of the third edition of this book.

Chicago, Ill., 1929. A. LEVINSON.

PREFACE TO THE SECOND EDITION

The welcome given the first edition of this book by medical reviewers as well as by the medical profession at large has encouraged me to undertake a second edition.

I have taken this opportunity to incorporate the results of the most recent research on cerebrospinal fluid. The

addition of new data and the revision of old has necessitated the recasting of some chapters. Several old illustrations have been discarded and many new ones have been added. Some of the methods of examination have been simplified for practical use. References have been brought up to date, and wherever possible errors have been corrected.

A. LEVINSON.

Chicago, Ill., 1923.

PREFACE TO FIRST EDITION

Of recent years the study of body fluids has been engaging the attention of many physicians and scientists. Particularly marked has been the interest in the study of cerebrospinal fluid. Through recent investigations of this fluid, we have gained a great deal of information regarding the diagnosis and nature of many diseases and a much clearer conception of the general physiologic processes in the body. Further investigations on the subject will open up new possibilities in science and medicine, for there is hardly another body fluid that presents so favorable an opportunity for the study of physiologic and pathologic processes in the human body as the cerebrospinal fluid.

Cerebrospinal fluid is of great physiologic importance for various reasons. It is the clearest and most transparent of all the fluids of the body. It is clearer than blood, than bile, and even clearer than urine, and under normal conditions experiments may be made on it without fear of clot formation or color change. Furthermore, cerebrospinal fluid, like blood and urine, can be removed from the living body without injury to the system. This gives one the opportunity of working with processes in the living body—a distinct advantage over the study of dead tissue.

From the standpoint of pathology also, cerebrospinal fluid presents an exceptional opportunity for study. The slightest change in the color of the fluid, the smallest increase in the protein content or in the cell count, all of which are easily discernible, indicate the presence of a pathologic process. One is able to follow the course of disease throughout all stages by noting the various changes the cerebrospinal fluid undergoes from time to time. These changes may be manifested not only by the presence of the causative organisms themselves, but just as frequently by specific physical, chemical, cytologic and physicochemical processes. A close study of the changes in the cerebrospinal fluid under pathologic conditions throws light, not only on the specific diseases of the nervous system, but on the condition of other systems. One can readily see, therefore, how large is the scope for the study of cerebrospinal fluid.

In this book I shall discuss cerebrospinal fluid in its various phases, and shall attempt to show the nature of the fluid in its normal state and to point out the deviations in processes of disease. I shall incorporate the results of my own clinical and experimental studies as well as the observations of the many workers who have added to our knowledge by their researches on cerebrospinal fluid.

This little book is sent out as an humble contribution, as I am fully aware of its many shortcomings and omissions; but if it saves the busy practitioner the irksome task of consulting countless sources for information on cerebrospinal fluid, I shall feel that the work has not been in vain. And if perchance it should serve to stimulate even one zealous student to help solve some of the problems presented, I shall feel that my effort has been amply rewarded.

Many of the investigations that have found their way into this volume would not have been possible without the constant cooperation of certain institutions and individuals. I, therefore, take this opportunity of expressing my

gratitude to them collectively and individually—to the attending staff, internes and nurses of the Michael Reese Hospital in general, and the Sarah Morris Hospital for Children in particular, to Dr. Katharine Howell, serologist of the Nelson Morris Institute for Medical Research, to Professor F. C. Becht of the Department of Pharmacology of the Northwestern University, and to Dr. G. Bartelmez of the Department of Anatomy, University of Chicago.

Particular thanks are due to Professor Ludvig Hektoen of the University of Chicago for his helpful suggestions and for his careful reading of the manuscript, and to Professor Shiro Tashiro of the Department of Biochemistry of the University of Cincinnati for his tireless assistance in checking up many of the experiments. Thanks are also due the editors and publishers of the many journals for their permission to republish some of my articles that appeared in their journals.

A. Levinson.

Chicago, Ill., 1919.

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