

Rare Causes of Stroke





Rare Causes of Stroke

A Handbook

Edited by

Derya Uluduz

Istanbul University

Anita Arsovska

University of Ss. Cyril and Methodius





CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India

103 Penang Road, #05-06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781108821254

DOI: 10.1017/9781108902793

© Cambridge University Press 2022

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2022

Printed in the United Kingdom by TJ Books Limited, Padstow Cornwall

A catalogue record for this publication is available from the British Library.

Library of Congress Cataloging-in-Publication Data

Names: Uludüz, Derya, editor. | Arsovska, Anita, 1970- editor.

Title: Rare causes of stroke: a handbook / edited by Derya Uluduz, Anita Arsovska.

Description: New York, NY: Cambridge University Press, [2022]

Includes bibliographical references and index.

Identifiers: LCCN 2021061756 (print) | LCCN 2021061757 (ebook) |

ISBN 9781108821254 (paperback) | ISBN 9781108902793 (ebook)

Subjects: MESH: Stroke - etiology | Handbook

Classification: LCC RC388.5 (print) | LCC RC388.5 (ebook) | NLM WL 39 |

DDC 616.8/1-dc23/eng/20220307

LC record available at https://lccn.loc.gov/2021061756

LC ebook record available at https://lccn.loc.gov/2021061757

ISBN 978-1-108-82125-4 Paperback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

Every effort has been made in preparing this book to provide accurate and up-to-date information that is in accord with accepted standards and practice at the time of publication. Although case histories are drawn from actual cases, every effort has been made to disguise the identities of the individuals involved. Nevertheless, the authors, editors, and publishers can make no warranties that the information contained herein is totally free from error, not least because clinical standards are constantly changing through research and regulation. The authors, editors, and publishers therefore disclaim all liability for direct or consequential damages resulting from the use of material contained in this book. Readers are strongly advised to pay careful attention to information provided by the manufacturer of any drugs or equipment that they plan to use.



Contents

List of Contributors ix Preface xvii

1 Inflammatory Conditions

- 1.1 Isolated Vasculitis of the Central Nervous System 1 Bora Korkmazer, Osman Kızılkılıç
- 1.2 Primary Systemic Vasculitis 10
 1.2.a.1 Giant Cell Vasculitis:
 Temporal Arteritis 10
 Hrvoje Budinčević, Marija
 Sedlić, Marina Ikić
 Matijašević, Vedran Ostojić
 - 1.2.a.2 **Giant Cell Vasculitis: Takayasu Arteritis** 17

 Marialuisa Zedde, Rosario
 Pascarella
 - 1.2.b.1 Necrotizing Vasculitis:

 Polyarteritis Nodosa
 (PAN) 24
 Sezgin Sahin, Fatih Haslak,
 Kenan Barut, Ozgur
 Kasapcopur
 - 1.2.b.2 Necrotizing Vasculitis:
 Churg-Strauss Syndrome
 (Eosinophilic
 Granulomatosis with
 Polyangiitis) and Stroke 28
 Klearchos Psychogios
 - 1.2.c.1 Granulomatous Vasculitis:
 Wegener
 Granulomatosis 34
 Amra Adrovic, Mehmet
 Yildiz, Ayten Aliyeva, Ozgur
 Kasapcopur
 - 1.2.c.2 Granulomatous Vasculitis: Lymphomatoid Granulomatosis 40

- Phillip Ferdinand, Christine Roffe
- 1.2.d.1 Vasculitis with Prominent Eye Movement: Susac Syndrome 45 Bengi Gül Türk, Sabahattin Saip
- 1.2.d.2 Vasculitis with Prominent Eye Movement: Vogt-Koyanagi-Harada Disease 50 Cheryl Carcel
- 1.2.d.3 Vasculitis with Prominent Eye Movement: Eales Disease 54 Sabrina Anticoli, Francesco Motolese
- 1.2.d.4 Vasculitis with Prominent Eye Movement: Cogan Disease 60 Nikoloz Tsiskaridze, Alexander Tsiskaridze
- 1.3 Vasculitis Secondary to Systemic Disease 66
 - 1.3.a Systemic Lupus
 Erythematosis 66
 Vildan Yayla, Hacı Ali
 Erdoğan, İbrahim Acır
 - 1.3.b **Behçet's Disease** 72 Uğur Uygunoğlu, Aksel Siva
 - 1.3.c **Sjögren Syndrome** 79 Marilena Mangiardi, Sabrina Anticoli
 - 1.3.d **Sarcoidosis** 85 Dilcan Kotan, Aslı Aksoy Gündoğdu

٧



vi

Contents

- 1.3.e Inflammatory Bowel
 Disease 92
 Gökhan Kabaçam,
 Merhmet Arhan, Murat
 Törüner
- 1.3.f Cerebral Amyloid
 Angiopathy-Related
 Inflammation 99
 Marialuisa Zedde, Rosario
 Pascarella, Jacopo C. De
 Francesco, Fabrizio
 Piazza

2 Infectious and Postinfectious Vasculitis

- 2.1 **Meningovascular Syphilis** 107 Thierry Adoukonou
- 2.2 Neuroborreliosis 112Zeljko Zivanovic, Nikola Boban,Vladimir Galic
- 2.3 **Tuberculosis Meningitis** 119 Yared Z. Zewde, Seda Tadesse
- 2.4 **Bacterial Meningitis** 125 Marilena Mangiardi, Eytan Raz
- 2.5 Neurocysticercosis 132Maria Cristina Bravi,Alfano Guido
- Varicella-Zoster
 Virus-Related: Cytomegalovirus
 (CMV) and Herpes
 Infections 137
 Asma Akbar Ladak, Mohammad
 Wasay
- 2.7 HIV Infection 141 Massimo Leone, Darlington Thole, Fausto Ciccacci, Maria Cristina Marazzi
- 2.8 **Chagas Disease** 147 Vinícius Viana Abreu Montanaro

3 Hypercoagulable Causes of Stroke

- 3.1 Antiphospholipid Antibody Syndrome 151 Luana Gentile, Danilo Toni
- 3.2 **Hyperhomocysteinemia** 157 Maria Cristina Bravi, Sabrina Anticoli
- 3.3 **Hyperviscosity Syndrome** 162 Francesca Romana Pezzella, Kateryna Antonenko, Larysa Sokolova
- 3.4 Disseminated Intravascular Coagulation and Moschkowitz Syndrome 168 Kateryna Antonenko, Valeria Caso, Andrea Blass, Andrea Fiacca
- 3.5 Immunoglobulin A Vasculitis (Henoch Schönlein Purpura) 174 Sarah M. Heldner, Barbara Goeggel Simonetti, Mirjam R. Heldner
- 3.6 Stroke Associated With Cancer 179Christine Kremer, Olof Gråhamn

4 Drug-Related Stroke

- 4.1 **Medication-Related Stroke** 185 Francesca Romana Pezzella, Sabrina Anticoli, Antonella Urso
- 4.2 **Illicit-Drug-Related Stroke** 190 Francesca Romana Pezzella, Marilena Mangiardi

5 Hereditary and Genetic Causes of Stroke

5.1 Genetic Collagen Disorders 199
 5.1.a Ehlers-Danlos
 Syndrome 199
 Pietro Caliandro, Giuseppe Reale, Aurelia Zauli



Contents

vii

- 5.1.b **Marfan Syndrome** 206 Turgay Demir, Filiz Koç
- 5.1.c FibromuscularDysplasia 212Otgonbayar Luvsannorov,Baigali Gongor
- 5.1.d NeurofibromatosisType 1 220Zuhal Yapici, Çağla Turan,Oğuzhan Obuz
- 5.1.e Hereditary Hemorrhagic
 Telangiectasia 228
 Paola Santalucia, Mariangela
 Piano
- 5.2 Genetic Small-Vessel Diseases 234
 - 5.2.a Cerebral Autosomal
 Dominant (Recessive)
 Arteriopathy with
 Subcortical Infarcts and
 Leukoencephalopathy:
 CADASIL and
 CARASIL 234
 Yasemin Akıncı, Adnan
 I. Qureshi
 - 5.2.b Retinal Vasculopathy with Cerebral Leukoencephalopathy and Systemic Manifestations (RVCL-S) 240 Janika Kõrv
- 5.3 Genetic Metabolic Diseases 246
 - 5.3.a Fabry Disease 246 Natan M. Bornstein, Yasemin Akıncı, Derya Uludüz
 - 5.3.b Mitochondrial
 Diseases 253
 Füsun Ferda Erdoğan, Duygu
 Kurt Gök, Halil Dönmez,
 İzzet Ökçesiz
 - 5.3.c Menkes Disease 262 Linda Azevedo Kauppila, Mariana Fonseca, Ana Catarina Fonseca

- 5.3.d **Tangier Disease** 267 Fatih Süheyl Ezgü
- 5.3.e Organic Acid
 Disorders 271
 Cristina Tiu, Vlad Eugen Tiu,
 Elena Oana Terecoasă

6 Rare Causes of Cardioembolism

- 6.1 Paradoxical Embolism: Patent Foramen Ovale 281 Hrvoje Budinčević, Petra Črnac Žuna, Edvard Galić, Vida Demarin
- 6.2 Infective Endocarditis 287Filipa Dourado Sotero, Diana Aguiar de Sousa

7 Vasospastic Conditions and Other Vasculopathies

- 7.1 Reversible Cerebral

 Vasoconstriction Syndrome
 Dejana R. Jovanović, Predrag
 Stanarčević
- 7.2 Eclampsia and Strokes during Pregnancy and Postpartum 299 Dejana R. Jovanović
- 7.3 Migraines and Migraine-Like Conditions 305Yagmur Turkoglu Comert, Peter J. Goadsby

8 Other Non-inflammatory Vasculopathies

- 8.1 **Moyamoya Disease** 309 Bojana Žvan, Marjan Zaletel
- 8.2 **Cerebral Amyloid Angiopathy** 314
 Matija Zupan



viii Contents

- 8.3 **Dolichoectasia and Fusiform Aneurysms** 321

 Jernej Avsenik, Bojana Žvan
- 8.4 **Carotid Artery Dissection** 326 Füsun Mayda Domaç, Mustafa Ülker

9 Venous Occlusive Conditions

9.1 Cerebral Venous SinusThrombosis 331Taşkın Duman, Derya Uludüz

10 Bone Disorders and Stroke

- 10.1 Bone Disorders 336Milija Mijajlovic, Vuk Aleksic, NatasaStojanovski, Natan M. Bornstein
- 10.2 Eagle Syndrome 343Anita Arsovska, Vida Demarin,Patrik Michel

Index 349



Contributors

Editors

Derya Uludüz

Department of Neurology, Division of Vascular Neurology, Istanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Istanbul, Turkey

Anita Arsovska

University Clinic of Neurology, Faculty of Medicine, University of Ss. Cyril and Methodius, Skopje, North Macedonia

Authors

İbrahim Acır

University of Health Sciences Bakırköy, Dr. Sadi Konuk Research and Training Hospital, Neurology Clinics, Istanbul, Turkey

Thierry Adoukonou

Department of Neurology, University of Parakou, Parakou, Benin; Clinic of Neurology, University Teaching Hospital of Parakou, Benin

Amra Adrovic

Istanbul University-Cerrahpaşa, School of Medicine, Department of Pediatric Rheumatology, Istanbul, Turkey

Yasemin Akıncı

Zeenat Qureshi Stroke Institute and Department of Neurology, University of Missouri, Columbia, MO, USA

Vuk Aleksic

Department of Neurosurgery, Clinical Hospital Center Zemun, Belgrade, Serbia

Ayten Aliyeva

Istanbul University-Cerrahpaşa, School of Medicine, Department of Pediatric Rheumatology, Istanbul, Turkey

Sabrina Anticoli

Stroke Unit, Head Neck and Neuroscience Department, S. Camillo Forlanini Hospital Rome, Italy

Kateryna Antonenko

National Bogomolets Medical University, Neurology Department, Kyiv, Ukraine

Merhmet Arhan

Gazi University School of Medicine, Department of Gastroenterology, Ankara, Turkey

Jernej Avsenik

Clinical Institute of Radiology, University Medical Centre Ljubljana, Slovenia

Kenan Barut

Istanbul University-Cerrahpaşa, School of Medicine, Department of Pediatric Rheumatology, Istanbul, Turkey

Andrea Blass

Santa Maria della Misericordia Hospital, University of Perugia, Department of Internal and Vascular Medicine, Perugia, Italy

Nikola Boban

Center for Radiology, Clinical center of Vojvodina, Novi Sad, Serbia

iх



x

List of Contributors

Natan M. Bornstein

Brain Division, ShaareZedek Medical Center, Jerusalem, Israel

Maria Cristina Bravi

Department of Neuroscience, San Camillo Forlanini Hospital Rome, Italy

Hrvoje Budinčević

Sveti Duh University Hospital, Department of Neurology, Stroke and Intensive Care Unit, Zagreb, Croatia; Faculty of Medicine, J. J. Strossmayer University of Osijek, Osijek, Croatia.

Pietro Caliandro

Neurology Unit, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy

Cheryl Carcel

The George Institute for Global Health, University of New South Wales, Sydney, New South Wales, Australia

Valeria Caso

Santa Maria della Misericordia Hospital, University of Perugia, Stroke Unit, Perugia, Italy

Fausto Ciccacci

UniCamillus, Saint Camillus International University of Health Sciences, Rome, Italy

Yagmur Turkoglu Comert

NIHR-Wellcome Trust King's Clinical Research Facility, King's College Hospital, SlaM Biomedical Research Centre; Institute of Psychiatry, Psychology and Neuroscience, King's College London, UK

Vida Demarin

International Institute of Brain Health, Zagreb, Croatia

Turgay Demir

Cukurova University School of Medicine, Adana, Turkey

Füsun Mayda Domaç

University of Health Sciences, Erenköy Psychiatry and Neurological Diseases Training and Research Hospital, Neurology Department, Istanbul, Turkey

Halil Dönmez

Erciyes University, Faculty of Medicine, Department of Neurology, Kayseri, Turkey

Taşkın Duman

Neurology Department, Hatay Mustafa Kemal University, Hatay, Turkey

Hacı Ali Erdoğan

University of Health Sciences Bakırköy, Dr. SadiKonuk Research and Training Hospital, Neurology Clinics, Istanbul, Turkey

Füsun Ferda Erdoğan

Erciyes University, Faculty of Medicine, Department of Neurology, Kayseri, Turkey

Fatih Süheyl Ezgü

Gazi University Faculty of Medicine, Departments of Pediatric Metabolic and Genetic Diseases, Ankara, Turkey

Phillip Ferdinand

Stroke Medicine, Neurosciences Directorate, University Hospital North Midlands, Stoke-on-Trent, UK



List of Contributors

χi

Andrea Fiacca

Santa Maria della Misericordia Hospital, University of Perugia, Neuroradiology Department, Perugia, Italy

Ana Catarina Fonseca

Stroke Unit, Hospital Santa Maria, Centro Hospitalar Universitário, Lisboa Norte, Portugal; Faculdade de Medicina da Universidade de Lisboa, Lisboa, Portugal; Instituto de Medicina Molecular, Faculdade de Medicina da Universidade de Lisboa, Lisboa, Portugal

Mariana Fonseca

Department of Paediatrics, North Middlesex University Hospital, London, United Kingdom

Jacopo C. De Francesco

Department of Neurology, ASST San Gerardo Hospital, University of Milano-Bicocca, Via Pergolesi, Monza, MB, Italy

Peter J. Goadsby

NIHR-Wellcome Trust King's Clinical Research Facility, King's College Hospital, SlaM Biomedical Research Centre; Institute of Psychiatry, Psychology and Neuroscience, King's College London UK; Department of Neurology, University of California, Los Angeles, CA, USA

Fatih Haslak

Istanbul University-Cerrahpaşa, School of Medicine, Department of Pediatric Rheumatology, Istanbul, Turkey

Mirjam R. Heldner

Department of Neurology, Inselspital, University Hospital and University of Bern, Bern, Switzerland

Sarah M. Heldner

Department of Pediatrics, Inselspital, University Hospital and University of Bern, Bern, Switzerland

Edvard Galić

Sveti Duh University Hospital, Department of Internal Medicine, Zagreb, Croatia

Vladimir Galic

Department of Neurology, Clinical center of Vojvodina, and Faculty of Medicine, University of Novi Sad, Serbia

Luana Gentile

Emergency Department Stroke Unit, Policlinico Umberto I Hospital – La Sapienza University, Rome, Italy

Baigali Gongor

Shastin Clinical Hospital, Neurology Center, Mongolia

Duygu Kurt Gök

Erciyes University, Faculty of Medicine, Department of Neurology, Kayseri, Turkey

Olof Gråhamn

Neurology Department, Skåne University Hospital, Department of Clinical Sciences, Lund University

Alfano Guido

Radiology Department of M.G. Vannini Hospital, Rome, Italy

Aslı Aksoy Gündoğdu

Neurology Department, Tekirdağ Namık Kemal University School of Medicine, Tekirdağ, Turkey



xii

List of Contributors

Dejana R. Jovanović

Neurology Clinic, Clinical Centre of Serbia; Medical Faculty, University of Belgrade, Serbia

Gökhan Kabaçam

Güven Hospital, Department of Gastroenterology, Ankara, Turkey

Ozgur Kasapcopur

Istanbul University-Cerrahpaşa, School of Medicine, Department of Pediatric Rheumatology, Istanbul, Turkey

Linda Azevedo Kauppila

Stroke Unit, Hospital Santa Maria, Centro Hospitalar Universitário Lisboa Norte, Portugal

Osman Kızılkılıç

Department of Radiology, Division of Neuroradiology, Istanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Istanbul, Turkey

Filiz Koç

Cukurova University School of Medicine, Adana, Turkey

Bora Korkmazer

Department of Radiology, Division of Neuroradiology, Istanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Istanbul, Turkey

Dilcan Kotan

Neurology Department, Sakarya University Medical Faculty, Sakarya, Turkey

Janika Kõrv

Department of Neurology and Neurosurgery, University of Tartu, Estonia

Cristine Kremer

Neurology Department, Skåne University Hospital, Department of Clinical Sciences, Lund University

Asma Akbar Ladak

Neurology Department, Aga Khan University, Karachi, Pakistan

Massimo Leone

Department of Neurology, Fondazione IRCCS Istituto Neurologico Besta Milano; Community of S. Egidio, DREAM Program, Rome, Italy

Otgonbayar Luvsannorov

Mongolian National University of Medical Sciences, School of Medicine, Neurology Department, Mongolia

Marilena Mangiardi

Stroke Unit Department, San Camillo-Forlanini Hospital, Rome, Italy

Maria Cristina Marazzi

LUMSA University, Rome, Italy

Marina Ikić Matijašević

Sveti Duh University Hospital, Department of Internal Medicine, Zagreb, Croatia

Patrik Michel

Centre Cerebrovasculaire, Service de Neurologie, Department des Neurosciences Cliniques, Lausanne, Switzerland

Milija Mijajlovic

Neurology Clinic, Clinical Center of Serbia, Faculty of Medicine University of Belgrade, Serbia

Vinícius Viana Abreu Montanaro

Department of Neurology, Sarah Network of Rehabilitation, Brasília, Brazil



List of Contributors

xiii

Francesco Motolese

Neurology, Neurophysiology and Neurobiology Unit, Department of Medicine, Università Campus Bio-Medico, Rome, Italy

Oğuzhan Obuz

Emar-Med Imaging Center, Istanbul, Turkey

Vedran Ostojić

Sveti Duh University Hospital, Department of Internal Medicine. Zagreb, Croatia

İzzet Ökçesiz

Erciyes University, Faculty of Medicine, Department of Neurology, Kayseri, Turkey

Rosario Pascarella

Neuroradiology Unit, Department od Diagnostic Imaging, Azienda Unità Sanitaria Locale-IRCCS di Reggio Emilia, Reggio Emilia (RE), Italy

Mariangela Piano

Neuroradiology Unit, Niguarda CàGranda Hospital, Milan, Italy

Adnan I. Qureshi

Zeenat Qureshi Stroke Institute and Department of Neurology, University of Missouri, Columbia, MO, USA

Francesca Romana Pezzella

Stroke Unit Emergency Department, S. Camillo-Forlanini Hospital, Rome, Italy

Fabrizio Piazza

Pharmaceutical Biotechnologist, PhD, Professor of Translational Research, Laboratory of CAA and AD Translational Research and Biomarkers, School of Medicine and Surgery, University of Monza, Italy

Klearchos Psychogios

Metropolitan Hospital Stroke Unit, Athens, Greece

Eytan Raz

Neurointerventional Radiology, NYU Langone Hospital, USA

Giuseppe Reale

Department of Geriatrics, Neurosciences and Orthopedics, Università Cattolica del Sacro Cuore, Rome, Italy

Christine Roffe

Stroke Medicine, Neurosciences Directorate, University Hospital North Midlands, Stoke-on-Trent, UK; Faculty of Medicine and Health Sciences, Keele University, Stoke-on-Trent, UK

Sabahattin Saip

Department of Neurology, Division of Vascular Neurology, Istanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Istanbul, Turkey

Sezgin Sahin

Istanbul University-Cerrahpaşa, School of Medicine, Department of Pediatric Rheumatology, Istanbul, Turkey

Paola Santalucia

Neurology and Stroke Unit, San Giuseppe Hospital-Multimedica Group, Milan, Italy

Marija Sedlić

Sveti Duh University Hospital, Department of Neurology. Stroke and Intensive Care Unit, Zagreb, Croatia

Barbara Goeggel Simonetti

Neuropediatrics San Giovanni Hospital Bellinzona, Bellinzona, Switzerland;



xiv

List of Contributors

Department of Neurology, Inselspital, University Hospital and University of Bern, Bern, Switzerland

Aksel Siva

Department of Neurology, Division of Vascular Neurology, Istanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Istanbul, Turkey

Larysa Sokolova

National Bogomolets Medical University, Neurology Department, Kyiv, Ukraine

Filipa Dourado Sotero

Neurology, Department of Neurosciences and Mental Health, Hospital de Santa Maria, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal

Diana Aguiar de Sousa

Neurology, Department of Neurosciences and Mental Health, Hospital de Santa Maria, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal; Faculdade de Medicina, Universidade de Lisboa, Lisbon, Portugal

Predrag Stanarčević

Neurology Clinic, Clinical Centre of Serbia; Medical Faculty, University of Belgrade, Serbia

Natasa Stojanovski

Faculty of Medicine, University of Belgrade, Serbia

Seda Tadesse

Adama Hospital Medical College, Adama, Ethiopia

Elena Oana Terecoasă

Carol Davila University of Medicine and Pharmacy, Bucharest

Darlington Thole

DREAM Program, Balaka, Malawi

Cristina Tiu

Carol Davila University of Medicine and Pharmacy, Bucharest

Vlad Eugen Tiu

Carol Davila University of Medicine and Pharmacy, Bucharest

Danilo Toni

Emergency Department Stroke Unit, Policlinico Umberto I Hospital, La Sapienza University, Rome, Italy

Murat Törüner

Ankara University School of Medicine, Department of Gastroenterology, Ankara, Turkey

Alexander Tsiskaridze

Neurological Service, Pineo Medical Ecosystem, Tbilisi, Georgia; Department of Neurology, Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia

Nikoloz Tsiskaridze

Neurological Service, Pineo Medical Ecosystem, Tbilisi, Georgia

Çağla Turan

Istanbul University, Istanbul Faculty of Medicine, Department of Neurology, Istanbul, Turkey

Bengi Gül Türk

Department of Neurology, Division of Vascular Neurology, Istanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Istanbul, Turkey



List of Contributors

χv

Antonella Urso

Department of Health, Lazio Regional Healthcare Government

Uğur Uygunoğlu

Department of Neurology, Division of Vascular Neurology, Istanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Istanbul, Turkey

Mustafa Ülker

University of Health Sciences, Erenköy Psychiatry and Neurological Diseases Training and Research Hospital, Neurology Department, İstanbul, Turkey

Mohammad Wasay

Neurology Department, Aga Khan University, Karachi, Pakistan

Zuhal Yapici

Istanbul University, Istanbul Faculty of Medicine, Department of Neurology, Istanbul, Turkey

Vildan Yayla

University of Health Sciences Bakırköy, Dr. Sadi Konuk Research and Training Hospital, Neurology Clinics, Istanbul, Turkey

Mehmet Yildiz

Istanbul University-Cerrahpaşa, School of Medicine, Department of Pediatric Rheumatology, Istanbul, Turkey

Marjan Zaletel

University Medical Centre Ljubljana, Neurology Clinic, Clinical Department of Vascular Neurology and Intensive Therapy, Ljubljana, Slovenia

Aurelia Zauli

Department of Geriatrics, Neurosciences and Orthopedics, Università Cattolica del Sacro Cuore, Rome, Italy

Marialuisa Zedde

Neurology Unit, Stroke Unit, Department of Neuromotor Physiology and Rehabilitation, Azienda Unità Sanitaria Locale-IRCCS di Reggio Emilia, Reggio Emilia, Italy

Yared Z. Zewde

Department of Neurology, College of Health Science, Addis Ababa University, Addis Ababa, Ethiopia

Zeljko Zivanovic

Department of Neurology, Clinical Center of Vojvodina; Faculty of Medicine, University of Novi Sad, Serbia

Petra Črnac Žuna

Sveti Duh University Hospital, Department of Neurology, Stroke and Intensive Care Unit, Zagreb, Croatia

Matija Zupan

University Medical Centre Ljubljana, Department of Vascular Neurology, Ljubljana, Slovenia

Bojana Žvan

University Medical Centre Ljubljana, Neurology Clinic, Clinical Department of Vascular Neurology and Intensive Therapy, Ljubljana, Slovenia





Preface

Stroke is the second leading cause of death and the major cause of long-term disability, directly impacting the quality of life, worldwide. Owing to the aging population, there has been a recent spike in the number of strokes, in both developed and developing countries. Unfortunately, strokes with rarer and unknown causes receive little or no attention due to the heterogeneity of disorders and a poor understanding of the clinical features. There are considerable variations in the etiology of this rare subcategory of stroke, requiring heightened clinical awareness for recognition, evaluation and treatment.

Many rare causes of stroke, such as infections and hypercoagulability, need specific treatments rather than standard therapies to prevent recurrences in patients. Early diagnosis is vital to understand the etiology of an acute cerebrovascular event, which could constitute the first manifestation of a systemic disease requiring different treatment.

Even though some rare causes are difficult to treat, a detailed evaluation and accurate diagnosis will allow better risk assessment and family counseling, for the future generations of doctors and patients, respectively.

We were motivated to create this book because we realized that there are limited recourses and a lack of available literature on rare causes of stroke. The majority of available books address the theoretical information behind stroke, rather than a more practical clinical approach.

We would like to emphasize the need for higher suspicion for a detailed etiological diagnosis of rare causes, to increase awareness and to provide practical clues with case presentations to improve knowledge and patient outcomes.

We have also realized the importance of early recognition and diagnosis of rare causes of stroke, and we wished to provide a serviceable guide for colleagues that would help them to recognize and treat stroke due to rare causes. This book looks at the topic in a new and pragmatic way, provides a workable model for management of strokes due to rare causes and covers all important aspects of rare causes of stroke. Also, it will allow readers to understand the subject in a new light; the information is topical, engaging and relevant for today's readers; and it is a useful tool for the diagnosis and treatment of rare causes of stroke.

This book provides a detailed practical, clinical and contemporary overview of rare causes of stroke. Through case reports, renowned authors describe concise and comprehensive approaches to the diagnosis and treatment of rare causes of stroke, from isolated vasculitis of the central nervous system, primary systemic vasculitis, vasculitis secondary to systemic disease, infectious and postinfectious vasculitis, hypercoagulable states, hereditary and genetic factors, rare causes of cardioembolism, vasospastic conditions and other vasculopathies, other non-inflammatory vasculopathies and venous occlusive conditions to bone disorders and Eagle's syndrome. This book is a user-friendly, useful and concise guide that will help the clinician to establish an accurate diagnosis through detailed evaluation of such patients. It represents a comprehensive and up-to-date clinical approach for the diagnosis and treatment of rare causes of stroke that will lead to increased awareness of this subject.

We would like to express our deepest appreciation and sincere gratitude to our families for their love and unwavering support that has helped us in finalizing this book.

xvii

