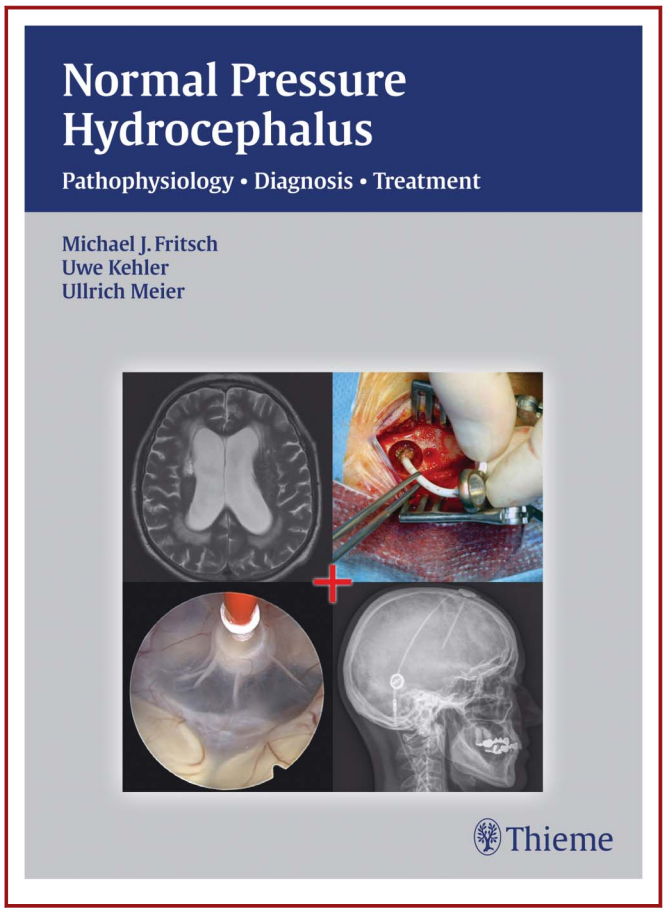
M. Beatriz S. Lopes, MD, PhD
Department of Pathology
University of Virginia School of Medicine
Charlottesville, Virginia

10.1227/NEU.0000000000000616



Book Review: *Normal Pressure Hydrocephalus: Pathophysiology, Diagnosis, Treatment*

By: Michael J. Fritsch, Uwe Kehler, Ullrich Meier
Published by: Thieme Medical Publishers, Inc,
New York, NY, 2014
Hardcover: 204 pp.
Price: $149.99
ISBN: 978-3-13-164601-9

Normal Pressure Hydrocephalus: Pathophysiology, Diagnosis, Treatment by Fritsch, Kehler, and Meier provides a well-written, timely, and readable summary regarding this important topic that is relevant for Neurosurgeons, Neurologists, or Geriatricians. Normal pressure hydrocephalus (NPH) refers to the triad of neurological symptoms (gait, cognitive, and urinary) with associated ventriculomegaly (hydrocephalus) first described by Hakim[1] in 1965. The topic has relevance and this is well stated by the authors: idiopathic NPH (iNPH) is frequently undiagnosed, the number of potential patients is rising as populations demographics evolve because of increased lifespan, and there is effective treatment available for this disorder. iNPH is a treatable form of dementia and should be recognized as such.

The authors have started their book with an introduction to the concept of secondary NPH (sNPH), which is often thought of as acquired hydrocephalus and iNPH. This has the potential to be confusing in that iNPH typically refers to elderly patients, who are most associated with this disease. Most of the book deals with iNPH patients, but there is frequent use of the term NPH and rare use of sNPH. I think it is reasonable to assume that while much of the book may have applicability to adult hydrocephalus patients, it is reasonable for the reader to accept that the majority of the material presented is directed toward the elderly patient with iNPH.

Chapter 2 navigates the literature regarding the epidemiology of iNPH. Prevalence is often discussed in terms of the percentage of patients over the age of 65 with dementia, or over the age of 65 total. It is challenging to find reliable information regarding the prevalence of iNPH. However, while the authors have attempted to review the literature, they often refer to the prevalence of patients evaluated in a study, rather than in the whole population. Determining the incidence of iNPH is also a difficult subject to evaluate. Additional caution should be exercised given the problems that exists with determining what incidence at different ages might mean. Although most think the increase of iNPH rises with increasing age, there is no reliable published information regarding this topic.

The chapters dealing with history (Chapter 3), clinical characteristics and differential diagnosis (Chapter 4), noninvasive diagnostic work-up (Chapter 6), and imaging (Chapter 7) are excellent, concise reviews with good illustrations. Each of these will provide the reader with a balanced overview of the subject material.

Chapter 8, which deals with invasive diagnostic work-up, is perhaps the most important in the book. It is critcal to understand the takeaway message: currently there are good and reliable methods to determine if a patient with symptoms and hydrocephalus could benefit from treatment. The noninvasive diagnostic workup, while important, does not adequately predict the benefits of treatment. Here the differences in current common practice between Europe and North America are reflected by the proportion of time spent discussing the lumbar cerebrospinal fluid infusion, which is more commonly used in Europe, vs the large volume lumbar puncture, also called the Tap Test or extended lumbar drainage, which are more commonly performed in North

American and Japan. The diagnostic pathway outlined in Figure 8.7 (page 53) is broad in scope and directed to what the authors have described as the entire NPH population. This is somewhat different from that reflected in the iNPH guidelines document presented in 2005 by Marmarou et al,[2] which are specifically directed to the iNPH population, and it would be valuable for the reader to compare the 2 approaches.

Chapter 9 provides a review of shunt technology issues and covers the major programmable valves that are commonly used and the different approaches used to attempt management of siphoning effects. The section that covers the classification of shunt valves is an important part that helps set the stage for the issues associated with the different approaches to shunt design that are discussed within the chapter. There is an emphasis placed on gravitational valves that reflects the authors experience and biases. In addition, while Chapter 10 provides 3 different perspectives regarding shunt and valve settings in the treatment of NPH, it is apparent that these opinion pieces reflect the current lack of consensus that exists regarding the optimal shunt material, valve type, or best shunt insertion location.

Chapter 11 deals with surgical technique for shunt insertion and should be read closely in conjunction with Chapter 15, which examines complications of treatment. The principles are solidly presented. Readers should consider this a good starting point if they wish to explore the methodology associated with shunt insertion and revision. Here the illustrations are limited to 1 type of valve technology, and it would have been of benefit to show other valve systems to demonstrate potential nuances. Unfortunately, we lack comprehensive, multicenter prospective data that documents shunt complications and treatment outcomes for adult patients with hydrocephalus. However, some lessons can be extrapolated from current pediatric literature. In particular, when dealing with shunt infection prevention, it would also be helpful for readers to familiarize themselves with the concepts presented by Kestle et al[3] as relates to use of infection prevention quality improvement bundles.

Chapter 12 examines the role of endoscopic third ventriculostomy in the management of patients with NPH. Chapters 13, 14, and 16 examine, respectively, scales and scores, follow-up management, and prognosis. Neurosurgeons managing adult patients with hydrocephalus should be aware of the potential significant benefits of endoscopic third ventriculostomy, especially in younger patients. However, as the authors point out, endoscopic third ventriculostomy should not be used as a standard treatment for iNPH patients unless further clinical research data substantiates a definitive role.

Chapter 17 ends the book with a perspective regarding goals for the future. We currently lack high-quality prospectively collected data to substantiate most management recommendations that would allow the development of an evidence-based assessment and treatment approach. That said, the authors have done an excellent job of guiding us through the available information, and they provide reasonable recommendations regarding how to approach the iNPH patient population. In Chapter 17, the authors provide some thoughts on what developments need to be accomplished to meet the current and future demands that the iNPH population presents to modern Clinical Neuroscience practice and are worthy of careful consideration.

In summary, this is an excellent book that can be used as a starting point to gain a basic understanding regarding the assessment and management of the adult iNPH patient and would be recommended reading for anyone with an interest in this important topic.

Disclosures

The author is a member of the Board of Directors of the Hydrocephalus Association and has received grant support from the Hydrocephalus Association, is a member of the Medical Advisory Board of Aqueduct Neurosciences, and is a consultant for Codman Canada and Medtronic Canada.

Mark G. Hamilton, MDCM, FRCSC, FAANS
Department of Clinical Neurosciences
Division of Neurosurgery
University of Calgary
Calgary, Alberta, Canada

REFERENCES

1. Adams RD, Fisher CM, Hakim S, Ojemann RG, Sweet WH. Symptomatic occult hydrocephalus with "Normal" cerebrospinal-fluid pressure. A treatable syndrome. *N Engl J Med.* 1965;273(3):117-126.
2. Marmarou A, Bergsneider M, Klinge P, Relkin N, Black PM. The value of supplemental prognostic tests for the preoperative assessment of idiopathic normal-pressure hydrocephalus. *Neurosurgery*. 2005;57(3 suppl):S17-S28 discussion ii-v.
3. Kestle JR, Riva-Cambrin J, Wellons JC III, et al. A standardized protocol to reduce cerebrospinal fluid shunt infection: the hydrocephalus clinical research network quality improvement initiative. *J Neurosurg Pediatr.* 2011;8(1):22-29.

10.1227/NEU.0000000000000620