Book Review: “Cerebral Small Vessel Disease”. What’s the Big Deal about Small Vessels?

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Book review: “Cerebral small vessel disease”. What’s the big deal about small vessels?

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A book review on Cerebral Small Vessel Disease


Cerebral small vessel disease is perhaps among the most common pathologies in the aging brain, primarily affecting the small perforating arteries and arterioles in the cortex and underlying structures of the white and deep gray matter. Small vessel disease includes hypertensive arteriopathy (arteriosclerosis, fibrohyalinosis, or lipohyalinosis) and cerebral amyloid angiopathy (injury to the vascular wall caused by deposition of the amyloid-β) as well as a range of less common genetic/hereditary or other forms with various etiologies (1). These small vessel disease processes can lead to vessel occlusion with small subcortical (lacunar) infarcts – accounting for a third of symptomatic strokes, or to vessel rupture with spontaneous intracerebral hemorrhage. Intracerebral hemorrhage, in particular, is the most severe and lethal type of stroke. The clinical importance of small vessel disease goes beyond causing obvious acute stroke syndromes, since it is also the commonest cause of “silent” strokes with cumulative effects on cognition. In fact, asymptomatic small vessel disease revealed by MRI, such as leukoaraiosis, cerebral microbleeds, etc., play a key role in vascular cognitive impairment and dementia, one of the biggest challenges facing all aging societies.

The pathophysiological and clinical spectrum of small vessel disease continues to expand rapidly, as revealed by the increasing number of published reports each year. Despite being known to pathologists for decades, as the resolution of brain MR imaging grows, parenchymal injury associated with small vessel disease is unraveled in vivo, creating many clinical dilemmas in stroke medicine, dementia, and aging. Hence, small vessel disease is of key interest to a broad scientific and clinical community.

Cerebral small vessel disease (Figure 1) is a 371-page multi-authored textbook attempting to bring all sources of information together in a single volume, to summarize the entire current knowledge, and controversies in the field. The book covers a range of topics, from pathological, pathogenic, and genetic aspects, to current neuroimaging (clinical and research) methods, biomarkers, and various clinical aspects. The volume is organized in four sections. The first covers basic definitions, classification, pathology, and basic aspects. Three chapters devoted in key ischemic and hemorrhagic consequences of small vessel disease, achieve to reaffirm the geography of pathology, and bring the subject to life. The second section deals with various neuroimaging and laboratory aspects, both in the routine clinical setting and new approaches to image small vessel disease. The third section discusses the clinical consequences of small vessel disease in specific settings and its role in cognition and...
disability. Finally, the last section poses an interesting approach in the
treatment of small vessel disease, with new hypotheses on trial
design and a glimpse into the future of the field.

One of the few aspects not systematically covered in the book
is an informative discussion on MRI-visible perivascular spaces,
a relatively new marker of small vessel disease and a current hot
topic in research. In addition, the chapters dealing with hem-
orrhagic aspects of small vessel disease are somewhat under-
represented in this volume. Chapter 4 focusses on the pathologic
consequences of hemorrhagic small vessel disease, providing an
excellent overview of the topic. However, a chapter dedicated
to all the different aspects of spontaneous intracerebral hem-
orrhage is missing; instead, this important topic rather appears
patchy within different chapters. I also feel that the clinical and
pathophysiological spectrum of cerebral amyloid angiopathy is
not captured in its entirety. Chapter 13 “Imaging of hemor-
rhagic cerebral small vessel diseases” partly compensates for this
by presenting an excellent modern summary of the key imag-
ing findings and clinical types of amyloid angiopathy, including
cerebral microbleeds and cortical superficial siderosis, but some
of these aspects might have benefited by more detailed individual
chapters going in greater depth. Similarly, the possible contribu-
tion of cerebral amyloid angiopathy in cognitive impairment and
dementia is only briefly covered. Finally, clinicians should not
expect a book with evidence-based recommendations on how to
manage their patients with all different MRI lesions suggestive
of small vessel injury, partly since there are, as yet, no reliable
data to inform clinical guidelines on specific treatment settings,
such as thrombolysis, oral anticoagulation, etc. Despite this, the
authors cover in a comprehensive way the current evidence where
available.

Overall, the Editors have done a remarkable job in assembling
a world-class team of authors, both established authorities in their
fields as well as rising stars. As is often the case with books of this
kind, given the relatively long time required to collect a multi-
author book, several important new findings made in the interim
might be missing. Due to the diverse co-author teams, the style
varies between chapters, but the reader will benefit from all the
different perspectives. Although each chapter can be read as a
stand-alone piece, the book flows nicely with repetition between
chapters minimized as much as possible – it can hence also be used
as a single comprehensive volume. This book will be of interest to
all clinicians and researchers working in the fields of stroke and
cognitive impairment, including students or trainees new to the
field, wanting to know what is the big deal about small vessels as
well as the more experienced clinician or neuroscientists in the
field.

The book goes a long way synthesizing practical clinical knowl-
edge and basic aspects in small vessel disease and in bridging
the gap between what we see on MRI, what we know, and what
we can do, on this fascinating topic. Definitive answers to many
questions cannot yet be provided, but this volume will contribute
significantly in understanding all that is known and directions for
future research. The editors and authors have rendered a great
service by putting this piece together. To quote Steven Greenberg,
“There is nothing small about the consequences of small-vessel
disease” (2), and arguably cerebrovascular diseases and cognitive
impairment are becoming the leading cause of death and disability
worldwide. The publication of this book is timely as it coincides
with major advances and a great momentum in the field (3).

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